Management of Aquatic Ecosystems through Community Husbandry (MACH) Program

Report of Mid-term Review

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Mid-term Review of
Management of Aquatic Ecosystems through Community Husbandry (MACH) Program

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List of Acronyms and Glossary of Terms

BCAS	Bangladesh Center for Advanced Studies
beel	Deeper area / depression in a floodplain which, if inundated during rainy season, becomes a large sheet of water.
boro	Rice planted in winter and harvested during April to June
BWDB	Bangladesh Water Development Board
CARITAS	CARITAS Bangladesh
CBFM	Community-based Fisheries Management
chharra	Stream
CNRS	Center for Natural Resource Studies
CoP	Chief of Party
doho	Deeper part in Beel / Depression
DoF	Department of Fisheries
DFID	Department for International Development
EGIS	Environmental and Geographical Information System
FTF	Farmer to Farmer Program
GIS	Geographic Information System
GoB	Government of Bangladesh
HH	Hail Haor
ICLARM	International Center for Living Aquatic Resources Management
IUCN	International Union for Conservation of Nature
jalmohal	Section of River /A semi-closed or closed water body or group of water bodies owned by the Government and are usually leased out for Fishing
khal	Canals
khas	Government owned land
KM	Kongshaw Malijhee River Basin
kum	Deeper part in the river/ scour holes
LCG	Local Consultative Group
LCS	Labor Contracting Society
LGED	Local Government Engineering Department
LGC	Local Government Committee
MACH	Management of Aquatic Ecosystems through Community Husbandry
MoFL	Ministry of Fisheries and Livestock
NGO	Non-Government Organization
para	part of a village
parishad	Council
RPT	Result Package Team (Project Monitoring and Review Unit of MACH)
thana	Smallest administrative unit in Bangladesh, Sub-Districts
TB	Turag Bongshi River Basin
UFO	Upazilla Fisheries Officer
UNO	Upazilla Nirbahi Officer (Sub – District Executive Officer)
upazila	Sub-district
UP	Union Parishad (local government unit)
WINROCK	Winrock International Institute for Agriculture Development
USAID	United States Agency for International Development

Executive Summary

Background

1. The Management of Aquatic Ecosystems Through Community Husbandry (MACH) Program was formulated to develop new approaches to floodplain and wetlands resource conservation and management. The major purpose of the project is to demonstrate to communities, local government and policy-makers the viability of a community approach to natural resource management and habitat conservation over an entire wetland ecosystem.

2. The program started in September, 1998 and following an inception period, field programs were initiated at two field sites in June of 1999 and a third site in July 2000. The overall purpose of the Mid-term Review is to review the performance of MACH and assess future directions for MACH, including possible extension and expansion of its coverage.

National Context

3. The MACH program supports the government's environmental and fisheries objectives including preservation, conservation, protection and development of natural resources, and increasing fish production.

Strategic Objectives

4. The MACH program comes under USAID's Strategic Objective 6 (SO6) "Improved Management of Open Water and Tropical Forest Resources". The main indicators for SO6 are the area of floodplain where sustainable management is being implemented and increase production of floodplain fish resources. MACH has exceeded the target area of floodplain under improved management and is working on making their approach sustainable. MACH interventions are already having a measurable impact on increasing floodplain fish production. The third indicator of increased biodiversity is too early to assess. MACH has also been successful in meeting or exceeding the planned targets for the indicators of Intermediate Results.

Activities and Achievements

5. MACH is implementing a wide range of innovative activities to achieve its objectives, including:

Wetland Resource Management: MACH has made good progress in rehabilitation of wetlands and related watersheds, and in developing local institutions to manage these areas

Community Development and Supplementary Income Generating Activities: MACH is progressing well with raising the environmental awareness of fishers and other resource users and with the program for fisher households to form groups to access credit and skill development services. Group members are able to diversify their income generating activities and reduce their dependency on fishing.

Monitoring. MACH has collected comprehensive data on many aspects of the three program sites, and used the data to increase the program's understanding of the requirements for improving wetland management, and evaluate the impact of program activities.

Special Programs: MACH has undertaken a range of special programs to supplement MACH's regular activities in response to local needs identified during the program's field activities. The Special programs have included studies on pollution, preparing watershed improvement plans and improving traditional practices for pineapple and lemon production.

Policy Dialogue: MACH is involved in the essential task of policy dialogue with the government and other stakeholders in the management of wetlands, and is actively involved with the Wetlands Network and the Local Consultative Group (LCG).

Summary of Findings of the Mid-term Review

6. The concept of MACH is still valid. MACH is implementing a broad range of activities many of which are innovative and complex. Program activities are already having positive impacts on ecosystems at the program sites including fish production. Program activities are also resulting in increased incomes for beneficiary group members. MACH is on course to meet the targets set for the Strategic Objective and the Intermediate Results, although more time will be required to ensure sustainability of the MACH approach. MACH has developed considerable understanding of the requirements of improving the productivity and management of wetlands, and has responded to unforeseen local requirements by developing solutions acceptable to stakeholders. The present geographical coverage provides sufficient variety of ecosystems to fully test the MACH approach. The main issue that needs to be addressed is the sustainability of the MACH approach particularly with respect to local institution building and the time required to consolidate the environmental changes implemented by communities with program support.

Recommendations

7. The main recommendations of the Mission are:

Wetland Resource Management

- *Prepare best practices of community based planning*
- *Integrate MACH planning systems into union and upazila planning systems*
- *Additional staff skilled in Institutional and Social Development appointed to develop RMOs*
- *Prepare detailed plan for development of local institutions*
- *Increase intensity of awareness program*
- *RMOs to develop plans*
- *Prepare case studies of RMOs*
- *Consider sub-contracting implementation of schemes*
- *Use Labor Contracting Societies to construct schemes*
- *MACH should be given more time to fully develop the RMOs*

Community Development and Supplemental Income Generating Activities

- *Develop strategy and plans for sustainability of groups*
- *MACH supports beneficiary groups for about 5 years*
- *Provision of group development and adult literacy training increased*
- *Ensure separation of group's savings and credit activities from RMOs*
- *Focus awareness training on resources used by beneficiary groups*
- *Increase group training and skill development activities to beneficiary group members*
- *Develop integrated credit plans*
- *Assist groups to prepare activity plans for their IGAs*

- *Re-assess coverage of beneficiary groups*

Monitoring
- *Expedite processing and distribution of socio-economic and other data*
- *Introduce standard activity monitoring system*

Policy Dialogue
- *Support Wetlands Network*
- *Develop communications strategy*

Geographical Coverage
- *Continue MACH activities at three sites.*

Timeframe
- *Extend MACH for three years beyond September 2003.*

1. INTRODUCTION

1.1 Background

The floodplains of Bangladesh are one of the world's most important wetlands and home to hundreds of species of unique plants, fish, birds and other wildlife. The wetlands provide the habitat for over 260 fish species and thousands of migrating birds, and are an important source of income and nutrition for millions of households in rural Bangladesh. As many 80% of rural households catch fish for food or to sell, and about 60% of animal protein consumption comes from fish (MACH 2000f). In addition, poor and marginal households catch many small fish that are not included in official statistics or policies.

The wetlands comprise of about 4 million hectares of open water during the monsoon season (Thompson et al 2001). In the dry season, the wetlands system reduces in extent to form of system of rivers, *beels* (permanent and seasonal lakes and wetlands), and *baors* (oxbow lakes). Conservation of the quality and quantity of wetlands during the dry season is critical for survival of the fish stocks that provide brood fish for spawning in the following wet season.

Unfortunately, the wetlands of Bangladesh are in decline due to over fishing and habitat loss to meet the demands of the growing population. The decline in wetlands has resulted in more than 40% of species of all freshwater fish, for which information is available, are in danger of extinction. Since 1985, natural carp spawn production has declined by 75% and major carp and large catfish have declined by 50%.

The Management of Aquatic Ecosystems Through Community Husbandry (MACH) Program was formulated to develop new approaches to floodplain and wetlands resource conservation and management. The goal of MACH is to ensure the sustainable productivity of all wetland resources – water, fish, plants and wildlife– over an *entire* wetland ecosystem (beels, seasonal wetlands, rivers/streams), not just a single water body. Inherent in this goal are the conservation and sustainable management of wetlands and their natural resources and the element of sustainable food security.

The MACH approach is to raise awareness of the need for change and to *demonstrate* in the field the benefits those changes can bring by considering all factors affecting the communities and their wetland resource. MACH advocates a multi-disciplinary, multi-sectoral and participatory process of planning, implementation and monitoring for sustainable wetland resource management. Recognizing that a reduction in fishing is likely to be a critical part of reviving the wetland fisheries, MACH has included supplemental income-generating activities to provide alternative income generating activities for existing and new fishers and others directly dependent on fishing. MACH is a “process” type of program supporting communities and local government in the planning and sustainable use of natural aquatic resources.

MACH is a program of the Government of Bangladesh (GoB) sponsored by USAID. An agreement to implement the project was signed in May 1998. Winrock International (Winrock International Institute for Agriculture Development) in partnership with the Bangladesh Centre for Advanced Studies (BCAS), CARITAS Bangladesh and the Centre for Natural Resource Studies (CNRS) were selected to implement the project. The program started in September, 1998 and following an inception period, field programs were initiated in Hail Haor in Maulovibazar District and the Lower Turag-Bongshi River Basin in Kaliakor Upazila in Gazipur District and

part of Tangail District in June of 1999. A third site at the Upper Kongshaw-Malijhee River Basin in Sherpur District was started in July 2000.

The Mid-term Programmatic Review is taking place at the end of the 3rd year of the project, as originally planned.

1.2 Purpose of the Mid Term Review

The Mid-term Review will focus on whether MACH is progressing toward the achievement of its goals and objectives. In particular, the Review will determine whether MACH has effectively: (a) developed innovative approaches to community-based aquatic resource management; (b) identified and stimulated alternative income generation opportunities for fisher folk; (c) facilitated appropriate technology transfer of community-based natural resource management interventions and approaches; (d) provided awareness building activities in project areas; (e) enhanced local government capacity to support community resource management initiatives; (f) led to adoption of best management practices (BMP) and is on track to achieving major targets of the program. The Mid-term Review is to comment on whether the approaches chosen at the beginning of the Project are still the most appropriate for achieving improved management of the aquatic floodplain resources, and what improvements are required to make the program even more effective in the years to come. The Review will also analyze the ability of the Project to successfully respond to its new performance indicators.

The overall purpose of the review is therefore to:

(a) Review the performance of MACH to date vis-à-vis the cooperative agreement; and

(b) Assess future directions for MACH, including possible extension and expansion of its coverage.

The complete Statement of Work for the Mid-term Review Mission is given in Appendix 1.

1.3 Staffing and Schedule of the Mission

The Mid-term Review Mission comprised of the 3 independent consultants and a representative from the government:

Dr. Ian Tod	Team Leader/Strategic Planning Specialist
Mr. Alamgir Chowdhury	Development/Communication Specialist
Mr. Md. Zahirul Islam	Environment and Fisheries Specialist (Part time)
Mr. A.S. Mahmood	Senior Assistant Secretary Ministry of Fisheries and Livestock

The Mid-term Review Mission visited the three program sites and held discussions with Resources Management Organisations, beneficiary group members, other wetland and watershed resource users, union parishad chairmen and members, upazila government officials and program staff. In Dhaka, the Mission reviewed documents, and discussed MACH with government officials, program staff, staff of the program partners, USAID staff and staff of other donors and projects working with wetlands and fisheries. The draft report was prepared and discussed with

program staff, USAID and the government before completion of the final report. The schedule for the Mid-term Review is given in Appendix 2, along with a list of the persons met during the Review.

The Mid-term Review Mission wishes to express its appreciation for the cooperation received from the many stakeholders including representatives of the Resource Management Organisations, Beneficiary Groups and other wetland resource users, government officials and program staff interviewed at the program sites and in Dhaka.

2. NATIONAL CONTEXT

2.1 National Level

In the Government's Fifth Five Year Plan (1997-2002), the environmental and fisheries objectives include among the control of pollution and degradation related to soil, water and air; promotion of environment friendly activities in the development process; preservation, protection, and development of the natural resource base; strengthening the capabilities of public and private sectors to manage environmental concerns as a basic requisite for sustainable development; creating and achieving fish production of 20.75 metric tones from 11.7 metric tones in 1995.

In the subsequent National Fisheries Policy (1998), some of these objectives were re-emphasized and expanded including the establishment of production-based management system in place of revenue oriented leasing system, ensuring fishers right of fishing access and limiting fishing efforts to maximize sustainable yield; establishing fish sanctuaries in suitable places to increase fish production and to conserve biodiversity; giving responsibility to local fishers organization and local government for operation and maintenance (management); undertake mitigation measures for embanked and irrigation areas and to stop pollution due to industrial and municipal wastes and pesticide usage. There is also provision that canals, beels and other open waters cannot be dried using artificial methods; haors, baors, beels should be excavated and areas of these water bodies cannot be reduced so that their use for fish rearing is ensured; fishers be given priority for leasing out khas (government owned) water bodies; conservation measures be taken to conserve and increase the population of the endangered species.

The Ministry of Fisheries has traditionally focused on increasing fish production by improving aquaculture in ponds and other closed water bodies, but more recently has also considered improving production of open water fisheries. The Ministry's priority is reflected in the activities of the Department of Fisheries where only 3 out of the 17 investment projects under the Annual Development Plan involve improvement to open water fisheries (DoF 1999).

2.2 Related Projects

There are three other projects that are working on improving wetland resources and open water fisheries. The Community Based Fisheries Management (CBFM) has the objectives of improving processes and policies for inland fisheries based on community based fisheries management. CBFM started its second Phase in September 2001. The Fourth Fisheries Project has the objective of establishing ecologically sound and community based sustainable fisheries management in inland waters. The Project started in 2000. The Jalmohal Project has the objective of increasing fish production and improving socio-economic conditions for fishers. A comparison of the features of these three projects with MACH is given in Appendix 4.

3. THE MACH PROJECT

3.1 Goals and Objectives

The goal of MACH is the promotion of ecologically sound management of floodplain resources (fisheries and other wetland products) for the sustainable supply of food to the poor of Bangladesh.

The objectives of MACH are:

- To raise awareness (of communities and local government) about the importance of natural flood plain resources to secure food and income security for the people of Bangladesh
- To maintain and recover the selected floodplain ecosystems and associated fisheries.
- To identify activities to generate alternative income that will result in a reduction of pressure from fishing and agriculture in the floodplain fisheries.

3.2 Strategic Framework and Targets

The MACH program comes under USAID's Strategic Objective 6 (SO6) "Improved Management of Open Water and Tropical Forest Resources". SO6 is an outgrowth of SO2 "Food Security for the Poor Improved". MACH is the only activity under SO6, although a new program in tropical conservation and management is expected to begin in 2002. Both programs focus on improved management of natural resources through community and local government participation.

The indicators for SO6 are shown in Table 3.1, along with the planned targets and MACH's achievement for each indicator until September 2001. The main indicators for SO6 are the area of floodplain where sustainable management is being implemented and increased production of floodplain fish resources. The third indicator of increased biodiversity is too early to assess. MACH has exceeded the target area of floodplain under improved management and is working on making their approach sustainable. MACH interventions are already having a measurable impact on increasing floodplain fish production. MACH has been successful in meeting or exceeding the planned targets for each indicator, although further support is required to make the management practices sustainable.

The indicators of Intermediate Results are shown in Table 3.2 along with the planned targets and MACH's achievements for each indicator until September 2001. MACH is supporting 16 Resource Management Organisations (RMO) to manage wetlands. The RMOs have established 59 sanctuaries to improve fish resource management. MACH has undertaken 484 public awareness activities that have been attended by 62,180 villagers. MACH has supported supplemental income generation by forming 177 groups and the income of the members of these groups has increased 31%. 180,060 villagers have benefited indirectly from MACH demonstration activities. The project has been successful in meeting or exceeding the planned targets for each indicator. The annual progress of MACH towards meeting the indicators for the Strategic Objective and Intermediate Results are shown in Appendix 4.

Table 3.1 Indicators of Strategic Objective 6 (SO6)

Reference	*Indicator(1)*	*Year*	*Planned*	*Actual Sep 2001*
6.1	Area of Floodplain where sustainable management is being implemented (ha)	*2001*	15,000	15,700
6.2	Increase in production of floodplains Fish resources (kg/ha of wetland)			
	Site 1: Hail Haor	*2001*	174	191
	Site 2: Turag-Bangshi	*2001*	61	124
	Riparian trees (number of trees-all sites)	*2001*	100,000	72,277
6.3	Increase in biodiversity of floodplain resources (no. of species)	*2001*	0	
6.4	Area of tropical forest areas conserved and sustainable management being implemented	*Not applicable to MACH*		

Note: (1) Indicators are cumulative targets since the start of MACH

Table 3.2 Intermediate Results (IR) Indicators

Reference	***Indicator(2)***	***Year***	***Planned(1)***	***Actual Sep 2001***
IR 6.1	**Improved Floodplain Resource Management Practices**			
	IR 6.1.1 Management groups formed *Units of measure*: # of groups formed	2001	20	16
	IR 6.1.2 Improved floodplain resource management established *Unit of measure:* # fish sanctuaries established	*2001*	30	48
IR 6.2	**Increased Public Awareness**			
	IR 6.2.1 Community awareness of the need for renewable resource management *Unit of measure*: # of public awareness meetings	*2001*	30(200)	484
	IR 6.2.2 as IR 6.2.1 but *Unit of measure:* Number of Participants in meetings	*2001*	1,800 (30,000)	40,000
IR 6.3	**Generate Supplemental Income**			
	IR 6.3.1 Community groups involved in alternative income generating activities *Unit of measure*: Number of groups	*2001*	100(150)	159
	IR 6.3.2 Increased income of community beneficiary *Unit of Measure*: % increase in supplemental income	*2001*	30%	31%
	IR 6.3.3 Total number of indirect beneficiaries *Unit of Measure*: total number of indirect beneficiaries (cumulative)	*2001*	100,000	180,000

Note: (1) Figures in brackets show the revised targets
(2) Indicators are cumulative since the start of MACH

4. ACTIVITIES AND ACHIEVEMENTS

4.1 Range of Activities

To achieve the objectives of the program, MACH is implementing a wide range of innovative activities related to Wetland Resource Management, Community Development and Supplemental Income Generation, Monitoring, Policy Dialogue and Project Management. The targets and achievements of the main activities are shown in Table 4.1 and discussed in more detail below. The targets and measurable indicators stated in the MACH agreement (Winrock/USAID 1998) have been adjusted during the initial years of the program, with less emphasis now being given to the impact of program activities on poor households.

