MACH
Project Profile

Management of Aquatic Ecosystems through Community Husbandry

August 2001

A project of the Government of Bangladesh
Sponsored by USAID

Project Partners

Winrock International
Bangladesh Centre for Advanced Studies (BCAS)
Center for Natural Resource Studies (CNRS)
CARITAS Bangladesh

Preface

The Project Profile of Management of Aquatic Ecosystems through Community Husbandry (MACH) is an introductory document to this innovative project. This is the first in a series of publications under the MACH Project.

MACH aims to promote ecologically sound management of floodplain resources including fisheries and other wetland products for the sustainable supply of food for the poor of Bangladesh. MACH is a Government of Bangladesh (GoB) program supported by USAID. It 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.

MACH is currently working at three sites representative of the wetland ecotypes of Bangladesh: (1) Hail Haor in Moulvibazar District, (2) the Lower Turag-Bongshi River Basin in Gazipur and Tangail Districts, and (3) the Upper Kongshaw-Malijhee River Basin in Sherpur District. In all of these areas MACH works with communities and local government, to restore wetland physical and biological functions through management and physical interventions that include: re-vegetation, excavation of key beels and canals, and establishing fish sanctuaries and other activities. Knowledge and technology accepted by the community is an essential input into the project. MACH has also been active in problem identification, community development, group formation, awareness raising, needs assessment, resource management organization establishment for local and resource support, environmental education, and community level meetings to ensure that the villagers voices are heard.

MACH as an innovative project hopes to develop, improve and demonstrate successful participatory community management practices.

We welcome comments from all sections of readers and stakeholders on this document and on the MACH project and its approaches.

Index

Background

> *" (Mankind) has a solemn duty to protect and improve the environment for present and future generations…."*
>
> First Principle of UN Conference on the Human Environment, Stockholm, 1972

Home to hundreds of species of unique plants, fish, birds and other wildlife, the floodplains of Bangladesh are one of the world's most important wetlands. These wetlands provide critical habitats for thousands of migrating birds, and are an important source of income and nutrition for millions of rural Bangladesh's poorest people. Unfortunately, these habitats are in decline due to over-use, siltation, and the conversion of more and more wetlands to agriculture and rural and urban development to meet the demands of the growing population.

MACH Goal

MACH's Goal 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.

Recognizing the need for new community-based approaches to floodplain and wetlands resource management, the Government of Bangladesh and the United States Agency for International Development (USAID) are jointly implementing MACH: *Management of Aquatic Ecosystems through Community Husbandry.*

Building on the successful strategies of previous projects, MACH demonstrates to communities, local government and policy-makers the viability of a community approach to natural resource management and habitat conservation in Bangladesh over an entire floodplain. The 'community' includes all of those people dependent either economically or nutritionally on the floodplain and its products. The program emphasizes and works with poorer groups, particularly fisher communities, but also includes local government as well as the local elite so that the program may be truly sustainable.

MACH differs from other Bangladesh community-based projects. MACH aims to increase the sustainable productivity of all floodplain resources—fish, plants and wildlife—over an entire floodplain ecosystem (beels, seasonal floodplains, rivers, streams) and recognizes that the problems of the wetlands extend beyond the wetland boundaries. Recognizing that the reduction of fishing pressure is likely to be a critical part of reviving the floodplain fisheries, MACH has included supplemental income generating activities that will focus on fishers and others directly dependent on fishing.

MACH community management activities emphasize support to the entire resource user community that includes poorer fishers, farmers, landless laborers and women. MACH also believes that local elites and local government are a part of the resource user community and must be a part of the management if the project is to be truly sustainable.

The project facilitates the creation of community awareness of the importance of a functioning wetland. MACH assists in those areas where management and physical interventions are required. Management issues would include fishing gear and catch regulations as well as the establishment of sanctuaries. Physical interventions have included excavation of beels, khals and the inclusion of small structures, re-introduction of lost species and re-vegetation of upland hills and streams.

Environmental Issues Addressed by MACH

Water

- Loss of dry season wetlands
- Padma/Ganges River dry season flow reductions.

Fisheries

- Significant decline in inland open water fish production
- Estimated 30-40% decline in fish production with about Tk. 500 million to Tk. 1 billion lost annually.