4.2 Wetlands Resource Management

Awareness raising. The purpose of awareness raising activities is to sensitise communities and government officials to the importance of the environment and the need for their participation in resource conservation, management and restoration. MACH started its awareness raising activities by initially holding meetings with UNO, union chairmen and other upazila government staff, and then holding larger meetings with all the union parishad members of the unions where program activities were likely to be implemented. These latter meetings were attended by district officials (District Commissioner, Assistant Commissioner (Revenue) and others). The purpose of these upazila and union meetings was to introduce the program and show that government supported the program. Subsequent awareness raising programs included awareness raising meetings at para and union level (16 programs with 7,217 participants)[1], introductory seminars and workshops at upazila and district levels (2 programs), awareness programs at schools, dramas, video presentations (5 programs with 850 people in the audiences), world environments day and wetlands day observances (26 programs), posters and other awareness material distribution.

Community based planning: Participatory Action Plan Development PAPD (formerly Participatory Community Planning PCP) workshops are used to work with the community to identify problems and develop potential solutions. Half-day workshops are held on 4 consecutive days. Participants are from 5 randomly-selected households in each of four occupational groups (fishers, farmers, landless and women), making 20 participants per village. The outcome of the PAPD workshops is lists of management and physical interventions. The management interventions include an outline of the Resource Management Organisation.

Formation of Resource Management Organisations. Following reconnaissance field visits, area exploration and rapid rural appraisals, the project identifies wetland management areas, around which a Resource Management Organisation (RMO) is organised. The RMO is elected by villagers living within the wetland management area. The RMO is responsible for the management of the wetland resource including deciding on appropriate management interventions identified during the PADP and implementing the physical interventions such as establishment of sanctuaries.

[1] Figures in bracket shows awareness raising activities carried out in 2001

Table 4.1 Summary of Main Activities, Targets and Achievements (1)

Activity	*Current Target to end of Program September 2003*	*Cumulative Achievement until September 2001*
1. Area of improved wetlands/floodplain resources management	See Table 3.1	
2. Increased production of floodplain resources	See Table 3.1	
3. Increase in diversity	See Table 3.1	
4. Floodplain wetland resource management organisation	See Table 3.2	
5. Establish Access (capacity building) of RMOs	30	16
6. Establishment of Fish Sanctuaries	See Table 3.2	
7. Habitat Restoration/Conservation		
• Re-excavation of khals (m)	25,000	3,000
• Re-excavation of beels (ha)	58	9.53
• Beels converted from seasonal to permanent	33	8
• Plantation-Swamp (No. of trees)	92,000	15,500
8. Awareness Programs		
• Number of programs	400	484
• Number of recipients	50,000	50,000
9. Watershed management		
• Riparian Habitat (km)	20	14
• Upper catchment forestation	to be decided	
• Pineapple demonstration (No)	5	2
10. Link program (provision of specialists)	1	2
11. Livelihood Generated		
• Beneficiary group formed (No)	220	159
• Demonstrations (No)	1,250	358
• Indirect impact of demonstrations (No)	150,000	180,000
12. Credit disbursed-grant funds available (Tk)	8,800,000	4,900,000 (2)
13. Alternative Income increased for beneficiaries (%)	50%	31%
14. Health care And Nutrition Services		
• Homestead vegetable (No)	3,125	1,342
• Pit latrines installed (No)	1,250	778
• Tubewells installed (No)	240	102
15. Other activities		
• Adult literacy (No of courses/participants)	18/360	17/194

(1) For table of targets and achievements for all activities see MACH (2001e)

(2) Total credit disbursed is Tk 8.82 million that is made up of Tk 4.9 million grant funds plus accumulated interest paid by group members. See also Section A6.7 for more details

The RMO is linked to government officials through the Local Government Committee, which is an upazila level committee, chaired by the Upazila Nirbahi Officer (UNO) and with union parishad chairmen and officials from government departments as members. By mid-2001, 16 RMOs have been formed and are active in managing water bodies. The program is negotiating with MoFL to improve the terms for the khas water bodies leased to RMOs. RMOs are a key feature of the project and are discussed in more detail in Appendix 5.

Physical Interventions: Physical interventions are implemented to restore and rehabilitate degraded habitats. Physical interventions are identified by the RMO and approved by the LGC. Interventions encouraged by the project include establishment of seasonal or permanent fish and wildlife sanctuaries (48 No.), roadside and wetland plantations, re-excavation of khals (1 khal) and beels (10 beels covering 6 ha). MACH has established a Physical Intervention Unit to plan design and implement earthworks scheme, in conjunction with the RMOs. MACH is scheduled to receive a significant increase in funds for physical interventions as Tk 330 million ($6 million) for physical interventions is being processed as a separate project under the control of MACH. These additional funds should be available during 2002-2005. MACH is intending to use the funds mainly for habitat restoration including conservation easements and long-rotation forests, and other environmentally sound interventions.

Biodiversity Conservation and Enhancement: MACH is enhancing biodiversity by re-introducing plant and fish species that were historically present at a particular site. The Beel-resident fish species have been re-introduced into several sanctuaries, and swamp trees have been re-introduced to beels and other seasonally-flooded areas.

Watershed management: The goal of the watershed management is to demonstrate on a sub-watershed scale, the benefits of improved land and water management practices that improve the flow and quality of water and reduce the sediment load into the haor. Chhara restoration plans have been prepared in collaboration with the Chhara Resource Management Organisations (CRMO) for 4 chharas. Vetiver grass hedges were planted along 18 km length of the 4 chharas and riparian tree plantations comprising of 10,000 saplings were also planted along the 4 chhharas.

4.3 Community Development and Supplemental Income Generating Activities

Group Formation: The purpose of forming groups of fishers and women from fisher households using wetlands is to ensure participation of poorer resource users in the community management of flood plain resources and to create a system for providing services such as credit and training to poorer households. By September 2001, 125 fishers groups with 2479 members and 52 women's groups with 1026 members had been formed at three sites. The groups have accumulated combined savings of Tk 1,254,335.

Alternative income generation (AIG) and Credit: Alternative income generating activities are being promoted for fishers and other directly dependent on wetland resources to reduce the pressure on fishing and also provide alternative income during periods when fish are scarce or fishing is restricted during the breeding season. By September 2001, MACH had provided a range of training and skill development courses to group members including group management (158 courses for 2916 members), accounts (4 courses for 85 members) and pond fish culture (5 courses for 84 members. In the same period, 1191 loans were allocated for alternative income

generating activities and Tk 8,818,000[2] of credit was disbursed. The alternative income generation (AIG) and credit activities of MACH are discussed in more detail in Appendix 6.

Demonstration Activities: MACH is supporting demonstration activities by providing seeds, fertilizers, and technical assistance. The beneficiary household provides the land and labor. During and after the demonstration, MACH arranges awareness sessions to disseminate the results. Demonstrations undertaken include pond fish culture (62 ponds); cage fish culture (64 cages) wheat cultivation (64 plots covering 4.9 ha); granular ("guti") urea (15 farmers); vegetable (36 plots covering 2 ha); vegetable cultivation (85 farmers covering 0.7 ha); tree nursery (32 beneficiaries producing 32,400 saplings). Other program activities such as homestead vegetable gardening (1342 beneficiaries) and homestead tree plantation (1000 beneficiaries received 5000 saplings) also have demonstrations effects. In addition, selected beneficiaries were given training on primary health care, nutrition and sanitation (278 beneficiaries) and adult literacy (17 courses to 294 students of whom 147 graduated). 778 pit latrines and 102 tubewells were also distributed to selected beneficiaries.

4.4 Monitoring

Baseline Survey and Monitoring: MACH is conducting a comprehensive monitoring program by collecting baseline data and monitoring program impacts on communities and the wetland ecosystem in terms of bio-diversity, resource productivity, consumption and income. Three types of monitoring are being undertaken: baseline surveys and impact monitoring and community monitoring. Reports of the baseline studies on fisheries, vegetation, wildlife, and household protein consumption have been prepared for two sites and the report is in process for the third site. Data from 474 beneficiaries have been collected and is being processed to provide beneficiary profiles.

Development of Databases: Geographic Information Systems (GIS) and Remote Sensing are being used to prepare geospatial and non-geospatial databases of the three project sites. Maps have been prepared showing the regional setting, land use, location of project activities and monitoring sites for each site along with landsat and IRS images showing the extent of water bodies at the end of the monsoon and in the dry season. In addition, maps have been prepared for specific water bodies where the project is working.

Hydrology: MACH has established several monitoring stations at each site to measure water levels, flows, rainfall and sediment loads. The data collected assists the Program's understanding of the complex flow patterns in and around the project sites and is used to analyse the feasibility of the physical interventions proposed by the RMOs.

4.5 Special Programs

Pollution Studies: The Turag-Bongshi site in Kaliakor is adjacent to several industries and poultry farms that discharge their untreated waste water directly into streams draining into the beels where the MACH is working. Following complaints about water quality by an RMO, MACH analysed effluent from the industries and found that heavy metals, sulphides and other chemicals

[2] This amount is made up Tk 4.9 million grant funds provided by MACH plus accumulated interest paid by group members.

were being discharged at concentrations in excess of national standards. MACH organised one workshop to introduce its activities to stakeholders and then another workshop to present its findings. MACH had success in convincing one poultry farm to use its waste to produce bio-gas and two textile mills to change from using kerosene to a chemical that was environmentally safe. A draft report describing the first phase of the Pollution activities (MACH 2001i) has been prepared.

Watershed Planning for Hail Haor: MACH have prepared a draft watershed management plan for Hail Haor (MACH 2001h) to improve flows and reduce sediment loads by establishing environmentally sound water and land use.

Feasibility Study for the Re-establishment of Connectivity between Kushiyara River and Hail Haor: Hail Haor was once directly connected to the Manu and Kushiyara rivers. The direct connections combined with overland flows allowed the seasonal migration of fish in both directions for breeding and nursing. The construction of embankments and the blocking of the connecting channels have eliminated the connections, resulting in a decline of biodiversity and fish production in Hail Haor. The study to determine the feasibility of re-establishing the connections found that there is potential for restoring and enhancing the connectivity between the Kushiyara River and Hail Haor.

Pineapple/Lemon Land Use Activities. Cultivation of lemon and pineapples down contours of hills around Hail Haor cause considerable soil erosion and subsequent siltation of Hail Haor. MACH has established demonstration plots to show the benefits of planting pineapple along contours and providing more vegetative cover to the soil.

Bio-economic model for Wetlands Evaluation: Even though wetlands are found throughout Bangladesh, there has been no analysis of the economic value of wetlands. MACH has completed an economic evaluation of the wetland resources in Hail Haor and found the fisheries gave a return of Tk 9,871/ha while boro rice production gave a return of Tk 5,192/ha. The results of the study indicate that economic factors are not driving landowners to maximise the area under rice at the expense of fisheries.

Wetland and Watershed Afforestation Studies Guidelines for the specific vegetation to be used for canopies, under-story and ground cover are being developed, along with planting and growing instructions for riparian corridors, swamp plantations and roadside forestry.

4.6 Policy Dialogue

Although not explicitly discussed in the MACH program documents, the importance of MACH addressing policy issues was recognised during the Inception Phase (MACH 1999), and MACH has since become involved in the essential task of policy dialogue with the government and other stakeholders in the management of wetlands. MACH has been actively involved with the Wetlands Network and the Local Consultative Group (LCG).

The Wetlands Network was created initially through a MACH program initiative. The Network's administrative functions are being carried out through IUCN with support from developmental partners involved in wetland related work in Bangladesh. The Network meets at least quarterly and includes representatives from projects working with wetlands, fisheries and environment, as well as representatives from the Department of Fisheries, Department of Environment, Ministry

of Environment and Forests and the Ministry of Fisheries and Livestock. The Network serves as a forum for discussing issues of common concern, and for sharing of ideas, methods and results from all the development partners working with the conservation and improvement of wetland ecosystems.

The Local Consultative Group (LCG) on fisheries comprises donors who support activities related to fisheries, and officials from concerned government departments. MACH has been active supporting USAID's contribution to the LCG and is presently assisting with preparation of terms of reference for a study to review the fisheries sector. The study is scheduled to start in early 2002. In January 2002, the LCG is planning a workshop on natural resources management with the main theme of governance of natural resources.

MACH has facilitated field visits by several government ministers and officials to the program sites and also discussed the MACH approach with numerous government officials including officials from the Ministry of Fisheries and Livestock, Ministry of Land, External Resources Division (ERD), and Planning Commission.

4.7 Project Management

National Steering Committee. The Steering Committee provides guidance and advice to MACH and is responsible for approval of project sites and annual work plans. The Steering Committee has met annually since the start of the program, and is performing the functions as intended.

Results Package Team (RPT): The RPT has authority to carry out the activities under MACH, and is responsible for achievement of program objectives. The RPT meets regularly to decide on implementation issues and review progress.

Local Government Committee (LGC): The LGC is an integral part of the MACH Program management at each site. The LGCs have worked well in linking project activities and communities with government staff and local government institutions, even though UNOs, UFOs and other key government staff are subject to frequent transfers. LGCs are discussed in more detail in Appendix 5.

Financial Control: Financial Authority rests with the grantee, Winrock International which is solely responsible for fund distribution. Winrock and its partners are subject to standard USAID financial control and review of the financial aspects of the program has not been part of this Mid-term Review. Up to September 2001, MACH has utilized $4.198 million out of the budget of $7.585 million. According to MACH, there are sufficient funds available to complete the current set of activities by the end of the program in September 2003.

Linkage with other USAID-funded Projects. MACH has worked with several other USAID-funded projects including FTF (provision of subject matter specialists); JOBS (for training and skill development); CYMMIT (for wheat demonstrations); ATDP1 (for 'guti' urea demonstrations); ICLARM (for cage and pond culture demonstrations); AVRDC (for vegetable seeds) and Helen Keller (for vegetables). MACH is also in discussion with the Democracy Project (project staff have visited MACH sites); and the Local Government Initiative.

5. REVIEW OF MACH PERFORMANCE

5.1 Program Rationale and Objectives

The rationale and objectives of MACH are still valid as wetland habitats continue to decline throughout the country and ways to reverse this trend need to be developed otherwise fish and other animal and plant wildlife will disappear with catastrophic results for rural communities including poorer households. Overall, open water fish production continues to decline each year. Ways of reversing this trend need to be developed, and the MACH approach has the potential to make a significant contribution to reversing the decline in fish production and biodiversity.

5.2 Wetland Resource Management

The *Awareness Raising Activities* have had a positive impact and, based on the Mission's discussions in the field, an estimated 50% of villagers are aware of MACH and its activities. There is scope to consolidate the impact of the initial awareness raising activities by continuing with awareness raising activities to specific environmental and wetland issues related to RMOs and their activities.

Community based planning has been organised by MACH in the management areas of selected water bodies. MACH's planning process has been effective in that communities have discussed the problems related to the water body and identified management and physical interventions to improve production from the water body.

Following community based planning, MACH facilitates the *formation of Resource Management Organisations* (RMO). The MACH approach is different from other related projects because all socio-economic groups are included in the management organisation rather than only fisher households. MACH has refined the process of forming RMOs following their initial experience in Hail Haor and the Lower Turag-Bongshi as the initial RMOs comprise mainly of large farmers. The RMOs formed at the KM site included more representation of fisher households. The RMOs are still in the early stages of development but the early indications are promising that RMO could develop into sustainable institutions if more support is provided by MACH. The program has had some success in improving the terms of khas water bodies leased to RMOs, but more effort is required to finalise the leases. With the proposed extended duration of leases from 3 to 10 years, the program needs to ensure proper management of the water bodies and transparency of RMOs. Linkages between the beneficiary groups and RMOs are weak and need to be strengthened to ensure equitable distribution of the benefits from increased fish production and biodiversity. Some of the interventions such as periodic fishing bans may be having a negative impact on fishers.

Physical Interventions were included on a limited scale in the initial documentation of MACH, and in 2000-2001 MACH started to implement several different type of schemes to restore and rehabilitate degraded habitats. The schemes were small scale and cost Tk 2,291,513. The sanctuaries established by RMOs are already having a significant impact on fish production and biodiversity. Generally, the earthwork schemes were implemented according to the plans, even though the work season was very short (January-March) before sites became waterlogged. With the provision of the additional funds for physical interventions, MACH will have to be careful that the program does not become dominated by the implementation of schemes. Further delays in finalising the additional funds for physical interventions will limit the program's impact on

rehabilitating watersheds and the program's ability to meet the targets for habitat restoration/conservation activities (See Table 4.1).

Biodiversity Conservation Enhancement Enhancing biodiversity is an activity unique to MACH and several different activities have been implemented including re-stocking of sanctuaries with beel-based fish species that were once resident, and re-introducing swamp trees to beels. The trees should increase wildlife, particularly birds.

Watershed management. Unlike other projects working to enhance wetlands, MACH is working with the watershed ecosystem. This has resulted in innovative work on habitat restoration along chhara (streams) in Hail Haor. These activities will have a major impact on the wetland and their watersheds if the trees and other vegetation are allowed to mature. Watershed management organisations have a different constituency from beel RMOs as there are no fish in the streams and poor households do not use the resource. Hence Chhara RMOs are formed from riparian landowners who will be the main beneficiaries from rehabilitation of the riparian habitat.

5.3 Community Development and Supplementary Income Generating Activities

Group formation. MACH activities with group formation are based on well-established procedures. Selection criteria and the selection process are sound. The savings system is working well and the additional savings made by group members indicates cohesiveness and trust within the groups. Access of members to their savings is flexible. Sustainability issues have not been discussed with group members. Linkages between the beneficiary groups and RMOs are weak .

Alternative Income Generating and Credit Skill development activities are very popular and sought after by members. Encouragingly, skills taught by the program are transferred to other family members and friends. Vocational training is also in high demand in part because after training members are offered to loans of up to Tk 30,000. This allows graduates to start independent non-traditional enterprises, and also provides a major lift in their status. Credit process works well although approval of credit sometimes is slow in being given. The intensity of the training program is scheduled to increase during eth final two years of the program.

Demonstration Activities Demonstrations of different activities have had a positive impact on incomes and production. The demonstrations of vegetable gardens and plant nurseries are particularly popular as these activities can be done on un-used land around the homestead. The demonstrations have reached more than the expected number of indirect beneficiaries.

5.4 Monitoring

Baseline surveys and monitoring. MACH has collected large data sets on the three program sites. There are needs to improve the quality control of the data to ensure its consistency, and to expedite the processing of some of the data so that it is available for use by the program.

Databases. The GIS is being used effectively to prepare excellent maps of the program sites.

Hydrology. Due to the limited topography in Bangladesh, hydrologic systems tend to be very extensive. Hail Haor has a clearly defined watershed but the tidal effects at the Turag-Bangshi site illustrate how extensive hydrologic networks can be. MACH needs to limit the extent of the

wetlands in which it is working as the program is not in a position to solve the broader hydrological problems associated with some of the sites.

5.5 Special Programs

Pollution Studies. MACH has done sound work in responding to local problems with pollution from nearby industries and poultry farms, and has managed to provide solutions that have been adopted. The problems of industrial pollution are likely to become more widespread as the country' economy continues to develop. MACH has coordinated its pollution activities with other projects such as BEMP.

Watershed Planning for Hail Haor. The draft Hail Haor Watershed Management Plan provides comprehensive data on resources within the watershed. The costs and the resources required to implement the proposed action plan is needed to assess the overall feasibility of the proposed action plan.

Feasibility Study for the Re-establishment of Connectivity between Kushiyara River and Hail Haor This is a complex scheme, and although the scheme would bring benefits to Hail Haor, the program's operational area would have to be increased significantly.

Pineapple/Lemon Land Use. The planting of pineapples along the contours could have a major impact on the erosion from hill areas, if the expected benefits are realised. MACH identified technically simple changes to cultural practices.

Bio-economic Model of Hail Haor. A very timely study as government and other donors take more interest in wetlands. The study should be completed and distributed to stimulate wider discussion on the economics of wetlands and their rehabilitation.

Wetland and Watershed Afforestation. The guidelines are being used in planning of rehabilitation schemes at the program's sites. The guidelines should be prepared for wider distribution.

5.6 Policy Dialogue

Policy dialogue is an additional activity of MACH, but MACH activities are contributing to the debate on key policy issues with the government, donors and other projects. Issues that require further work include sanctuaries, leasing of beels and resource management.

5.7 Program Management

The various committees set up to review the program and assist MACH with implementation are functioning as intended. The frequent transfer of UNOs, UFOs and other government staff working with the program is hampering the development of linkages between program activities and the government structure. The Local Coordinator post is vacant at present, and there is a need for more support for the CoP. The program could make additional efforts to integrate some of its activities such as beneficiary group involvement in RMOs, development of nurseries etc.

There are possibilities of involving Peace Corps volunteers in MACH, but their role should be limited to activities such promotion of specific technologies (such as cage fish culture) or monitoring (data processing).

5.8 Sustainability

MACH Staff have been discussing issues related to sustainability of project activities, but unfortunately the Program Report on Sustainability was not available due to the absence of the CoP for health reasons. The Mission discussed sustainability issues with MACH staff and also RMOs and beneficiary groups. The Program needs to expedite addressing sustainability issues, including developing exit strategies for its activities. Time is short to implement actions required to ensure sustainability as the program has only two years until completion. Sustainability issues are mainly related to the RMOs and the beneficiary groups and are discussed under the relevant sections covering those activities.

5.9 Summary of the Review Findings

The concept of MACH is still valid. MACH is implementing a broad range of activities many of which are innovative and complex. Program activities are already having positive impacts on ecosystems at the program sites including fish production. Program activities are also resulting in increased incomes for beneficiary group members. MACH is on course to meet the targets set for the Strategic Objective and the Intermediate Results, although more time will be required to ensure sustainability of the MACH approach. MACH has developed considerable understanding of the requirements of improving the productivity and management of wetlands, and has responded to unforeseen local requirements by developing solutions acceptable to stakeholders. The present geographical coverage provides sufficient variety of ecosystems to fully test the MACH approach. The main issue that needs to be addressed is the sustainability of the MACH approach particularly with respect to local institution building and the time required to consolidate the environmental changes implemented by communities with program support.

6. MAIN ISSUES ARISING AND RECOMMENDATIONS

6.1 Wetland Resource Management

Community based planning. MACH has developed and filed-tested a process for community based planning that identifies management and physical interventions required to improve wetlands. *The Mid-term Review Mission recommends that:*

- *MACH should prepare guidelines of best practices for community based planning*
- *MACH should review the present upazila and union planning activities and identify ways how MACH practices can fit in and improve upazila and union planning.*

Formation of Resource Management Organisations The key issue to be addressed is the sustainability of the local institutions developed by MACH for managing the wetlands. The existing RMOs require more time to mature and fully adopt the responsibilities and requirements of the task. RMOs will probably require support from the program for about 5 years or more. *The Mid-term Review Mission recommends:*

- *MACH requires more time to develop RMOs as a sustainable management model (see also Section 6.6)*
- *MACH staff working with RMOs should be strengthened with the addition of an Institutional Development Specialist and field staff with social development skills.*
- *MACH should develop long term plans for the local institutions being developed by the program including exit strategies showing how project support will be phased out and ways to link the program institutions into local government structures. MACH is a pilot program and hence there is scope to try different approaches towards developing sustainability.*
- *After the formation of the RMO, the awareness program should continue at greater intensity than at present to ensure the actions of the RMO are understood by the communities they represent and communities understand how the revenues raised by the RMO are being utilised for the improvement of wetland resources.*
- *MACH-formed institutions should move closer to the existing government structure, and consideration should be given to making the UFO the member secretary of the LGC with the MACH Site Coordinator becoming the facilitator.*
- *With assistance from MACH, RMOs should develop long-term plans to show inter alia how the RMO intends to manage the water body, annual fisheries management plans, the level of funding required and how they intend to raise the revenue required.*
- *The project should prepare detailed case studies of RMOs to show how the RMOs are actually operating. Issues to be discussed in the case studies should include which members are dominant, who contributes to discussions during meetings, who within the RMO actually makes the decisions, the awareness of different groups within the village of the workings of the RMO, the extent of participation, how communities are informed of decisions taken by the RMO etc.*

Physical Interventions. MACH is to receive a major increase in funds for physical interventions, and there is a risk that the implementation of schemes will start to dominate program activities. *The Mid-term Review Mission recommends that:*

- *Where possibilities exist, MACH should consider out-sourcing the implementation of schemes.*

- *MACH should consider using Labor Contracting Societies[3] to implement schemes as use of Labor Contracting Societies have been found to improve the quality of work and increase the sense of local ownership.*

Watershed management Establishing vegetative strips along the banks of chharas is a new concept in Bangladesh, and should result in significant improvements to the watershed and environmental habitats. The Chhara RMOs have a different composition than the Beel RMOs and the interaction between the two different RMOs need to be monitored. *The Mid-term Review Mission recommends that:*

- *MACH should be closely monitor the chhara rehabilitation schemes to determine the resources required (provision of caretakers; replacement of saplings etc.) for the vegetation to mature and become effective*
- *As with the Beel RMOs. MACH should prepare case studies of the Chhara RMOs so that the performance of CRMOs are better understood.*
- *MACH should investigate the linkages required between the chhara RMOs and Beel RMOs.*

6.2 Community Development and Supplementary Income Generating Activities

Group Formation As with the RMOs, the issues of sustainability of the groups and the credit program need to be addressed. The importance of training and skill development to group development and to members should also be recognised. Group formation and consolidation is still going on and this process will probably take about 4-5 years to complete. *The Mid term Review Mission recommends*

- *MACH should support the beneficiary groups for about 5 years to ensure full development of groups*
- *A plan for the sustainability of the groups should be developed, including an exit strategy and an estimate of the time required to consolidate the groups and phase out MACH support.*
- *Group development training should cover more beneficiaries*
- *Adult literacy courses should be increased to ensure members have basic literacy skills.*
- *MACH should ensure the separation of the functions of the savings/credit/training of beneficiary groups and the functions of the RMO, as the requirements are very different.*
- *Awareness training for beneficiary groups should be focused on resources that can be accessed by poor households and group members.*
- *Target figures for group formation should be re-assessed*

Supplementary Income Generating Activities Training is a valuable and essential component for supplementary income generation, and MACH needs to provide the targeted training and skill development. *The Mid-term review Mission recommends that:*

- *MACH should develop an integrated credit plan including requirements for training and skill development.*
- *Groups should prepare activity plans showing the expected costs and return from different income generating activities.*

[3] In Labor Contracting Societies, the laborers themselves are given the contract to construct a scheme. The laborers organise their own work and payment. LCS's have been used successfully by BWDB and LGED.

- *Consideration should be given to re-structuring the credit program so that re-payment is based on the income schedule for different activities.*

Demonstrations. Demonstrations are a key activity in diversifying local economies and reducing pressure on wetlands, and the program need to implement the targeted number of demonstrations. *The Mid-term Review recommends that:*

- *MACH ensures that the targeted number of demonstrations. are provided*

6.3 Monitoring

MACH has collected extensive data on many aspects of wetlands and their related communities at the 3 program sites, but there seems to be a backlog in processing the data and making the data available to the program staff. MACH should expedite the processing of the data and the data should be made readily accessible for use by project staff and other development agencies. *The Mid-term review Mission recommends that:*

- *MACH expedites the compilation of the existing data (particularly socio-economic data) by the program and prepares reports and CDs of the data sets for distribution to site offices and other concerned agencies working in the Program areas.*
- *MACH should develop a standard approach to monitoring.*

6.4 Policy Dialogue

Policy dialogue is a valuable addition to MACH activities and should be supported further, and MACH should prepare a strategy for disseminating the MACH approach. *The Mid-term Review Mission recommends that:*

- *MACH provides financial support to the Wetlands Network if required.*
- *MACH prepares a communications strategy*

6.5 Geographical Coverage

MACH's wetland management and rehabilitation models are not at a stage that they are replicable elsewhere. MACH should consolidate its activities in the three project sites, and focus on developing the institutions required to improve the management of wetlands and determining the resources required to rehabilitate the wetlands of these different ecosystems. *The Mid-term Review Mission recommends that:*

- *MACH should continue its activities at three sites*
- *The K-M site should be expanded to include portions of Nalitabari and Nakla upazilas required to form a more complete hydrological unit.*
- *The T-B site should be expanded to include the areas in Tangail district adjacent to Aola beel.*
- *At HH the project should focus on rehabilitation of the watershed and catchments around Hail Haor. Re-connection of Kushiyara River to Hail Haor is complex and before proceeding the program should assess the program resources required to undertake the work required*.

6.6 Timeframe

Key activities of MACH are the institutional development of management organizations and beneficiary groups, and wetland rehabilitation and environmental improvement. Achievements related to these components will take several years to realize as the processes involved are slow.

Resource Management Organizations (RMO) will need to try managerial and physical interventions over several monsoons to find out the most beneficial mix of interventions for the resource users. Based on progress to date, the Mid-term Review Mission estimate that RMOs will need program support for up to 5 years before they become self managing and self sustaining organizations serving wetland users. Beneficiary groups start with low skill levels and project will be required over several years (credit cycles) for groups to mature, as discussed in Section A6.8. The MTR Mission estimate that the beneficiary groups will take up to 6 years after formation to become self managing and self sustaining, and for the overall support structure to be established and functioning.

MACH is funding the implementation of innovative interventions to rehabilitate wetlands and their watersheds, but the resulting environmental change will take time to become affective because of the slow processes involved. Fore example, trees and other vegetation will take at least 5 years before they become established and start to make a tangible impact on the habitat. Swamp trees will take even longer (10-15 years) as they are slow growing. MACH interventions need to be supported and closely monitored for sufficient time to ensure the environmental improvements will be forthcoming. The Mid-term review Mission estimate that 5 years should be an adequate period for the environmental impacts of different interventions to be affective and the program support required to establish the interventions will be fully understood.

Formation of RMOs and beneficiary groups started in year 2 of the program, and the first batch of organizations and groups will require until year 7 to reach maturity. Similarly the environmental interventions will take until year 7 to become established and for the full requirements for implementing similar interventions elsewhere to be determined.

The Mid-term Review Mission recommends that:

- *MACH should be extended for three years beyond September 2003 in order for the RMOs and related institutions and beneficiary groups to be fully developed, for the wetlands rehabilitation activities to mature so that their impact can be assessed more fully and to establish the MACH approach as a replicable model. Additional resources will be required for this extension.*

APPENDIX 1
STATEMENT OF WORK

Background

The floodplains of Bangladesh form one of the world's most important wetlands-- home to hundreds of species of unique fish, plants and wildlife and critical habitat for thousands of migrating birds. Alarmingly, in spite of a decade or more of project interventions, the inland fisheries and floodplain catch of Bangladesh, as well as the overall plant and animal bio-diversity within these wetlands continue to decline.

Recognizing the need for new approaches to floodplain and wetlands resource conservation and management, the Governments of Bangladesh and the United States of America have jointly developed a program called Management of Aquatic Ecosystems Through Community Husbandry (MACH). An agreement to implement this program was signed in May 1998. Winrock International (Winrock International Institute for Agriculture Development) was selected, based on USAID procedures, with the participation of the GoB. Winrock is implementing this program with its three partners: the Bangladesh Centre for Advanced Studies (BCAS), CARITAS Bangladesh and the Centre for Natural Resource Studies (CNRS).

The major purpose of the project is to demonstrate to communities, local government and policy-makers the viability of a community approach to natural resource management and habitat conservation over an entire wetland ecosystem. The MACH 'community' includes those people who are dependent, either economically or nutritionally, on the wetland and its products. The program emphasizes and works with poorer individuals and groups, particularly fisher communities who are generally the poorest members of rural society. To be truly sustainable, the MACH project must continually involve the local government and local elite in its activities

MACH's goal is to ensure the sustainable productivity of all wetland resources – water, fish, plants and wildlife– over an *entire* wetland ecosystem (beels, seasonal wetlands, rivers/streams), not just a single water body. Inherent in this goal are the conservation and sustainable management of wetlands and their natural resources. Also inherent in this goal is the elements of sustainable food security.

The MACH approach requires that all factors affecting the communities and their wetland resource be considered. MACH advocates a multi-disciplinary, multi-sectoral and participatory process of planning, implementation and monitoring for sustainable wetland resource management. Recognizing that the reduction of fishing pressure is likely to be a critical part of reviving the wetland fisheries, MACH has included supplemental income-generating activities that provide a development focus particularly for fishers and others directly dependent on fishing. The idea being that by providing workable income generating activities, existing and new entrants to the fishery will be reduced.

Key components of the project are:

- Participatory wetland resource and problem assessment
- Integrated wetland resource planning and management
- Alternative or supplemental livelihood development for wetlands resource users
- Participatory resource use zoning to be used in part to establish limited access regimes such as sanctuaries

- Skill training in integrated wetland resource management including cross-visits by beneficiaries to successful areas
- Awareness building through information, education and communication
- Leveraging support and creating synergy with other projects to boost impact.
- Develop mechanisms for effective awareness building and policy strengthening at the national level
- Community and MACH Impact monitoring and evaluation

Under Strategic Objective No. 6 (Improved Management of Open Water and Tropical Forest Resources) USAID/Bangladesh addresses the natural resources management issues. The overall goal of the Environment program is to strengthen the efforts of the GoB and the NGO's in environmental and natural resource management. The specific goal is to demonstrate improved, environmentally sustainable management of aquatic and tropical forest resources. The adaptive model is based on the need to restore or maintain ecosystem function of aquatic and forest habitats through a participatory approach.

MACH is a five year integrated program that uses a participatory approach to community resource management. The project began in September of 1998 and following an inception period was able to establish field programs in June of 1999 at two of the projects three sites. The third site in and around Sherpur was started the following July of 2000.

MACH like other environmental projects is working to institute radical changes in the way communities and local government approach and manage their natural resources. MACH is a "Process" type of project supporting communities and local government in the planning and sustainable use of natural aquatic resources. The approach is to raise awareness of the need for change and to *demonstrate* in the field the benefits those changes can bring.

This mid-term programmatic review is taking place as originally planned, at the end of the 3rd year of the project. This review will analyze the ability of the Project to successfully respond to its new performance indicators. The review will also inform the planned expansion in both area and time for the project.

Purpose of the Mid-Term Review

The mid-term review will focus on MACH's effectiveness toward achieving the goals and objectives set out for the project. The MACH objective is for communities, in partnership with local government, to effectively manage their floodplain wetland resources. The rationale is that by improved management, limiting access and reducing fishing effort, sustainable harvests of fish will be possible, conserving freshwater resources while ensuring food security to the community over the medium to long-term.

This mid-term review will focus on assessment of the aquatic (floodplain) resource management intermediate results package, and specifically on the Management of Aquatic Ecosystems through Community Management (MACH).

The review will address whether MACH is progressing toward the achievement of its goals and more particularly whether MACH has effectively: (a) developed innovative approaches to community-based aquatic resource management; (b) identified and stimulated alternative income generation opportunities for fisher folk; (c) facilitated appropriate technology transfer of

community-based natural resource management interventions and approaches; (d) provided awareness building activities in project areas; (e) enhanced local government capacity to support community resource management initiatives; (f) led to adoption of best management practices (BMP) and is on track to achieving major targets of the program. Along this line the review is to comment on whether the approaches chosen at the beginning of the Project are still the most appropriate for achieving improved management of the aquatic floodplain resources. The overall purpose of the evaluation is therefore to: (a) review the performance of MACH to date vis-à-vis the cooperative agreement; and (b) assess future directions for MACH, including possible extension and expansion of its coverage. This last question is key: how can the program be made even more effective in the years to come and what improvements can be suggested over the original design?