Quality of Life

- 42% of children suffer from moderate to severe malnutrition

(Source: Child Nutrition Survey, BBS, 1996)

Bio-diversity

- 201 animal species are reported to be under threat of extinction.

(Source: IUCN, 2000)

Forests

- Removal of all floodplain forests and at least 90% loss of all forest cover.

(Source: USAID, 1990)

● Fisheries

One of the country's most important resources, its open water fisheries, has lost half of its dry season area. This has resulted in a dramatic decline in the fish catch. With over 80% of rural households involved in fishing, the open water fishery remains a vital source of food and income for millions of poor people. As the population of Bangladesh increases, and therefore the demand for fish as nourishment increases, greater pressure is put on the already shrinking resources.

● Forests

Large scale deforestation has taken place in all major forest areas of Bangladesh. Today only small remnants of tropical, evergreen and coastal mangrove forests remain. Floodplain forests have been almost completely eliminated. Population pressure and corruption are often cited as the primary reasons for the disappearance of forest areas and their conversion to crop lands. Unfortunately, traditional practices of community forest management have been lost to a more commercial approach of forest exploitation.

● Bio-diversity

As environmental degradation reaches dangerous levels, the loss of bio-diversity becomes a matter of great concern. In Bangladesh, there are now over 201 animal and fish species on the Bangladesh Red List. Many of these are dependent on the declining wetlands and disappearing forests. We have only just begun to realize the damage to Bangladesh's flora.

● Water and Water Quality

The water distribution network of Bangladesh is comprised of the tributaries and distributaries of three major river systems: the Ganges-Padma, the Brahmaputra-Jamuna, and the Meghna, that provide most of the drainage for the Himalayas. There are also numerous perennial and seasonal wetlands within the major floodplains of these rivers.

The abundance of water in the monsoon causes the annual flood. It is the dry season, when the flow of up-stream water decreases, ground water levels go down and saline water intrudes further inland, that the scarcity of fresh water occurs.

Not surprisingly, most health problems are water-borne; only 32% of the urban population have reasonable access to safe drinking water. Because of this, 11% of the deaths in 1996 were due to diarrhea.

In MACH studies, water and sediments near the discharge point of several local industries indicate that industries are discharging toxic heavy metals and other poisonous chemicals far in excess of national standards.

(Source: Health and Demographic Survey, 1996)

● Quality of Life

Loss of ecosystem function, siltation of surface waters, overgrazing, deforestation, exploitation of fishing and desertification are all contributing to a downward spiral of poorer environmental health and thus poor economic and social health.

The quality of life for rural and urban dwellers has deteriorated due to low literacy rates, scarcity of land, migration of rural poor to cities, and inadequate housing, health and sanitation facilities. A staggering 84.4 million people, more than 75% of the population, live below the poverty line. Approximately 25%, or 28.1 million people, are classified as “hard core” poor.

About 42% of Bangladesh’s children suffer from moderate to severe malnutrition. An estimated 50% of the newborns in rural areas weigh less than 2.5 kg.

(Sources: Report of the Bangladesh Household Expenditure Survey 1995-6, BBS, Child Nutrition Survey BBS, 1996, Environmental Issues and Natural Resource Management in Bangladesh, 1990)

MACH Objectives

Objective 1

To raise awareness (of communities and local government) about the importance of natural floodplain resources to secure food and income security for the people of Bangladesh.

- There will be development and adoption of policy guidelines at local level.
- Community awareness of the need for renewable resource management will increase.

Objective 2

To maintain and recover the selected natural floodplain ecosystems and associated fisheries.

- Floodplain Management Organizations will be organized.
- Improved floodplain resource management will be established.

Objective 3

To identify activities to generate alternative income that will result in a reduction of pressure from fishing and agriculture in the floodplain fisheries.

- Community groups will be involved in alternative income generating activities.

Measurements of Success

- Increased area of wetlands with sustainable management.
- Increased production of floodplain resources.
- Increased bio-diversity.

Execution and Management

National Steering Committee

A National Steering Committee chaired by the Secretary, Ministry of Fisheries and Livestock with the Joint Secretary, Ministry of Land as the Vice-Chairperson and with representatives from the Department of Fisheries, Ministry of Environment, Ministry of Finance's Economic Relations Division, Planning Commission, USAID and Winrock International is the highest approval authority for the Project.