Statement of Work (SOW)

To meet the objectives of the Mid-Term review, the consultants shall:

1. Assess the progress of MACH in implementing the co-management approach, i.e., involving the various stakeholders including GoB, elites of the area and the resource users in achieving the MACH main goal of: increasing the area of wetland floodplain under improved community management.
2. Review MACH's Awareness and training programs for the stakeholders at all levels. Establish the progress in achieving its objectives through increasing the awareness of the interest groups to the importance of wetland resources.
3. Assess MACH programs effectiveness in improving the management of the floodplain wetland resources. Do the local management organizations and beneficiary groups take ownership of the MACH activities? How relevant/effective are the communication activities in strengthening the resource management capabilities of the communities and stakeholders?
4. Review MACH's Wetland Management Component. How relevant are the activities under this component to ensure sustainable productivity from the natural resources available. Are the activities improving management of the resources in measurable ways?
5. Review of MACH's Alternative Income Generation (livelihoods) Component. How effective is it in supporting the MACH's larger objectives. Is it creating environmentally sound, socially feasible livelihood opportunities? Does it cater effectively to the targeted beneficiaries? Does the credit and savings program as designed provide adequate security to the beneficiaries? Make recommendations on the credit and savings program as to how the program should be structured by the end of the project and what institutions or groups should ultimately control.
6. Review the "special programs" (programs requested by the communities not originally planned) element of MACH namely the "pollution" component of Kaliakor and the demonstration chara restoration of Hail Haor in Srimangal. Make recommendations for the future of these efforts that have been recommended by the stakeholders.
7. Review the GIS and Hydrology components of the project and make recommendations on further requirements for these inputs through the remaining period of the project life.
8. Assess the projects habitat improvement, i.e., the physical intervention program and the need for this kind of intervention into the future.
9. Assess the degree of success in achieving wider (NGO & GoB) recognition of the MACH approach and achievements, & the extent to which MACH methodology is being replicated.
10. Identify on the basis of the review, steps to help ensure sustainability of the co-management structure and the MACH activities into the future.

11. Make recommendations on the future direction of MACH including possible expansion of area and influence, relative to the time frame allotted for the project.

Methods and Procedures

The review will be conducted in Dhaka, Kaliakor, Sreemongal, and Sherpur Bangladesh during the period from November 4, 2001 and December 4, 2001.

Activities in Dhaka: The team will:

1. Review the SOW and MACH documents (including the MACH project progress and technical reports, USAID/Dhaka R4, the latest indicators for the program and others as deemed necessary.
2. Receive administrative and technical briefings from the MACH and USAID management teams. Refine the methodology for the Dhaka and site based portions of the review, and plan the site visits. The team will prepare a brief report that will outline any refinements in the review methodology and outline of the final report.
3. Conduct interviews and discussions with appropriate partners of the project, USAID and the GoB.

Site Visits: In the course of the site visits, the Team will:

1. Interview program partner staff, key officials, and stakeholders of the project.
2. Visit site field offices and all field activities so as to be able to assess the projects accomplishments and programs.
3. Evaluate progress toward goal and assess future needs for the projects approach and activities.

Activities in Dhaka: The team will:

1. Prepare draft report
2. Receive comments on the draft
3. Finalize the report, and conduct formal exit debriefings.
4. Make factual corrections identified by the reviewers but use its own professional judgement concerning matters of interpretations and analysis of findings.
5. Complete the entire evaluation with 30 calendar days of starting.

Proposed Schedule

DAY	ACTIVITY	LOCATION
1	Arrival of team members	Dhaka
2-3	Meetings with MACH HQ and COP, USAID, GoB. In consultation with MACH and USAID, make any final revisions to the statement of work, objectives, tasks and a preliminary work plan.	Dhaka
4	Conclude preliminary meetings in Dhaka commence visits to field sites. Visit to Kaliakor site.	Dhaka/Kaliakor
5	Visit to Kaliakor site	Kaliakor
6-9	Visit to Sreemongal site, discussions with staff and stakeholders, haor and chara visits, RMO groups and Beneficiary groups.	Sreemongal
10	Dhaka report work and meeting with MACH HQ and COP	Dhaka
11-13	Visit to MACH field site at Sherpur	Sherpur
14-21	Preparation of Draft report	Dhaka
22-23	Debriefing with MACH, USAID and GoB	Dhaka
24-29	Finalization of Report	Dhaka
30	Submission of Final Report	Dhaka

Reporting Requirements.

Inception Report: The team will prepare a very brief inception report within the first two days. This report may include suggestions for revisions in the statement of work, objectives, tasks and a preliminary work plan (to be revised in consultation with MACH and USAID, as needed) and an outline of the final report. The work plan shall reflect the team's schedule for data collection, analysis, report writing and periodic interim briefings with MACH and USAID. The outline of the final report shall be approved by MACH and in consultation with USAID.

Draft Report: A draft report shall be submitted to MACH for forwarding to USAID not later than the 22nd day of the consultancy.

Exit Debriefing: Prior to the Team's departure from Bangladesh and to the submission of the final report, the team will conduct an exit debriefing for MACH and USAID. The debriefing will reflect the content of the draft report and focus on key issues that may be clarified with the team members.

Final Report: The final report will be submitted to MACH and USAID by the team leader no later than 5 days after the exit debriefing. The report should include an executive summary, a brief background of MACH, a summary of the methodology used in the evaluation, issues, team findings, conclusions and recommendations, as well as a list of persons interviewed during the data collection period. The report will focus on addressing the topics and questions described in Section III. For each of the topics/questions the evaluation report will present the major findings of the team relevant implications, and recommendations for future action.

Team Composition and Level of Effort

The review team will be composed of four (4) members. The team members are as follows:

Specialist

1 Strategic Planning Specialist (Expatriate, Team Leader)
2 Environmental and Fishery Specialist (National)
3 Social Science/Development Specialist (National)
4 A Representative from the Government of Bangladesh

The **Strategic Planning Specialist (senior-level)** should have at least a Master's Degree in a field relating to natural resource management/social science/international development fields. S/he should have at least 10 years of field experience in Asia including but not limited to the design, implementation and evaluation of development projects, natural resource management projects, and expertise in strategic planning and analysis. S/he should also have experience in analyzing the development, diffusion, communication and adoption of new technologies/strategies in the context of development of programs and projects. The Strategic Planning Specialist will act as Team Leader. Level of effort will be 27 days.

The **Environment and Fishery Specialist (mid-level)** should have at least a Master's Degree in a relevant field and at least eight (8) years work experience in environment, natural resources or fisheries management related fields in Bangladesh. S/he should have expertise in the monitoring of project impacts and progress indicators, to include, but not be limited to, socio-economic and biophysical results indicators, institutional development, and related sustainability issues in developing countries. S/he is to be locally hired. Level of effort to be 27 days.

The **Development/Communication Specialist (mid-level)** should have an advanced degree (M.A. or equivalent) in Community Development (or related field) and/or at least eight (8) years of experience working with diverse groups, especially in Bangladesh. S/he should be experienced in implementing community programs and alternative income generation schemes that have led to changes in the general public's perceptions, understanding, and behavior as related to natural resources management. Some background and experience in communication and adoption of new technologies/strategies. S/he should have experience in the design and implementation of social research activities in Bangladesh, including the evaluation of development programs and projects. S/he is to be locally hired. Level of effort to be 27 days.

Relationship and Responsibilities

The review team will report to Chief of Party of the MACH project or his designee(s) on all matters related to the scope and issues/objectives of the evaluation. The team will be responsible for preparing interim reports and briefings for USAID and the GoB as required during the course of the assessment period.

IX. Duty Post

All fieldwork will be performed in Dhaka, and at the MACH sites of Srimangal, Sherpur, and Kaliakor in Bangladesh

X. Logistic Support

Logistical support will be provided by the project

Schedule

The review effort will be conducted over a period of one month from November 4th through December 4th 2001.

APPENDIX 2
SCHEDULE OF MID-TERM REVIEW AND LIST OF PERSONS MET

Date	*Time*	*Activities*
Mon 5 Nov	PM	Briefing on Project, planning of review
Tues 6 Nov	AM	Meeting with MoFL
		DoF Briefing
	PM	Discussions with MACH Staff
Wed 7 Nov	AM	Preparation of Inception Report
	PM	Presentation to USAID and MACH.
Thurs 8 Nov	AM	Travel to Kaliakor
		Briefing from MACH staff, Kaliakoir
		Visit Aowla Beel and Meeting with Aowla Beel, RMO
	PM	Visit Lalkhar Kum and meet RMO
		Meeting with Beneficiary Group, and RMO Bashtoli
Fri 9 Nov		Reviewing Reports, discussing program
Sat 10 Nov	AM	Travel to Srimongal and Site Visit
	PM	Briefing from MACH staff, Srimongal
		Meeting with Jethua RMO and Beneficiary Group, Hajipur
Sun 11 Nov	AM	Meeting with Beneficiary Group, Jethua Beel
		Visit to Balla Beel
		Meeting with Beneficiary Group, Boulashir
		Visit to Boula Chhara Riparian Plantation
	PM	Meeting with Balla RMO
		Visiting IGA activities
		Meeting with UNO, Srimongal
Mon 12 Nov	AM	Visit Chhara Riparian Planatation
		Meeting with Union Chairman, Mirzapur
		Visit to CAGES
		Visit to Gopla River at Uttar Panchaun
	PM	Return to Dhaka
Tues 13 Nov	AM	Meeting with, Dr. Azharul Mazumder, USAID
	PM	Travel to Sherpur, Briefing from MACH staff, Sherpur
Wed 14 Nov	AM	Meeting with Union Chairman, Malijhikanda
		Meeting with Takimari Darabashia RMO
		Meeting with Beneficiary Group, Julgaon
		Visit Riparian Plantation, swamp plantation and CNRS nursery
	PM	Visit upper watershed

Thurs 15 Nov	AM	Meeting with UFO (Jhenaigati) and UFO (Sherpur Sadar) Meeting with Deputy Director, Social Welfare Department, Sherpur
	PM	Return to Dhaka
Fri 16 Nov		Reviewing Document and Report Preparation Meeting with ICLARM
Sat 17 Nov		Reviewing documents/ Report preparation
Sun 18 Nov	AM	Meetings with BCAS
	PM	Report Preparation
Mon 19 Nov	AM	Meeting with Ted Thomas, USAID Governance project
	PM	Meeting with CARITAS
Tues 20 Nov	AM	Meeting with CNRS
	PM	Discussion of specific issues with MACH staff
Wed 21 Nov	AM	Meeting with USAID
	PM	Report Preparation
Thurs 22 Nov		Preparing preliminary draft report
Fri 23 Nov		Preparing preliminary draft report
Sat 24 Nov		Preparing preliminary draft report
Sun 25 Nov	AM	Preliminary draft Report submitted to MACH staff
Mon 26 Nov	AM	Preliminary draft Report discussed with MACH staff
	PM	Preparing draft report
Tues 27 Nov	AM	Draft Report submitted to USAID/GOB Preparing appendices
Wed 28 Nov	AM	Preparing appendices and presentation
Thurs 29 Nov	AM	Preparing presentation
	PM	Presentation to USAID
Fri 30 Nov		Preparing final report
Sat 1 Dec	AM	De-briefing with GoB and USAID
	PM	Preparing Final Report/Discussions with MACH
Sun 2 Dec		Preparing Final Report
Mon 3 Dec	AM	Submission of Final Report

List of Persons Met

Government

Mohammad Shah Alam	Joint Secretary, Ministry of Fisheries and Livestock
Animul Islam	Joint Secretary, Ministry of Fisheries and Livestock
Abdur Razzaque	Senior Assistant Chief, Ministry of Fisheries and Livestock
Md. Nasiruddin Ahmed	Director General, Department of Fisheries
Mokammel Hossain	Deputy Director Planning, Department of Fisheries
Abdul Awal	Deputy Director Social Welfare Department, Sherpur
Anisur Rahman	Upazila Nirbahi Officer, Srimongol, Maulovibazar
Shahidul Islam	Assistant Commissioner, Srimongol, Maulovibazar
Jaharlal Majumder	Upazila Agriculture Officer, Srimongol, Maulovibazar
Siddiqur Rahman	Upazila Nirbahi Officer, Jhenaigati, Sherpur
Md. Matiur Rahman	Upazila Social Welfare Officer, Jhenaigati, Sherpur
Mizanur Rahman	Upazila Fisheries Officer, Jhenaigati, Sherpur
Guljar Hossain	Upazila Fisheries Officer, Sherpur Sadar, Sherpur
Anwar Ullah	Upazila Fisheries Officer, Kaliakoir, Gazipur

USAID-Dhaka

Mary Ott	Mission Director
Charles Uphaus	Deputy Mission Director (EGFAE)
John Riffenback	Head of Programs Office USAID Dhaka
R. David Hardin	Regional Legal Officer
Kathleen Bridges,	Regional Contracting Officer (MACH Administrator)
Azharul Haque Majumder	Team Leader, Environmental Program
Karyl Camesa	Program Officer
Carol Jenkins	Programs Officer (MACH Program Officer)
Alan Fleming	EGFAE, Program Specialist
Latifur Rahman	MACH-Activity Manager, USAID-Dhaka
Rowshan Akhtar,	Program Assistant
Luna Purification	Program Assistant

MACH Program

Darrell Deppert	Chief of Party
William J. Collis	Sr. Natural Resource Advisor
Md. Shahabuddin	Manager Administration and Finance
Mahbubur Rahman	Fisheries Biologist
A. Atiq Rahman	Senior Advisor, BCAS
Mujibur Rahman	Senior Fellow, BCAS
Mazharul Alam	GIS, MACH-BCAS
Aminul Karim Chowdhury	Hydrologist, MACH-BCAS
Sharif Mominul Islam	Pollution Expert
Mukhlesur Rahman	Floodplain Ecologist, MACH-CNRS
Sachindra Halder	Monitoring Coordinator, MACH-CNRS
A. M. Kamaluddin	Fisheries Biologist, MACH-CNRS

Thomas Costa	Director, Development, Caritas
Anwara Begum Shelley	Director, CFP, Caritas
John Gomes	Regional Director, Caritas Dhaka
Md. Iqbal Faruk	Program Officer/MACH-Caritas
Ashoke Kumar Das	Site Coordinator, MACH-CNRS, Kaliakoir
Moloy K. Sarker	Site Coordinator, MACH-CNRS, Hail Haor
S.M. Ziaul Huque	Site Coordinator, MACH-CNRS, Sherpur
Hebina Azim	Field Coordinator, MACH-CARITAS, Sherpur
Field Staff of MACH	

Organizations and Projects

Paul Thompson	Officer In Charge, ICLARM, Dhaka
Jock Campbell	Consultant, ICLARM, Dhaka
Ted Thomas	CoP, Local Government Initiative, USAID
Ainun Nishat	Country Director, IUCN
Abdullah Harun Chowdhury	Program Officer (Wetlands Network), IUCN
Bjorn Ceder	Adviser, Productive Employment Program, BRDB

APPENDIX 3
COMPARISON OF PROJECTS TO IMPROVE OPEN WATER FISHERIES

	Management of Aquatic Resources through Community Husbandry (MACH)	*Fourth Fisheries Project*	*Community Based Fisheries Management (CBFM) Project*
Funding Agency	USAID GoB and Grantees	DFID/World Bank/Global Environmental Fund GoB	1st phase:Ford Foundation/GoB 2nd phase-DFID/GoB
Implementors	Winrock BCAS, CNRS, Caritas	Department of Fisheries	ICLARM
Budget	$ 7.59 million	$ 88 million	$ 11 million
Duration	1998-2003	2000-2004	1st phase-1996-99 2nd phase-2001-06
Approach	• Whole ecosystem based • Co-management. • Direct participation of all users. • Involve local government	• Not ecosystem based • Co-management. • Direct participation of • users group • No direct involvement of local government • At least 50% fishers in FMC	• Not ecosystem based • Flexible co-management with direct participation of fishers and/or other users groups • Only informal involvement of local government • Implemented through DoF and NGOs
Objectives	• To raise awareness (of community and Local Govt.) about the importance of natural floodplain resources to secure food and income security for the people of Bangladesh • To maintain and recover the selected floodplain ecosystems and associated fisheries • To identify activities to generate alternative income that will result in reduction of pressure of fishing and agriculture in the floodplain fisheries	• To establish ecologically sound and community- based sustainable fisheries management in the inland open waters of Bangladesh	CBFM 1: To test models for community based fisheries management and to ensure more equitable and sustainable benefits from fisheries CBFM 2: To improve processes and policies for inland fisheries based on evidence of testing community based fisheries management, including mechanisms for linking local community management and informing and influencing policy stakeholders of the outcome.

Appendix 3 Comparison of Projects to Improve Open Water Fisheries (continued)

	Management of Aquatic Resources through Community Husbandry (MACH)	*Fourth Fisheries Project*	*Community Based Fisheries Management (CBFM) Project*
Outputs	• Increased production fish, floodplain resources and biodiversity. • There will be development and policy guideline at local level. • Community awareness of the need for renewable resource management will be established • Floodplain Management Organization will be organized • Improved floodplain resource management will be established • Community groups will be involved in alternative income generating activities.	• Increased fish production of ?? tonnes • CBO is established in each of the 125-150 sites and continue to function on their own • Improved Management in each of the sites • 50 aquatic sanctuaries • 16 fish passes and fish friendly regulators • Improved habitat in 10 sites	• at least 5 approaches to Community based fisheries management tested • community based organizations in at least 65 water bodies • improved fisheries/wetland practices introduced by committee • wetland/floodplain institutions (clusters of CBOs) for 6+ systems established • recommendations for legal and policy changes
Indicators	• -Increased area of wetlands with sustainable management • -Increased production of floodplain resources • -Increased bio-diversity	• Increased production of fish amounting to ?? tonnes. • Sustainable livelihoods for the targeted beneficiaries • Poverty alleviation and improved socio-economic condition of the beneficiaries.	• number of CBOs operating and level of NGO support • Improved livelihoods for poor wetland users • improved decision making • more sustainable production • local government support for institutions • change attitudes and behavior of fisher communities and in awareness of government and non-government organisations
Coverage	• 3 sites of 3 different ecosystems/ habitats	• 125-150 sites from all over Bangladesh	• 1st phase- 19 sites • 2nd phase 46 sites or clusters (including 1st phase)
Command area of each site	• Larger	• Larger	• Smaller or as clusters medium-larger

Appendix 3 Comparison of Projects to Improve Open Water Fisheries (continued)

	Management of Aquatic Resources through Community Husbandry (MACH)	*Fourth Fisheries Project*	*Community Based Fisheries Management (CBFM) Project*
Physical Interventions	• Plantation • Fish sanctuaries • Earth work for habitat improvement • Re-stocking of rare/endangered beel-based species	• Establish 50 sanctuaries • Fingerling stocking in 60,000 hectares • Earth work for improvement 10 habitats • Construction of 6 fish passes and convert 10 regulators to fish friendly structure	• Earth work for habitat improvement • Fingerling stocking • Establish sanctuaries • Training and inputs like nets, fingerlings
Social Interventions	• Awareness raising about m\natural aquatic resource conservation and community's own management • Training and Credit for AIGA • Health and sanitation • Adult literacy	• Awareness raising about inland fisheries resource conservation and community's own management • Training and credit for AIGA	• Awareness raising about natural aquatic resource conservation and community's own management • Training and credit for AIGA • Grants for community development
CBO	Primary group at village/doho/kum level RMO with representative from each village/kumdoho at centralm beel/river level Institutional structure still being developed	• FMC at central water body • Sanctuary level Executive body wit at least two representatives from each village • May or may not be any village committee • At least 50% should be fishers	• Primary groups of fishers (100% fishers) • Beel or river MC at central water body level • Executive body with representatives from each group or from different stakeholder groups also • Flexible according to site and likely to be different/additional arrangements in CBFM-2

APPENDIX 4
INDICATORS, TARGETS AND ACHIEVEMENTS

Table A4.1 Indicators and Achievements of Strategic Objective 6

Reference	*Indicator*	*Year*	*Planned*	*Actual Sep 2001*
6.1	Area of Floodplain where sustainable management is being implemented (ha)	*1999*	0	200
		2000	1,000	2,200
		2001	5,200	6,300
		2002	10,000	
		2003	15,000	
6.2	Increase in production of floodplains Fish resources (kg/ha of wetland)			
	Site 1: Hail Haor	*1999*		164*
		2000		
		2001	174	191
		2002	184	
		2003	184	
	Site 2: Turag-Bangshi	*1999*		51*
		2000		
		2001	61	124
		2002	*71*	
		2003	*71*	
	Riparian trees (number of trees-all sites)	*1999*		
		2000	2,000	40,000
		2001	100,000	103,952
		2002	150,000	
		2003	276,000	
6.3	Increase in biodiversity of floodplain resources (no. of species)	*1999*	0	
		2000	0	
		2001	0	
		2002	0	
		2003	25	
6.4	Area of tropical forest areas conserved and sustainable management being implemented	*Not applicable to MACH*		

* from Baseline Studies

Table A4.2 Intermediate Results (IR) Indicators and Achievements

Reference	*Indicator*	*Year*	*Results Planned(1)*	*Actual*
IR 6.1	**Improved Floodplain Resource Management Practices**			
	IR 6.1.1 Management groups formed *Description*: Formation of active wetland resource management committees (RMOs) made up of representatives of all resource users including fishers and women. *Units of measure*: # of groups formed	1999 2000 2001 2002 2003	0 13 20 30 30	1 13 16
	IR 6.1.2 Improved floodplain resource management established *Description:* Establishment of sanctuaries for the conservation of fish and other aquatic habitat. Sanctuaries identified, planned and managed by resource management organisations (RMOs) *Unit of measure:* Number of fish sanctuaries established	*1999* *2000* *2001* *2002* *2003*	0 15 30 40 50	1 16 59
IR 6.2	**Increased Public Awareness**			
	IR 6.2.1 Community awareness of the need for renewable resource management *Description:* Increased awareness among the community and other stakeholders groups regarding the complexity of floodplain ecosystem *Unit of measure*: # of public awareness meetings	*1999* *2000* *2001* *2002* *2003*	O 15 30(200) 40(300) 50(400)	60 123 484
	IR 6.2.2 as IR 6.2.1 but *Unit of measure:* Number of Participants in meetings	*1999* *2000* *2001* *2002* *2003*	0 900 30,000 40,000 50,000	4,900 6,100 62,180
IR 6.3	**Generate Supplemental Income**			
	IR 6.3.1 Community groups involved in alternative income generating activities *Description:* Development of alternative income generating opportunities for groups formed from households dependent on fishing. *Unit of measure*: Number of groups	*1999* *2000* *2001* *2002* *2003*	0 100 100(150) 100(220) 100(220)	44 105 159
	IR 6.3.2 Increased income of community beneficiary. *Description*: as IR 6.3.1 but *Unit of Measure: % increase in supplemental income*	*1999* *2000* *2001* *2002* *2003*	 20% 30% 40% 50%	10% 19% 31%
	IR 6.3.3 Total number of indirect beneficiaries *Description:* Through result demonstration, farmer field days, awareness sessions and improved resource planning, others in the community will directly benefit from MACH activities *Unit of Measure*: total number of indirect beneficiaries (cumulative)	*1999* *2000* *2001* *2002* *2003*	0 60,000 100,000 120,000 150,000	10,000 160,300 180,000

Note: (1) Figures in brackets show the revised targets

APPENDIX 5
FORMATION OF LOCAL INSTITUTIONS

A5.1 Introduction

The most critical activity for the success of MACH approach is the development of local institutions to manage water bodies after the completion of the project. Without appropriate institutions being in place and functioning at the end of the project, the degradation and over-exploitation of wetlands is likely to resume and the gains made by the project in improving biodiversity and wetland habitats lost.

Creating local institutions is very challenging for many reasons including the weakness of existing local government structures and resources in rural areas are traditionally controlled by a small number of households. Recognising the dominance of better off households in local affairs, the program has included members of all socio-economic groups in the local institutions formed to manage the wetlands. Other projects working on improving wetlands have focused on developing homogeneous groups of fishers to take over the management of the wetlands but the results have been inconclusive as to whether such management organisations are sustainable.

Another major difference between MACH and these other projects is that MACH is working on improving the management of resources over the entire wetlands ecosystem rather than working on just a single water body. The broader approach of MACH increases the complexities of who should be involved to make the management system sustainable.

Creation of similar heterogeneous groups to manage natural resources has been tried in the water resources sector. Government agencies and NGOs have tried to create local institutions to manage the numerous flood control, drainage and irrigation schemes that have been constructed during the past four decades. A group or Water Management Organisation (WMO) is formed from predominantly farmers but also other resource users to manage the structures that control water levels within an area enclosed by embankments, The purpose of such schemes is usually is to provide farmers with irrigation water or to protect the land inside from floods or waterlogging. Unfortunately, there has been only limited success in creating sustainable groups to manage such flood control and irrigation schemes. The reasons why groups fail are often complex but usually include factors such as the inability to reach a consensus amongst the various groups using the water (such as highland farmers, lowland farmers and fishermen) about how the scheme should be operated, and an inability to collect sufficient funds from the users to cover operational and maintenance costs as farmers do not traditionally pay for water in rural Bangladesh. In the National Water Policy (MoWR 1999), the importance of wetlands and the need to address the requirements of different water users are recognised. The government has prepared guidelines for participatory water management, based on the experience of Bangladesh Water Development Board and LGED (MoWR 2001).

A5.2 Types of Water Bodies

MACH is forming local management institutions around three different types of water bodies, namely:

- beels (deeper areas or depressions in the floodplain that are seasonal or perennial water bodies that become large areas of water during the monsoon season)
- rivers (the main drainage channels, usually carrying perennial flows)

- chhara (streams or smaller drainage channels)

The program has developed different management systems for the different water bodies due to their different characteristics. For example, the users of beels tend to live in adjacent villages within about 1-2 km of the beel while the users of rivers tend to live within about 500m of the river channel but spread out over 5km to 10 km along the length of the river,

A5.3 Ownership of Water Bodies

A critical issue is the ownership of water bodies. Many beels are khas (owned by the government) but some beels are owned privately. In many areas throughout the country, khas land including beels has been either partially or fully encroached, and is now under the private control. Although land is registered, determining the status of land ownership is often very difficult because records are not kept up to date and are subject to change by illegal means. In many cases, khas and private beels are drained to extend the area available for boro rice cultivation.

Under present government rules, khas beels are leased out for three years and the annual lease amount must be increased by 25% after the first year and an additional 10% after the second and third years. The lease conditions for beels tend to encourage over-exploitation of the resource as leasees tend to increase the catch of fish to cover the increased costs of the lease and at the end of the three year lease, the leasee may remove all the fish in case the lease is given to someone else. The project is working with the Ministry of Fisheries and Livestock, the Ministry of Land who are responsible for allocating the lease and other fisheries project is trying to reform the leasing system to protect fish stocks.

Rivers are owned by the government and are open access to fishing. Chhara (streams) are owned by the government but tend not to carry fish due to deterioration of the riparian habitat.

The program has made some progress in improving the terms for leasing khas water bodies, and is presently negotiating with MoFL to provide 10 year leases to RMOs. MACH has also been working with the Wetlands Network on the preparation of a position paper on leasing issues for submission to MoFL.

A5.4 Formation of Resource Management Organisations

The program's present approach to formulating a Resource Management Organisation (RMO) for a particular water body is:

- Introductory meetings at the upazila for UNOs and union chairmen by senior program staff, and staff from the ministry.
- Followed by meetings at the union for union parishad members and community leaders by senior program staff, government staff including the Deputy Commissioner, and the Assistant Deputy Commissioner (Revenue), and staff from USAID.
- Awareness program to introduce MACH and sensitise villagers about the importance of fisheries and other animal and plant wildlife.
- Participatory action plan development (PADP) to identify possible management and physical interventions.

- Delineation of the management area of a suitable water body and identification of associated villages and resource users.
- Rapport building and awareness raising of communities within the management area including dissemination of messages regarding process of formation and activities of RMO.
- Organisation of village committees by inviting all households to a village meeting.
- Village committee comprising of all those attending the village meeting selects RMO members.
- Meeting of RMO members to select Executive Committee and decide on constitution; and
- Registration of RMO with Social Welfare Department who consider the RMO to be a non-government organisation.

Wetlands usually have a number of lower pockets (locally known as *kur, kum* for rivers and *doha* for beels) and separate committees are organised locally to look after particular features within the wetland but the committees come under the RMO. For example, a *doha* committee may be given responsibility for establishing a sanctuary in the lowest pocket of water but the committee is supervised by the RMO.

The program initially formed RMOs be requesting existing Doha Committees to recommend RMO members. To encourage wider participation, the program modified the selection process by working through village committees.

The main features of the 13 RMOs formed by MACH are shown in Table A5.1 for the 5 RMOs in Hail Haor, Table A5.2 for the 3 RMOs at Turag-Bongshi Basin and Table A5.3 for the 4 RMOs in Kongshaw-Malijhee Basin. The number of villages covered by one RMO ranges from 2 to 6 with populations ranging from 555 to 1580. In Hail Haor, professional fishers comprise about 30% to 40% of the villages while in Turag-Bongshi and Kongshaw-Malijhee, professional fishers comprise about 10% to 16% of villagers. The percentage of seasonal fishers is higher (25-30%) in Kongshaw-Malijhee, while the percentage of subsistence fishers is higher (55-57%) in Turag-Bongshi.

Based on the selections made by villagers, the number of members of the general body of Beel RMOs (BRMO) range from 21 to 78. The general members selected Executive Committees ranging in size 7 to 19. The general body members wanted large Executive Committees to ensure involvement of various influentials and interest groups.

Medium and large farmers dominate the Executive Committees in Hail Haor and Turag-Bongshi except for I BRMO in Hail Haor where fishers have reasonable representation. In Kongshaw-Malijhee, medium and large farmers dominate 1 BRMO, but in 2 BRMOs there are similar numbers of farmers and fishers and fishers have reasonable representation in the other BRMO. Some fishers have been elected to RMOs as individuals, but there has been limited linkage between the MACH Beneficiary Groups and the RMOs. The representation of different socio-economic groups in the RMO is very variable, even though poorer households comprise about 60% of the community. There is a high risk of not involving poorer households when there are so many social and cultural constraints on their actions in open forums.

Table A5.1 Features of RMOs, Hail Haor

Name of Committee/Organisation	*RMO1*	*RMO2*	*RMO3*	*RMO4*	*RMO5*
Location - union - upazila	Sananda Mirzapur Sreemongal	Balla Vunbir Sreemongal	Jethua Kalapur Sreemongal	Kajura Giannagar Moulavi bazar	Agari Nazirabad Moulvi bazar
Number of village involved	4	3	6	2	3
Population of villages: total (Households) - professional fishers (%) - seasonal fishers (%) - subsistence fishers (%) - non fishers (%)	1100 33% 20% 40% 10%	825 40% 20% 29% 11%	1200 30% 25% 30% 15%	555 25% 20% 30% 25%	830 30% 25% 30% 15%
Type (RMO, Committee etc.)	BRMO	BRMO	BRMO	BRMO	BRMO
Date of formation	Nov.'00	January'01	Nov.'00	Feb.'01	March'01
Number of members-general body	40	30	42	21	30
Number of members on Exec. Committee - number of professional fishers - number of women - medium or large farmer	13 2 - 11	9 6 - 4	13 2 - 11	7 2 - 5	9 2 - 7
Registered with Social Welfare ?	Yes	Yes	Yes	Yes	Yes
Number of CARITAS groups in Village	3	5	14	2	5
Other NGOs active in Village	BRAC, ASHA, Grameen Bank Pashabit Unnayan Sangtha, SPOSP, Sreemongal Foundation	BRAC, ASHA, Grameen Bank, Pashabit Unnayan Sangtha, SPOSP, Sreemongal Foundation	BRAC, ASHA, Grameen Bank, Pashabit Unnayan Sangtha, SPOSP, Sreemongal Foundation	BRAC, ASHA, Grameen Bank, Pashabit Unnayan Sangtha, SPOSP, Sreemongal Foundation	BRAC, ASHA, Grameen Bank, Pashabit Unnayan Sangtha, SPOSP, Sreemongal Foundation
Type of water body	Beel	Beel	Beel	Beel	Beel
Area of water body in dry season (Acres) (Varies year to year)	8.89	70.73	6.86	0.80	72.86
Ownership/property rights - of dry season water bodies if khas land, state lease amount, and who holds lease	Khas	Khas lease still being processed	Khas	Khas Non-lease	Khas
Resources provided by project - purpose and amount of loans also provide conditions of loan - Purpose and amount of grants	Tk 90,208 for details see Table A5.4 Tk 341,893 for beel excavation	Tk 5,500 for details see Table A5.4 Tk 82,799 for beel excavation	Tk 47,670 for details see Table A5.4 Tk 825,712 for beel excavation	Tk 5,500 for details see Table A5.4 Tk 165,358 for beel excavation	Tk 5,500 for details see Table A5.4 Tk 374,149 for beel excavation
Fisheries management decisions and rules (for example: fishing ban; charges for fishing; sanctuary established etc.)	Ban fishing throughout the year	Ban fishing in sanctuary 3-months Ban fishing in all areas	Ban fishing in sanctuary Ban fishing in all areas for 5 months Collect tolls	details not available	details not available

Table A5.2 Features of RMOs, Turag-Bongshi

Name of Committee/Organisation	*RMO1*	*RMO2*	*RMO3*
Location - union - upazila	Mokash Kaliadoha para Kaliakoir	Alua beel chapeion Kaliakoir	Turag River Boali, Maddya Para Chapair, Sreepaltoli, Kaliakoir
Number of village involved	6 nos.	5 nos.	20 nos.
Total Population of villages (Households) - professional fishers (%) - seasonal fishers (%) - subsistence fishers (%) - non fishers (%)	1440 15% 12% 57% 16%	1200 16% 15% 55% 14%	4600 10% 16% 56% 18%
Type (RMO, Committee etc.)	5 Doha Committees	5 Oho Committees	3 section Committees
Date of formation	April'01	January'01	September'01
Number of members-general body	73 member	78 members	57 members
Number of members on Exec. Committee - number of professional fishers - number of women - medium or large farmer	EC- 18 nos. Fisher – 5 Medium - 13	EC- 19 nos. Fisher – 3 Farmer- 16	EC- 19 nos. Fisher – 2 Farmer- 17
Is organization registered with Social Welfare ?	Submitted	Submitted	Submitted
Number of CARITAS groups in Village	08	06	08
Other NGOs active in Village	BRAC, Grameen Bank, ASHA, Proshika	BRAC, Grameen Bank, ASHA, Proshika	BRAC, Grameen Bank, ASHA, Proshika
Type of water body (beel river, chhara etc.)	Beel	Beel	River
Area of water body (ha) (varies year to year) -dry season -wet season - number of separate dry season water bodies	 20 ha 2000 ha 1 no.	 50 ha 5000 ha 3 nos.	
Ownership/property rights - of dry season water bodies - of wet season water body % of Households in villages owning land used for boro cultivation.	Khas 30 acre. Not leased 2000 ha (50%)	Khas 50 acre. Not leased 5000 ha 50%	Khas 12 km Not leased -
Resources provided by project - purpose and amount of loans - Purpose and amount of grants	 Tk 5,500 for details see Table A5.4 Tk 154,626 for beel and khal excav.	 Tk 5,500 for details see Table A5.4 no funds for PI	 Tk 5,500 for details see Table A5.4 no funds for PI
Fisheries management decisions and rules (for example: fishing ban; charges for fishing; sanctuary established etc.)	No fishing by dewatering Stop fishing in sanctuary	No fishing by Dewatering Stop fishing in sanctuary Ban on fishing for 5 months Collect tolls	No fishing by Dewatering Stop fishing in sanctuaries

Table A5.3 Features of RMOs, Kongshaw-Malijhee

Name of Committee/Organisation	*RMO1*	*RMO2*	*RMO3*	*RMO4*
Location - union - upazila	Kewta Beel RMO Pakuria UP Office, Pakuria Sherpur	Takimari Darabashia Beel RMO Chenguria Kalibari bazar Jhenaigati,	Dholi Beel RMO Jhenaigati	Bailsha RMO Dhansail Jhenaigati,
Number of village involved	3	4	4	2
Total Population of villages (Households) - professional fishers (%) - seasonal fishers (%) - subsistence fishers (%) - non fishers (%)	1215 10% 25% 30% 35%	1580 15% 30% 30% 25%	1490 15% 25% 34% 26%	820 14% 27% 35% 24%
Type (RMO, Committee etc.)	RMO	RMO	RMO	RMO
Date of formation	19.2.2001	18.4.2001	22.5.2001	26.5.2001
Number of members-general body	37	48	48	24
Number of members on Executive Com. - number of professional fishers - number of women - medium or large farmer	15 1 2 10	17 7 1 9	17 7 1 8	17 12 2 3
Is organization registered with Social Welfare ?	Under process (Submitted)	Under process	Under process	Under process
Number of MACH beneficiary groups in Villages				
Other NGOs active in Village	BRAC, Grameen, Unnayan Sangha	BRAC, Grameen, Unnayan Sangha	BRAC, Grameen, Unnayan Sangha	BRAC, Grameen, Unnayan Sangha
Type of water body (beel river, chhara etc.)	Beel	Beel	Beel	Beel
Area of water body in dry season (ac) (Varies year to year)				
Ownership/property rights of dry season water bodies if khas land, state lease amount, and who holds lease - of wet season water body % of Households in villages owning land used for boro cultivation.	Originally thought to khas but claimed to be private after construction of PI	Private	Khas	Khas
Resources provided by project - purpose and amount of loans - Purpose and amount of grants	 Tk 5,500 for details see Table A5.4 Tk 216,347 for beel excavation.	 Tk 5,500 for details see Table A5.4 Tk 128,001 for khal and beel excavation.	 Tk. 10,500 for details see Table A5.4 no funds for PI	 No loan provided No funds for PI
Fisheries management decisions and rules (for example: fishing ban; charges for fishing; sanctuary established etc.)	Stop fishing control and stop destructive gear Stop fishing for 2 moths	Stop fishing control and stop destructive gear Stop fishing for 2 moths	Stop fishing control and stop destructive gear Stop fishing for 2 moths	Stop fishing control and stop destructive gear Stop fishing for 2 moths

Table A5.4 Details of Advances provided to RMOs

Name of RMO	**Funds provided as an Advance**				
	Opening of Bank Account (Tk)	*Registration fees (Tk)*	*Lease Money (Tk)*	*Capital and management Expenditure (Tk)*	*Total (Tk)*
Hail Haor					
Sanonda RMO	5.000	500	21,708	63,000	90,208
Balla RMO	5.000	500	15,000	27,170	47,670
Jethua RMO	5.000	500			5,500
Kajura RMO	5.000	500			5,500
Agri RMO	5.000	500			5,500
Turag Bongshi					
Mokesh RMO	5.000	500			5,500
Alua RMO	5.000	500			5,500
Turag River RMO	5.000	500			5,500
Kongshaw Malijhee					
Kewta RMO	5.000	500			5,500
Takimari RMO	5.000	500			5,500
Dholi RMO	5.000	500	5,000		1000
Bailsha RMO	0	0			0

Source: CNRS

The program recognised the importance of involving all socio-economic groups, and, in more recent RMOs, MACH has made progress by encouraging wider representation from fishers. The participation of members in the affairs of the Executive Committee is very variable, which is to be expected with such large committees.

MACH has provided advances to all but one RMO for opening a bank account and registration. In addition, 3 RMOs have been given advances to purchase leases and one RMO has been given an advance for capital management expenditure. (See Table A5.4). The Mission found that terms of the advance are not always clear to the RMOs. RMOs have also been given grants to implement physical interventions such as excavation of beels and khals (see Tables A5.1 to A5.3 for details). The amounts provided as grants range from Tk 82,712 (Balla RMO) to Tk 825,712 (Jethua RMO).

MACH has modified the RMO for rivers and chhara to take account of the different physical layout of the resource and its users. For chhara, the RMO is formed from riparian landowners along the length of the chhara, as there are no other users of the water due to degradation of the resource. For rivers, the RMO is organised from users who live adjacent to a particular reach or section. For example, at the Kaliakor site, three RMOs have been formed along a 10 km stretch of the Turag River with 3 section committees. The RMO covers 20 villages with a total population of 4600 which is significantly larger than any BRMO.

The program have also organised one Union Resource Management Committee (URMC) to oversee the establishment of a central sanctuary in Hail Haor.

The RMOs have taken over the management of wetlands and had undertaken both management and physical interventions. The management interventions include:

- Total ban on fishing in sanctuaries

- Ban on fishing with certain types of gear and for specific fish species in all areas during late dry season/ early monsoon (April-June)
- Stop de-watering
- Imposing fees on fish catches.

The ban on fishing in all areas needs to be a minimum of about 2 months during the critical early monsoon spawning period to yield significant benefits. Although banning fishing for longer periods will also benefit fish populations, extending the ban to 5 months causes particularly hardship for professional fishers, one of whom said that he was "forced to each vegetables" during the period of the ban. MACH should determine as to who is benefiting from the increase in fish production resulting from the ban and ensure fishers are receiving an appropriate share of the benefits. The Mission found that RMOs were not clear about the technical reasons for banning fishing, and hence some RMOs had imposed bans of up to 5 months. MACH needs to work with RMOs to clarify the basis for banning fishing during specific periods. Some RMOs have imposed fees to limit the extent of fishing and to raise revenue for the RMO.

The physical interventions include:

- Khal re-excavation
- Beel/doha re-excavation
- Establishment of sanctuaries

Fish production had increased due to the interventions (see Table A4.1), but more data are required to determine the extent to which the increase is due to the interventions or more favorable hydrological conditions.

RMOs visited by the Mission did not have long term plans to show how the wetlands would be improved further. Even though some RMOs were collecting fees from fishers, accounts were not readily accessible. There is need for transparency in the revenue collection, expenditure and investment of the RMOs. There is a need for transparency in the revenue collection, expenditure and investments of the RMOs.

MACH is considering establishing Union Coordination Committees as an apex organisation for the RMOs in a union, but the details of how this committee would work are still being worked out and discussed with the existing RMOs and LGCs.

A5.5 Local Government Committee (LGC)

Local Government Committees have been established to link the RMO and other MACH activities with the upazila government staff and the union parishad chairmen.

The Local Government Committee is chaired by the Upazila Nirbahi Officer (UNO) and the MACH Site Coordinator is the member-secretary. The chairmen of the Union Parishads are members of the LGC, along with officials of appropriate government departments such as the Upazila Fisheries Officer, the Upazila Agricultural Officer, the Assistant Commissioner (Land), the Assistant Conservator of Forests and the Thana Police Officer. The LGC meets quarterly.

The terms of reference for the Local Government Committee include:

- propose schemes and approve plans for physical interventions
- review progress;
- assist the project with implementation;
- offer recommendations for program interventions;
- suggest policy changes (local and national) needed to achieve project targets and goals;
- provide advice and suggestions to achieve project targets and goals.

The LGCs is recognised by UNOs and union parishad chairmen as a useful channel between the program activities and the government administration. One constraint on the performance of the LGC is that government staff are subject to frequent transfers. For example, in Srimongal, there have been 4 UNOs and 5 UFOs between 1999-2001.

A5.6 Review of MACH's Institutional Development

Developing sustainable institutions to manage natural resources in rural Bangladesh is very challenging ands there have been few successes. The environment for creating new institutions is difficult for many reasons including the hierarchical and conservative power structures in rural areas and weak local government institutions. Against this background, MACH is trying to create institutions to improve the management of wetlands for the betterment of local communities in general and poorer households in particular.

All but one of the first batch of RMOs selected by villagers in Hail Haor and Turag-Bongshi are dominated by better-off farmers. According to the Baseline Survey of Turag-Bongshi (MACH 2000e and Table A6.1) , better-off farmers are not involved in fishing, indicating that these RMO members may be more interested in management issues rather than the impact of interventions on their ability to catch fish.

Resource Management Organisations are a new institution and will take some time to mature. MACH should monitor the development and functioning of the existing RMOs to determine who is making the decisions

RMOs have the potential to become viable institutions to improve wetlands but they need to be strengthened as in their present form they are not sufficiently representative of the different resource users.

The LGC was initiated by MACH and will probably not survive after MACH. The LGC has a similar composition to the Upazila Technical Development Committee (UTDC), and consideration should be given to merging the LGC into the UTDC. Similarly the union technical development committee could have a role in supporting RMOs. Upazila and unions should have development plan books showing the infrastructure (roads, khals for drainage and irrigation, etc.) to be developed for the next 5 years. The union and upazila technical development committees are meant to select all infrastructure development schemes from the books but the plan books are rarely prepared and used.

Program staff need to be strengthened to support the development of the RMOs by the addition of an Institutional Development Specialist and field staff with social development skills.

A5.7 Recommendations

The key issue to be addressed is the sustainability of the local institutions developed by MACH for managing the wetlands. The existing RMOs require more time to mature and fully adopt the responsibilities and requirements of the task. RMOs will probably require support from the program for about 5 years or more.

The Mid-term Review Mission recommends that:

- *MACH is extended as more time is required to fully develop RMOs*

- *MACH staff working with RMOs should be strengthened with the addition of an Institutional Development Specialist and field staff with social development skills.*

- *MACH should develop a long-term plan for the development of local institutions being developed by the program including exit strategies to show how project support will be phased out. MACH is a pilot program and hence there is the scope to try different approaches in different areas. MACH is a pilot program and hence there is scope too try different approaches towards developing sustainability.*

- *MACH-formed institutions should move closer to the existing government structure, and consideration should be given to making the UFO the member secretary of the LGC with the MACH Sit Coordinator becoming the facilitator.*

- *After the formation of the RMO, the awareness program should be continued at greater intensity than at present to ensure the actions of the RMO are understood by the communities they represent and communities understand how the revenues raised by the RMO are being utilised for the improvement of wetland resources.*

- *With assistance from MACH staff, RMO members should develop long-term plans to show inter alia how the RMO intend to manage the water body, the level of funding required and how the RMO intend to raise the revenue required.*

- *The project should prepare detailed case studies of the RMOs to show how the RMOs are actually operating. Issues to be discussed in the case studies should include which members are dominant, who contributes to discussions during meetings, and who within the RMO actually makes the decisions, the awareness of different groups within the village of the workings of the RMO, the extent of participation, how committees are informed of decisions taken by the RMO, and transparency of operation and fund management.*

- *MACH should determine who is benefiting from the increase in fish production resulting from the ban on fishing and ensure fishers are receiving an appropriate share of the benefits.*

APPENDIX 6
COMMUNITY DEVELOPMENT AND SUPPLEMENTARY INCOME GENERATING ACTIVITIES

A6.1 Introduction

MACH is a program of the Government of Bangladesh sponsored by USAID. The program is being implemented by four non-government organizations: Winrock International, Bangladesh Centre for Advanced Studies (BCAS), Center for Natural Resource Studies (CNRS) and Caritas Bangladesh. The project started in September 1998 and is planned for a period of 5 years. Following an inception period, field programs were initiated in Hail Haor (HH) in Maulovibazar District and the Lower Turag-Bongshi (TB) River Basin in Kaliakor Upazila in Gazipur District and part of Tangail District in June of 1999. A third site at the Upper Kongshaw-Malijhee (KM) River Basin in Sherpur District was started in July 2000.

The present targets and measurable indicators for the program place less emphasis on the impact of program activities on poor resource users than in the MACH agreement (Winrock/USAID 1998) but the program still emphasizes the need for inclusion of all socio-economic groups in management of wetland resources. MACH has a twofold aim: (i) to ensure sustainable wetland resource management (water, fish, plants and wild life) through community participation and (ii) to ensure food security of those who depend on wetland/flood plain resources for their livelihood. As a part of ensuring food security, MACH is organizing groups of economically or socially disadvantaged individuals including fishers. The primary objective of this effort is to ensure the participation of poorer resource users in the management of the flood pain resources (MACH 2000b).

The MACH approach emphasizes on raising the awareness of the population in and around wetlands (*haor, beel*, etc) to restore the wetland resources through an appropriate management. The project focuses on a multi-disciplinary, multi-sectoral and participatory process of planning, implementation and monitoring for sustainable wetland resource management. The project encourages the communities and local government in the planning and sustainable use of natural aquatic resources. In order to reduce over-fishing, the project has included the development of alternative income generating activities for existing and new fishers as well as others who directly depend on fishing.

A6.2 Socio-economic Profile of Program Sites

The socio-economic condition of wetland areas in Bangladesh is generally backward. Wetland areas often have poor communications and infrastructure developments. In general, the livelihood strategies of the population are very traditional and depend mainly on utilization of natural resources and the incidence of poverty is widespread. MACH's field sites have the typical characteristics of wetlands. Baseline socio-economic data are available for Hail Haor and the Lower Turag-Bongshi (TB) River Basin. Data for the third site at the Upper Kongshaw-Malijhee (KM) River Basin are still being processed.

According to the baseline data, the average family size in Hail Haor is 5.7 and in the Lower Turag-Bongshi (TB) River Basin 5.3 (MACH 2000e). Interestingly, the family size is smaller among the poorer households at both locations. The incidence of illiteracy is high at both sites, and even higher among poorer families. The landholding patterns and crop related and non-crop

related occupations of different socio-economic groups are shown in Table A6.1. In Hail Haor, 92% of the households own only about 49% of agricultural land, while 8% households own about 51% of the agricultural land. In the Lower Turag-Bongshi (TB) River Basin the landownership pattern is slightly less skewed: 88% of households own about 55% of the agricultural land, while 12% of households own 45% of the agricultural land. The implications are that a few households control most of the land resources at both sites. The majority of households (64% at HH and 57% at TB) are functionally landless and have negligible access to land resources. The number of landless households in the program sites is higher than the national average of 53% (BBS 2001), particularly in Hail Haor.

Table A6.1: Occupational and landownership pattern in MACH Project areas

Variables	*Landless (0 – .5 ac)*	*Marginal (.51 – 1.50 ac)*	*Small (1.51 – 2.50ac)*	*Medium (2.51 – 5.0 ac)*	*Large (5.01 ac +)*
Srimongol (HH)					
Family Size	5.1	5.6	6.6	8.2	8.0
Households (%)	64.0	19.0	9.0	6.0	2.0
Land owned (%)	4.0	22.0	23.0	27.0	24.0
Primary Occupation					
Crop related (%)	15.0	37.0	55.0	56.0	70.0
Non-crop (%)	85.0	53.0	45.0	44.0	30.0
(Fisher - %)	(55.0)	(40.0)	(15.0)	(18.0)	(20.0)
Kaliakoir (TB)					
Family Size	4.7	5.1	6.6	7.0	11.9
Households (%)	57.0	24.0	7.0	9.0	3.0
Land owned (%)	6.0	24.0	15.0	32.0	23.0
Primary Occupation					
Crop related (%)	34.0	53.0	65.0	88.0	87.0
Non-crop (%)	66.0	47.0	35.0	12.0	13.0
(Fisher - %)	(23.0)	(2.0)	(0)	(0)	(0)

Source: MACH (2000d)

In Srimongol the primary occupation of 15% of landless households are crop related, and 85% of landless households depend more on non-crop related activities. Fishing is a common activity among the non-crop related activities. It is noticeable that at least a certain percentage of households in all categories are involved in fishing related activities. Among the landless who depend on non-crop related occupations, 55% are fishers, while 20% of the large farm households have fishing as their primary occupation.

In Kaliakoir, the primary occupation of 34% landless households are crop related, and 66% landless households depend more on non-crop related activities. Fishing is not so common in the TB area even among the land-poor categories. Among the landless who depend on non-crop related occupations, only 23% are fishers, while no large farm households are engaged in fishing as their primary occupation. The main reasons of less involvement in fishing related activities are (a) beels are not perennial – fish catch is seasonal; and (b) the area is located in an industrial environment and not far from Dhaka where there are alternative employment opportunities.

Catching fish in fresh water and the marketing of fish are traditionally done by only male members of households. Women's involvement in fishing tends to be limited to fish processing, although some extremely poor female headed households occasionally become involved in fishing.

A6.3 Awareness Raising on Wetland Resources Management

Activities to raise the awareness of communities about the potential of natural flood plain resources to secure food and income are being implemented by the program partners CNRS and Caritas.

CNRS and Caritas organize awareness raising programs and activities for the communities living around the *beels* selected for inclusion in the program. CNRS takes the lead with awareness raising activities and focuses on organizing cultural programs, demonstrations and annual rallies to raise awareness about the potential of natural flood plain resources and their uses at *para* level meetings, village level meetings, and union level meetings. Caritas also organize awareness raising activities at para and village meetings. After the initial awareness raising campaign, CNRS concentrates mainly on formation and capacity building of Resource Management Organizations (RMO) comprising of representatives from different socio-economic groups, organizing sanctuaries, nurseries, plantations, and other physical activities and Caritas concentrates mainly on group formation, group management, skill training, demonstration, and development of IGAs for fisher community and poor females. Once the RMOs and the beneficiary groups have been formed, the intensity and coverage of awareness raising activities decline. MACH has the opportunity to use awareness raising campaigns to ensure discussion and transparency of key issues for groups such as the handing over process and future of their savings and credit and income generating activities, and key issues for RMOs such the reasons for changing the way resources are managed and the distribution of benefits from increased fish production.

The purpose of awareness raising activities is to sensitize communities and government officials to the importance of the environment and the need for their participation in resource conservation, management and restoration. In 2001, the awareness programs included awareness raising meetings at para and union level (16 programs with 7,217 participants), introductory seminars and workshops at upazila and district levels (2 programs), awareness programs at schools, dramas, video presentations (5 programs with 850 people in the audiences), world environments day and wetlands day observances (26 programs), posters and other awareness material distribution.

In general, awareness raising activities have had a positive impact and based on discussions with stakeholders, the Mission estimates that about 50% of villagers are aware of MACH and its activities. There is scope to consolidate the impact of the initial awareness raising activities by continuing with awareness raising activities to specific environmental and wetland issues related to RMOs and beneficiary groups.

The Mid-term Review recommends that:

- *The intensity of the awareness raising activities should be maintained after the formation of RMOs and beneficiaries groups to ensure the transparency of RMOs.*

- *The awareness campaigns of Caritas and CNRS should be integrated more closely to ensure that consistent messages are presented about the MACH approach.*

- *Awareness campaigns should be designed for specific constituencies. For example, the awareness campaign for beneficiary groups should be focused on the resources that can be accessed by poor households and group members.*

A6.4 Group Formation and Savings

Under MACH, Caritas is responsible for organizing beneficiary groups comprising of fishers and females from poor households utilizing the wetland/flood plain resources. Members may be full-time, part-time or subsistence fishermen, farmers, hunters, grass collectors and other disadvantaged people living in close proximity of the wetlands. Female groups include mainly women from fisher households, but also other women like widows, orphan girls, and abandoned poor women.

The selection criteria for group members are that members own less than 0.2 ha (0.5 acres) of land, are between 18-55 years old, have an average monthly income of about Tk. 3,000 or less, and educational qualification up to grade 10. A person who is involved in a government service, or a member in another NGO group or mentally disabled is disqualified from being a member.

In the process of group formation, Caritas organize a series of para and village meetings to identify beneficiaries by their wealth ranking and other means. In these meetings the objectives of MACH are discussed and general awareness regarding conservation of wetland resources is emphasized. Once a group is formed, discussion takes place between group members about group management and importance of weekly meeting and savings. The group formation process takes about three months.

After group formation, the basic training – group management, leadership and accounting training – is organized and group members become used to organizing and attending weekly meetings, and making weekly savings. Under MACH, there is a target to form 220 beneficiary groups in three MACH program areas. By September 2001, Caritas has organized a total of 177 groups, of which 125 are fisher groups and 52 are female groups. The number of groups and members at each program site are shown in Table A6.2, along with details of group savings. Though the standard group size is 20-30, in Sherpur area (KM) the average size of groups is generally smaller with 17 members.

About 50% of the target population has joined groups. The target for group formation was fixed prior to the start of fieldwork, but the areas selected for MACH activities are larger than originally assumed and consideration should be given to increasing the target for number of groups so that MACH activities cover all possible target households in the communities where the program is working. MACH should assess whether accessing only 50% of target households will be sufficient to achieve MACH'S objectives or whether to reduce fishing pressures sufficiently requires that the target be increased to cover a larger percentage of target households.

Table A6.2 Status of Organized Groups and Savings up to September 2001

Particulars		*HH*		*KM*		*TB*		*Total*	
		Target	*Achieved*	*Target*	*Achieved*	*Target*	*Achieved*	*Target*	*Achieved*
Fisher	Group	50	50	70	50	28	25	138	125
(Male)	Member	1000	1005	1200	879	560	595	2760	2479
	Av. Group Size	20	20.1	20	17.6	20	23.8	20	19.8
Female	Group	30	30	30	10	12	12	57	52
	Member	600	601	300	169	240	256	1140	1026
	Av. Group Size	20	20.0	20	16.9	20	21.3	20	19.7
Total	Group	80	80	75	60	40	37	195	177
	Member	1600	1606	1500	1048	800	851	3900	3505
	Av. Group Size	20	20.0	20	17.5	800	23.0	20	19.8
Savings	Fisher	0	525,575	0	170,392	0	189,121	0	885,088
(Tk)	Per Member	0	523	0	194	0	318	0	2,152
	Women	0	280,020	0	15,153	0	74,074	0	369,247
	Per Member	0	466	0	89	0	289	0	335
	Total	0	805,595	0	185,545	0	263,195	0	1,254,335
	Av. Savings/ Member	0	502	0	177	0	309	0	1,520

Source: MACH-Caritas (2001)

In the Caritas approach, regular weekly meetings and savings are indicators of group dynamism. MACH activities in Srimongol and Kaliakoir started about the same time, while MACH activities started in Sherpur one year later. The savings per member in Kaliakoir is Tk. 309 (Male: Tk. 318 and Female: Tk. 289); in Srimongol Tk. 502 (Male: Tk. 523 and Female: TK. 466), and in Sherpur Tk. 177 (Male: Tk. 194 and Female: Tk. 89). Even with groups formed at the same time, the amount of savings differs from one group to another, and even from one member to another within a group. Part of the reason for differences in the amount of savings from one member to another is that there are two kinds of savings: (i) compulsory savings, and (ii) optional savings. Groups have generally kept up with compulsory savings while some members have made optional savings when there is a surplus in their household income.

The level of group savings indicates that members are saving regularly and group self-discipline is strong. In addition, the fact that members are making optional savings indicates that members have confidence in the group. The program needs to address the reasons why the savings of female groups are less than the savings of fisher groups. The reason for lower savings of female group members include the more recent formation of female groups, and the tendency of female members to deposit only the compulsory savings as they have not yet received credit to start IGAs. The shortage of female program staff may be a factor in the slow development of female groups as with the present staffing female groups are mostly supported by male staff

The purpose of forming groups of fishers and women from fisher households using wetlands is to ensure participation of poorer resource users in the community management of flood plain resources and to create a system for providing services such as credit and training to poorer households. Unfortunately, MACH has concentrated its efforts on the credit and training part and

has not been so successful with the social mobilization required to ensure participation of poor resource users in RMOs, as discussed in Appendix 5.

MACH group formation activities are based on well-established procedures. Selection criteria and the selection process are sound. The savings system is working well and the additional savings made by group members indicates cohesiveness and trust within the groups. Access of members to their savings is flexible. Sustainability issues have not been discussed with group members. Even though 30% of groups are females, there are few female field staff.

The Mid-term Review Mission recommends that:

- *A plan for the sustainability of the groups should be developed, including an exit strategy and an estimate of the time required to consolidate the groups and phase out MACH support*

- *Group development training should cover more beneficiaries.*

- *MACH should determine the impact of the present coverage of groups and re-assess the targets for group formation.*

- *As 30% of the groups are female, MACH should have a proportional number of female staff to work with these groups.*

A6.5 Income Generating Activities (IGAs) and Skill Training

With help from Caritas field staff, group members identify suitable income generating activities. So far, members have identified income generating activities (IGAs) under two major areas: natural resources and non–natural resources. The groups select some of their members to receive micro-credit from the project to start income generating activities. Under the project framework Caritas provides skill training on cow rearing and fattening, plant nursery, poultry (chicken and duck) rearing, tailoring, vocational trainings and some other activities, as shown in Table A6.3.

Table A6.3: Status of Imparted Training Courses up to September 2001

Type of Training or Skill Development		*Project Target*	*Srimongol (HH)*		*Kaliakoir (TB)*		*Sherpur (KM)*	
			Site Target	*Achieve-ment to 30th Sept*	*Site Target*	*Achieve-ment to 30th Sept*	*Site Target*	*Achieve-ment to 30th Sept*
Group Development Training								
Group management	Batch	220	80	80	40	36	100	42
	Participants	4400	1600	1451	800	660	2000	805
Leadership	Batch	55	20	16	10	7	25	2
	Participants	1100	600	325	200	140	300	40
Accounts keeping	Batch	22	0	0	6	2	16	2
	Participants	440	0	0	120	45	320	40
Resources awareness	Batch	220	80	20	40	6	100	27
	Participants	4400	1600	367	800	78	2400	548
Skill Dev. for IGA & Demo								
Cow rearing & fattening	Batch	21	7	3	6	2	8	0
	Participants	420	140	48	120	48	160	0
Poultry/Duck rearing	Batch	13	6	1	3	0	4	2
	Participants	260	60	12	60	0	140	22
Pond culture/nursery	Batch	13	6	2	3	1	4	2
	Participants	195	90	47	45	9	60	29
Cage/pen culture	Batch	9	3	1	3	1	3	1
	Participants	90	30	21	30	10	30	16
Plant nursery	Batch	9	3	2	2	2	4	1
	Participants	90	30	29	20	17	40	16
Vegetables cultivation	Batch	21	7	3	3	1	11	2
	Participants	420	140	54	60	14	220	61
Wheat cultivation	Batch	21	6	5	7	5	8	1
	Participants	420	120	93	140	90	160	18
Vocational	-	-	-	--	-	-	-	
	Participants	50	20	10	30	5	0	9
Tailoring	Batch	9	0	2	3	0	6	1
	Participants	108	0	24	36	0	72	12
Small business	Batch	13	5	0	3	0	5	0
	Participants	260	100	0	60	0	100	0

Source: MACH-Caritas (2001)

The program is lagging behind in organizing accounts and resource awareness training courses, particularly in HH and in skill development training in general.

NGOs usually provide skill development training and credit prior to taking up specific IGAs by individual group members, but, based on discussions with groups, some MACH group members received credit and have taken up an IGA before receiving the relevant training. As a result, the

IGAs of some group members did not perform well and did not result in the expected profit. The provision of credit before training happened in the initial stage of the project when there was a pressure for credit disbursement from the project and demand from the groups. Skill training is need-based, and takes time to formulate but project approval and clearance to organize skill training has been subject to delays.

Caritas also organizes training courses for group members on health, nutrition and sanitation. Along with this training, there is provision to install 240 hand tube wells for 4800 group members and 1250 pit latrines for 5000 group members. By end of September 2001, MACH has installed 102 hand tube-wells to serve 2040 group members and 778 number of pit latrines for 3112 group members. The Department of Public Health Engineering has certified each tubewell installed by the program as being free of arsenic.

The provision of training and skill development is very popular among group members, as they appreciate the benefits that the training can bring. Timely provision of appropriate training will increases the capacity of group members to repay the loans.

Illiteracy amongst group members is very high, and during 2000 MACH provided adult literacy training for group members, but in 2001 no adult literacy training was provided.

Skill development activities are very popular and sought after by members. Encouragingly, skills taught by the program are transferred to other family members and friends. Vocational training is also in high demand in part because after training members are offered to loans of up to Tk 30,000. This allows graduates to start independent non-traditional enterprises, and also provides a major lift in their status.

In addition to skill development and training, social mobilization is another important activity in the process of capacity development of beneficiary group members. Social mobilization activities can help the poor to understand their position and enhance their level of empowerment so that eventually they can establish their rights and access to public resources. This is very much related with the sustainability of the groups and establishing their rights in society. The program should provide more social mobilization activities to groups to enhance their capacities to deal with issues related to resource management.

The Mid-term Review Mission recommends that:

- *MACH prepares a plan for skill development training to takes place on time and should include the annual plan and budget allocation*
- *MACH simplifies the approval and clearance process fore training activities*
- *Provision of literacy courses should be increase to ensure members have basic literacy skills.*
- *MACH provides the targeted number of training and skill development courses.*
- *Provision of adult literacy training should be increased to ensure members have basic literacy skills.*
- *Special training should be given to female groups on family law and legal issues.*

A6.6 Demonstration Activities

MACH also organizes demonstration activities to encourage and train the local population to take up alternative IGAs and make their income generating activities more productive. MACH provides inputs (such as fingerlings, seeds or fertilizers) and technical assistance and the beneficiary households provide the labor and the land. MACH arranges awareness sessions to disseminate the results.

Demonstrations undertaken include pond fish culture (62 ponds); cage fish culture (64 cages) wheat cultivation (64 plots covering 4.9 ha); granular ("guti") urea (15 farmers); vegetable (36 plots covering 2 ha); vegetable cultivation (85 farmers covering 0.7 ha); tree nursery (32 beneficiaries producing 32,400 saplings); homestead vegetable gardening (1342 beneficiaries) and homestead tree plantation (1000 beneficiaries received 5000 saplings). In addition, selected beneficiaries were given training on primary health care, nutrition and sanitation (278 beneficiaries) and adult literacy (17 courses to 294 students of whom 147 graduated). 778 pit latrines and 102 tubewells were also distributed to selected beneficiaries.

MACH has introduced fish culture using cages as a pilot demonstration for beneficiary group members. Cages with dimensions of 1mx1mx1m have been installed at one location at each of the program sites. The cages are constructed using knotless synthetic twine on a bamboo frame. Each cage cost Tk 245.

In Hail Haor, the cages were stocked with three species of fish, Thai *pungus* (*P. sutchi*), grass carp (*Ptenopharyngodonidellus*) and Thai *swarputi*. Supplementary feed at the rate of 5% of the fish's total body weight of fishes was supplied daily for pungus and punti at a cost of Tk 6 and Tk 3 respectively. Grass carp were fed only aquatic plants and weeds of which there are usually an abundance nearby. Only aquatic plants and weeds of Hail haor are being supplied to the grass carp. After seventy days, the average growth of grass carp was 130 grams, *punti* 25 grams and *pungus* 40 grams. The growth of grass carp is promising while that of *puti* and *pungus* has not been so much. The rearing of grass carp in cages seems to be profitable.

The effect of demonstrations is widespread. During the their field visits, the Mission observed that the demonstrations were well-accepted by the people in all project sites and the demonstrations are having widespread impact, although in some cases the demonstrations have not had the intended impact. For example, in Srimongol, the impact of demonstration pond fish culture did not result in improved management practices in adjacent ponds because of disputes amongst the joint owners about how the pond should be managed.

Demonstrations of different activities have had a positive impact on incomes and production. The demonstrations of vegetable gardens and plant nurseries are particularly popular as these activities can be done on un-used land around the homestead. The demonstrations have reached more than the expected number of indirect beneficiaries (see Table A4.2).

Demonstrations are a key activity in diversifying local economies and reducing pressure on wetlands, and the program needs to implement the targeted number of demonstrations.

The Mid-term Review recommends that:

- *MACH provides the targeted number of demonstrations.*

A6.7 Micro-credit

Provision of Micro-credit for the beneficiary group members is an essential part of developing alternative IGAs. MACH's credit program started in Srimongol (HH) in April 2000, in Kaliakoir (TB) in May 2000 and in Sherpur (KM) in April 2001. Tk. 8.8 million is available for establishing revolving funds for micro-credit, and, by September 2001, Tk. 4.9 million had been provided as grants for micro-credit.

Generally members of a group are eligible to receive credit for IGA about 5-6 months after formation of the group. During the period before credit is available, group members organize weekly meetings, deposit weekly savings and participate in skill development training for their selected IGAs.

Credit management guidelines were developed in March 2000 for credit disbursement and recovery (MACH 2000c). MACH strictly follows a checklist to select members for credit disbursement and there is a scoring system to identify the eligible group members. Once selected, a member applies for credit using a standard credit application form, and credit is sanctioned or refused within 2-3 weeks following submission of the application form. There are three tiers of loans: the first-time borrower can receive up to Tk. 5,000 with the group's recommendation; the second-time borrower can receive up to Tk. 8,000 provided he/she repaid the previous loan in time and the group recommends a further loan; and the third-time borrower can receive up to Tk. 10,000 provided he/she repaid the previous loan in time and the group recommends a further loan. If a member wants to take further loans, the procedure for the third-time borrower is adopted. Interest is paid on annual basis and the current interest rate is 12%, which is lower than the rate of many other NGOs. The loan is repaid in 45 instalments and the first instalment is due after 7 days from the date of borrowing.

Table A6.4 shows the details of credit disbursement in 3 program sites. The total number of loans allocated is 1,911 and Tk 8,818,000 has been disbursed. The credit fund is made up of Tk 4.9 million from MACH grant funds plus the accumulated interest paid by group members. In Srimongol, the credit coverage is about 66% of group members, in Kaliakoir about 52% and in Sherpur about 20%. Significant numbers of group members still remain outside loan coverage.

A general request to the Mission from many group members was that the first re-payment should be delayed because members take about 3-4 weeks to start the IGA and can only earn income thereafter. The present arrangement is a burden and members often use their savings to pay the initial instalments.

Table A6.4: Status of Micro-credit up to October 2001

Item	*HH*	*TB*	*KM*
Fund allocation (Tk.)	3,200,000	1,800,000	3,800,000
Number of groups targeted	80	40	100
Number of target beneficiaries	1,600	800	2,000
Number of existing beneficiaries	1,606	851	1,048
Number of loans	1,058	443	410
Amount disbursed (Tk.)	5,128,000	2,309,000	1,381,000
Amount recovered (Tk.)	3,192,025	1,386,150	223,326
Percentage of recovery	100	100	99.15
Interest rate – flat (%)	12	12	12

Source: Caritas files

The credit process works well although approval of credit sometimes is slow in being given. The percentage recovery is good being close to 100%, but experience form other micro-credit schemes suggests that the money used for repayment does not always come from the activity for which the loan was given. As part of the loan application, members should prepare a production plan to calculate the expected returns from an activity, and the program should monitor the net income from different IGAs is being realized.

Credit and training are valuable and essential activities of supplementary income generation component and MACH needs to provide the targeted credit, training and skill development.

The Mid-term review Mission recommends that:

- *MACH considers changing to flexible re-payment schedules based on the estimated income flow from an IGA.*
- *MACH should integrate more the training, skill development and credit activities. .*
- *Groups should prepare activity plans showing the expected costs and returns from different activities (see IGA profiles prepared by ITDGB 2000).*

A6.8 Sustainability

Ensuring the sustainability of the MACH beneficiary groups and their income generating activities is under a great challenge for the program. Neither group members nor program staff are clear about how the group savings, micro-credit and income generating activities will be continued after MACH. So far, program staff has not discussed sustainability issues with group members. Group members are concerned about the ultimate destination of their savings, revolving credit fund and the accumulated interest paid by members.

Group members are very much in favor of controlling their savings and the revolving fund themselves. The potential involvement of RMOs and LGCs with the savings and credit funds was also discussed with group members. At present, group members are not well represented in RMOs and LGCs; even when the representation is there, their voice is always ignored or overruled. Groups are suspicious about the intentions of RMOs because, in past months, some RMOs have banned fishing in the beels under their management, thereby depriving group members of catching fish and earning income. Therefore, beneficiary groups tend not to trust RMOs. Group members tend to view LGCs as being no different from RMOs.

The possibility of involving union parishad and upazila parishad in managing the group savings and the revolving fund for IGAs was also discussed with the group members in the three program sites. The response of the group members was much more critical, and everywhere they were opposed.

Another option discussed was for an organization at union level could be formed with representatives only from the primary groups. The financial responsibilities of savings and revolving credit fund, including earned interest would be entrusted to that organization. A higher organization would be formed at upazila level as an apex body with representations from Union level beneficiary organizations, which may also be entrusted with those financial responsibilities. Group members were negative towards this type of apex organization as they wanted to keep control of the funds themselves. Caritas has tried to form apex organizations but without much success.

Members are in favor of organizing union and upazila level organizations by themselves. The union level organization may help to resolve internal conflicts within and between groups. It may also help for activities to be taken up by more than one group. Another advantage of this union level organization would be that they could select representatives for RMOs. Similarly, the upazila level organization could help at Upazila level and select representatives for LGCs**.**

Another possibility proposed by MACH staff was to form credit union. A credit union would create the scope for individual members to buy unlimited shares and to deposit unlimited savings. Under this arrangement the group members' interest and their fund are secured. It also provides scope for credit following some set rules. For regular re-payers there is a scope for receiving a larger amount of credit up to the amount of his/her shares and savings. For credit greater than his/her total shares and savings, a member can borrow money taking collateral or security from other fellow group members.

The capacity of the groups to take on their own financial responsibilities is limited to a large extent by the low literacy rates and low level of education of group members. On average only 3 – 4 members know how to read and write the minutes of the meetings. Though Caritas has provided accounting/book keeping training to a limited number of group members, those people are not yet capable to maintain the accounts and book-keeping registers. Even if those people were well-trained, there would still be potential problems as most group members would have to depend on a few unless the level of literacy and numeracy of other members are upgraded. Group members are confident that the 3 year old groups need a further 2-3 years special training on literacy and accounting to make them capable of maintaining the books and registers independently. Group members would strongly like the project to continue for another 5 years, and by this time the existing groups and the groups to be formed in near future will be able to consolidate their experience and develop their operational capabilities**.**

Furthermore, group members were of the view that, to reach a desired level of economic sustainability (food, cloth & shelter with little healthcare and education), would take a total of 7-8 years. If the project continues for another phase they would feel more comfortable, but in case it does not, an arrangement must be made in a way that Caritas can continue its support to the groups for another 2-3 years after the closing of the project. During that time Caritas should prepare a plan by which the groups can operate their activities independently, including taking over their financial obligations; and such trial should be continued at least for 2-3 years under the guidance and supervision of Caritas.

Part of the reason for the mistrust between beneficiary groups and RMOs is the lack of understanding of each other. MACH has not insisted on the inclusion of fishers in RMOs to ensure that fisher interests are properly represented. The RMOs need to accept that fishers have certain traditional fishing rights and many fisher households are completely dependent on the income form fishing. Groups need to understand that RMOs are trying to improve production from the wetland resources.

Ways to improve the understanding of MACH activities by beneficiary groups would be to increase the intensity of awareness raising activities and to target the awareness messages to the resources used by group members and to increase the awareness of groups through social mobilization.

The Mid-term Review recommends that:

- *MACH should support the beneficiary groups for about 5 years to ensure their full development*

- *MACH should prepare a plan for the saving and credit activities including an exit strategy showing how program support will be phased out.*

- *MACH should place more emphasis on social mobilization activities with beneficiary groups so that groups can become more involved in the management of local resources. MACH staff working with groups should have social mobilization skills and program staff should visit other social mobilization programs(such as SAMTA in Pabna)*

- *MACH should continue to ensure the separation of functions of the savings/credit/training of beneficiary groups and the functions of RMOs as the requirements are very different.*

APPENDIX 7
TECHNICAL ASPECTS OF WETLAND MANAGEMENT

A7.1 Aquatic Sanctuaries

In Bangladesh, most inland water bodies of rivers, floodplains, haors, beels and other wetlands have been degraded and reduced in area and depth due to changes resulting from both man-made and natural processes. Many water bodies now dry out rapidly soon after the start of the dry season and fish are caught in the shallow waters as the water recedes. As the dry season progresses, even the deeper parts of water bodies become short of water and fish have no place to shelter or take refuge. To make matters worse for fish, the water that remains is sometimes drained by pumps[4] enabling fishers to catch all of remaining fish. Other aquatic animals and plants are also destroyed when all the water is removed. Parent fish (fish brooders) have no chance to survive and are not available to breed in the next monsoon with the result that fish stocks decline. Similarly, the population of other aquatic flora and fauna including water fowl are declining due to habitat degradation.

Establishment of aquatic sanctuaries is one of the management tools to conserve and enhance aquatic resources like fish and other aquatic flora and fauna. MACH has established 48 small-scale aquatic sanctuaries at the three program sites, shown in Table A7.1. 40 sanctuaries are semi-permanent wherein there is a partial ban on fishing while 8 sanctuaries are permanent as there is a total ban on fishing. Five (5) of the sanctuaries are located in deeper parts of rivers (locally called *kum* and *kur*) and 43 sanctuaries are located in deeper parts of *beels*(locally called *doho).*

Table A7.1 Sanctuaries Established by RMOs with support of MACH

Type	*River*			*Beel*			
	HH	*TB*	*KM*	*HH*	*TB*	*KM*	*Total*
Permanent	*0*	*0*	*0*	*8*	*0*	*0*	*8*
Semi-permanent	*0*	*3*	*2*	*9*	*14*	*12*	*40*
Totals		*3*	*2*	*17*	*14*	*12*	*48*

Sanctuaries are demarcated by flags placed on bamboo poles. Tree branches called brush piles are placed in the sanctuaries to provide shelter for fish particularly during critical periods when surrounding areas are disturbed or become unsafe for fish. Aquatic flora and fauna like algae, plankton and other organisms grow on the surface of these tree branches and become a source of food for fish.

The brush piles placed on the bed of sanctuaries tend to facilitate siltation. To avoid the problems of siltation and unnecessary expense, the program is considering a trial to determine whether brush piles are necessary for sanctuaries to be effective as there are no data to compare the benefits of sanctuaries with and without brush piles.

RMOs have imposed bans of various lengths on fishing within the sanctuaries depending on the local circumstances. For example, in Alua beel in TB, there are three sanctuaries and each of the

[4] The practice of de-watering beels is illegal but is not always enforced.

sanctuaries is fished annually on rotation. Some RMOs have banned fishing in the areas surrounding sanctuaries for 3-5 months, starting at the end of the dry season and the onset of the monsoon. The fishing ban allows parent fish to breed, thereby allowing the fish population in and around sanctuaries to increase.

There is one MACH sanctuary in KM located on private land and all the other MACH sanctuaries are located on khas land.

The sanctuaries established by RMOs with support from MACH are very effective in increasing fish stock and fish production, and the sanctuaries are being used to demonstrate the benefits of sanctuaries to other projects and to government and NGO staff.

Initial findings indicate that the management and physical interventions of which sanctuaries are an important component have resulted in increased fish production. For example, in Hail Haor, fish production has increased from 164 kg/ha in1999 to an estimated 194 kg/ha in 2001 and in Turag-Bongshi, fish production has increased from 50 kg/ha in 1999 to 124 kg/ha in 2001 (see Appendix 4). More data are required to separate out the influence of program interventions from seasonal fluctuations caused by changing hydrological conditions.

MACH is working with the Fourth Fisheries Project and the Community Based Fisheries Management Project to design studies of sanctuaries as these other projects have funds for scientific studies of wetland components.

The Mid-term Review Mission recommends that:

- *MACH develop best practices for sanctuary planning, design and management*

- *The performance of sanctuaries is closely monitored to determine the impact of different management system methods including the costs and benefits of banning fishing for different periods*

A7.2 Riparian Rehabilitation

MACH follows a holistic approach to rehabilitation of wetland habitats. Riparian areas adjacent to the streams and rivers flowing into wetlands are very important to maintaining and conserving wetlands and its aquatic resources.

Previously there was about 150 hilly streams (locally called chharas) flowing from the surrounding hills into the Hail Haor. At present, many of the chhara around the Haor are silted up and blocked or converted to other land. The lands beside the chharas were covered with grasses, shrubs and trees and flows in the chharas were continuous, not highly variable and with low silt loads. Chharas were important and rich habitat for diversified species of plants, birds and other wildlife. Major changes in land use have resulted in deforestation of the catchments, causing major changes in the flow characteristics of the chharas. Chharas are now liable to flash floods during the monsoon season, negligible flows during the dry season, bankside erosion and heavier silt loads. The silt is deposited on the beds of the beels in Hail Haor, diminishing the volume of water stored, particularly during the dry season.

The wetlands in Kongshaw-Malijhee basin are degrading for similar reasons, although the rivers of KM have larger flows and carry greater sediment loads. These hydrological changes have resulted in large areas of wetland and agricultural land being covered by sand and silts. In Turag-Bongshi basin siltation is also causing degradation of the wetlands. The characteristics of these different ecosystems are being changed and wetland habitats are becoming uninhabitable for more and more species of plants and animals.

MACH is the pioneer of rehabilitating upper watersheds, and is implementing restoration activities in the watersheds of 4 chharas of Hail Haor. The program initially facilitated riparian landowners to form a Chhara RMO (CRMO) and the CRMOs have implemented a range of measures to restore bankside vegetation including the planting of trees and grasses. 6,00,000 tillers of vetiver and other shrubs were planted along the banks of 18 km of chharas. In K-M, 464,000 tillers of vetiver and the shrub *dholkalmi* were planted along rivers. Similarly, hedges of vetiver and *dholkalmi* have been created in upper watershed and banks of T- B area. In addition, 10,000 saplings of mostly timber and some fruit trees were planted.

The Mission observed that the riparian vegetation planted along the 4 chharas in HH and the rivers in K-M area are in good condition although in some places, the banks had been eroded and the vegetation lost.

The restored riparian habitat will take about 5-10 years to affect stream flows significantly and reduce sediment loads as the vegetation will take this time to become established.

After planting the trees are looked after by a caretaker who is paid Tk 1200/month by the program. Each caretaker is responsible for trees a 1.6 km length of chhara. The caretaking requirements are based on the conditions developed for caretakers of roadside plantations. The program needs to determine whether the conditions for caretakers are applicable to the needs of establishing riparian habitat.

The ownership of the trees has been discussed and agreed with the landowners but no formal agreement is still in process. Trees planted with program funds will be shared 80% for the landowner, 15% for the union parishad and 5% for the CRMO.

Planting of trees will bring major benefits. In addition to many positive environmental impacts, the mature trees will provide annual income (for example from fruit and firewood) and when harvested will provide a large amount of capital for the owner. The program's investment in tree planting could cover a significant part of the cost of the program by itself, as has been found elsewhere (IDP 2001).

The Mid-term Review Mission recommends that:

- *Agreements for the ownership of the trees should be finalized*
- *MACH should determine the requirements for the interface between the Chhara RMO and the Beel RMO.*
- *MACH should closely monitor the chhara rehabilitation schemes to determine the resources required (provision of caretakers, replacement of saplings etc.) for the vegetation to mature and become effective.*

- *As with beel RMOs, MACH should prepare case studies of Chhara RMOs so that the performance of CRMOs is better understood.*

A7.3 Re-excavation of *Beel* and *Khal*

Siltation of khals and beels are a major problem for many wetlands. In addition to reducing the volume of water stored in beels, siltation also closes the connections between beels and the larger river system. These connections are important as some species of fish breed in the river environment and migrate from the river to the beel at the start of the monsoon when water levels are rising and then return to the river at the end of the monsoon as water levels are falling. Due to blocking of the connecting khals by siltation or sometimes man-made structures, the migration of brooders or offspring is disrupted or prevented.

Wetland habitat can be improved by re-excavating khals to improve flows, and re-excavating beels to increase the volume of storage. The improved habitat provides better shelter for fish, and facilitates breeding nurseries and regeneration of aquatic plants and animals.

Re-excavation of beels and khals is challenging due to the waterlogged conditions. Soils can be very wet. Disposal of soil can be difficult as the soil has to be carried sufficiently far away to prevent the soil being washed back into the hole. Sites are sometimes remote from villages which can cause problems with recruitment of labor.

Earthwork schemes are being implemented by MACH's Physical Intervention Unit (PIU) and a Project Implementation Committee (PIC) appointed by the RMO. The PIC comprises of three members who receive an honorarium of Tk 200/day. The members organize the laborers required through work sadar (foreman). The Union Parishad Chairman as advisor to the PIC is paid Tk500/day for occasional visits to the site.

During the 2000-01 dry season, MACH funded earthworks schemes for 5 RMOs in HH, 1 RMO in TB and 3 RMOs in KM. Six (6) beels were re-excavated in HH, 2 beels and 1 khal were re-excavated in TB and 2 beels and 1 kum were re-excavated in KM. A total of 5.9 ha of beel area was re-excavated to depths of 3 to 9 ft. (1 to 3 m). A 70 m length of khal with an area of 0.35 ha was re-excavated at T-B.

The costs of the schemes ranged from Tk 82,799 to Tk 825,712. The total cost of all earthworks schemes was Tk 2,291,413.

MACH is to receive a major increase in funds for physical interventions, and there is a risk that the implementation of schemes will start to dominate program activities.

The Mid-term Review Mission recommends that:

- *Where possibilities exist, MACH should consider out-sourcing the implementation of schemes.*

- *MACH should consider using Labor Contracting Societies*[5] *to implement PI schemes as use of Labor Contracting Societies have been found to improve the quality of work and increase the sense of local ownership.*

A7.4 Re-stocking of endangered/threatened fish species

Several indigenous fish species have disappeared or become rare or endangered due the over fishing and degradation of habitats. MACH has re-introduced some beel-resident species to beel where these fish were once resident or are now rare or endangered. As a trial and demonstration, 16,936 fingerlings of beel-based indigenous fish species, *nandil, saputi, air, kalibaush* and *goinna*.) were reintroduced in 5 beels in HH, while 46,920 fingerlings of *sholl, gajar, kalibaush, goinna, polida* and *saputi* were released into 7 beels in TB. The cost of the fingerlings was Tk 16,939 in HH and Tk 46,290 in TB. In addition, 661 brood fish (*sharputi, kalibaush* and *pabda*) were released at a cost of Tk 20,866. Fishers and local people reported that some of the reintroduced fish were caught in good condition and hoped that the fish would regenerate if proper care was taken.

There is reportedly evidence that some species of fish have re-appeared after MACH interventions have improved habitat. For example, in TB *chapila* and *many/veda* have re-appeared in Alua Beel.

A7.5 Kathas

Kathas are a traditional fishing devise designed to encourage fish to aggregate. Kathas comprise of tree branches and bamboo poles placed in the deeper parts of water body and sometimes covered with water hyacinth. Kathas are installed in clusters usually at the end of the monsoon and provide shelter/ refuge for fishes, particularly at critical periods when water recedes and the surrounding area is disturbed. The brush in the kathas produce and harbor natural fish food and fish are attracted to stay in the katha. In the project areas kathas are constructed in the sanctuaries primarily for protecting fish from poaching and illegal fishing. Private kathas are usually harvested two to four times a season (December to April).

The cost of kathas varies with size and the availability of brush wood. Small kathas can cost about Tk 3,000-4,000 while larger kathas can cost up to Tk 25,000.

Kathas facilitate deposition of soil/ silts on the bed of river or beel if sediment loads are high. So area should be properly selected to avoid silts to deposit and usual fishing.

One social problem with kathas are that use of kathas is usually monopolized by local influential households. In most cases, fishers provide only labor or catch fish on a nominal share basis, and most of the benefits from the increased catch go to the owner. MACH should support beneficiary groups to be involved in the construction of kathas.

Another problem with kathas is that there are often too many. RMOs should be encouraged to control the number of kathas to ensure that sufficient stock remain in the water body.

[5] In Labor Contracting Societies, the laborers themselves are given the contract to construct a scheme. The laborers organise their own work and payment. LCS's have been used successfully by BWDB and LGED.

A7.6 Swamp Plantations

Swamp trees are the indicator species of plants in the wetlands. Swamp trees like *hijal*, *karach*, and *sheora*, can withstand flood and survive submerged for long periods. Swamp trees were once abundant throughout the beels of Bangladesh, but due to human pressure and encroachment of agriculture land, swamp trees have almost disappeared. These trees provide very good shelter for birds, and when submerged provide excellent habitat for fish. Branches of swamp trees are also good for use in kathas and can be used for up to 3 years.

The program has been planting swamp trees to improve beel and river habitats. By the end of 2000, MACH had planted a total of 16,200 *hijal* trees around beels of the three program sites. (2001c).

APPENDIX 8
REFERENCES

Bangladesh Bureau of Statistics (2001) 1999 Statistical Year Book of Bangladesh.

BCAS (2001) Semi Annual Report on MACH Pollution Project August

Department of Fisheries (1999) A Brief on Department of Fisheries. July

Department of Fisheries (1999) Community Based Fisheries Management and Future Strategies for Inland Fisheries in Bangladesh. Proceedings of workshop

IDP (2001) IDP Plantations over the Phases. Infrastructure Development Project, Local Government Engineering Department, Dhaka. March

ITDGB (2000) IGA Profiles on Food Processing and Small Enterprises. Intermediate Technology Development Group, Bangladesh

MACH (1999) Interim Inception Report January

MACH (2000a) Hydrology Interim Report. Working Document #12. March

MACH (2000b) 1st Annual Report. April

MACH (2000c) Credit Management Guidelines

MACH (2000d) Pollution Report and Proposal for Facilitating Mitigation of Industrial Pollution in MACH Project Area. Working Document #11. May

MACH (2000e) Baseline Survey Report for Hail Haor and Turag Bongshi Basin. (draft) April

MACH (2001a) Restoration of Vegetation and Sustainable Management of Wetlands and Watersheds of Hail Haor Basin and Turag Bongshi Floodplain February

MACH (2001b) 2nd Annual Report, February

MACH (2001c) Afforestation Program Implementation: Work Plan (2001-2003)

MACH (2001d) Baseline Report on Fisheries, Vegetation, Wildlife and Household Protein Consumption. February

MACH (2001e) Semi- annual Report August

MACH (2001f) Project Profile. August

MACH (2001g) Hail Haor Wetland: Estimation of Economic Value (Partial Draft) October

MACH (2001h) Report on Hail Haor Watershed Management Plan (Draft) November

MACH (2001i) Report on MACH-Kaliakoir Pollution Project (draft) November

MACH(2000k) Progress Report-Caritas September

Ministry of Water Resources (1999) National Water Policy. January

Ministry of Water Resources (2001) Guidelines for Participatory Water Management. April

Sultana, P. and P.M. Thompson (2000) Community Fishery Management Implications for Food Security and Livelihoods. Paper presented to IIFET Conference, Corvallis, Oregon. July

Thompson, P.M., P. Sultana et al (1999) An Assessment of Co-management Arrangements Developed by the Community Based Fisheries Management Project in Bangladesh. Paper presented to International Workshop on Fisheries Co-management, Penang, Malaysia. 23-28 August.

Thompson, P.M., P. Sultana et al (2001) Lessons from Community Based Management of Floodplain Fisheries in Bangladesh. Paper presented to Asian Wetlands Symposium 2001, Penang, Malaysia 27-30 August

Winrock and USAID (1998) MACH Agreement July