Results Package Team

USAID/Bangladesh, designated members of the Government of Bangladesh, Winrock International and its partners (BCAS, CNRS and CARITAS Bangladesh) are the members of a self-directing, self-monitoring team, termed the "Results Package Team". The Team according to project documents has the authority to carry out the activities under MACH and shall be responsible for the achievement of the project objectives. The Results Package Team meets frequently, to consult and review implementation issues and review business.

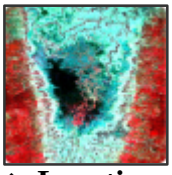
Program Management

Winrock International was appointed as grantee to implement the project with Bangladesh Centre for Advanced Studies (BCAS), Center for Natural Resources Studies (CNRS), and CARITAS Bangladesh as its partners.

Local Government Committees

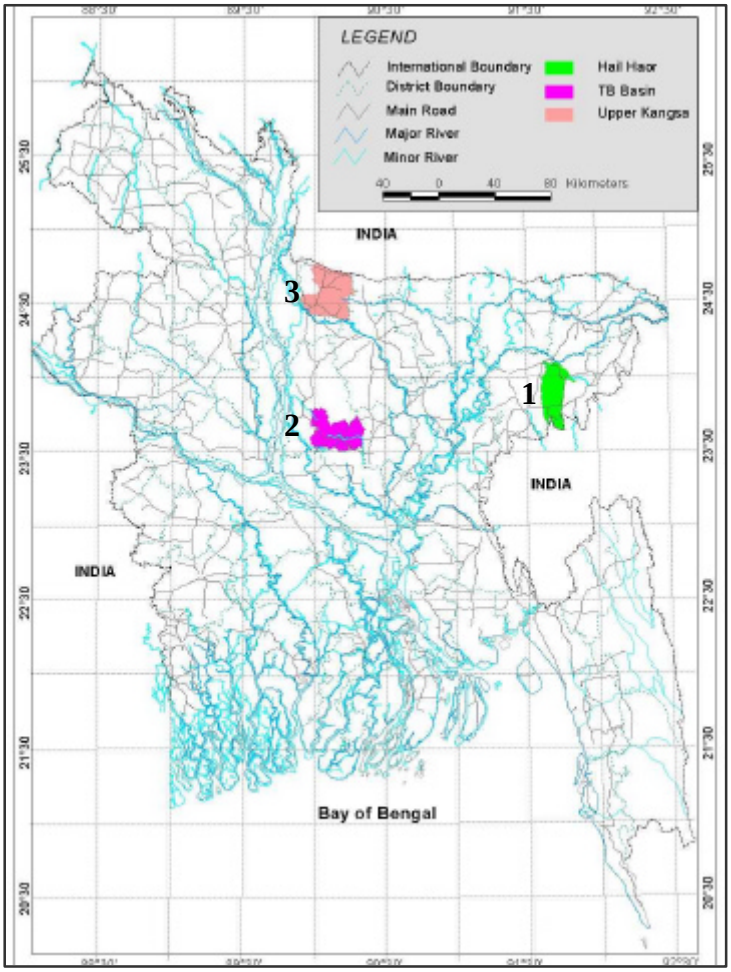
The MACH Local Government Committees (LGCs) are part of the project management. The LGCs review progress, assist in implementation, offer recommendations for program interventions, suggest policy related changes (local and national) and provide such advice and suggestions they feel appropriate to achieve project targets and goals. They are in all cases chaired by the concerned Upazila Nirbhahi Officer, other members include concerned Union Council Chairpersons, representatives from the Department of Fisheries, other Upazila Officers, MACH staff and others as appropriate.

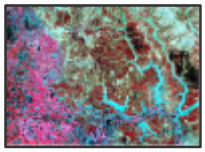
MACH Sites



Site 1: Hail Haor

- **Location:** Floodplains of Moulvibazar District under Sreemongal and Moulvibazar Upazilas.
- **Wet Season Water area:** More than 12,000 ha.
- **Total Population in actual project area:** Over 160,000 people





Site 2: Lower Turag-Bongshi River Basin

- **Location:** Lower Turag-Bongshi River Basin in Gazipur District under Kaliakoir Upazila and part of Tangail District.
- **Wet Season Water area:** More than 15,000 ha.
- **Total Population in actual project area:** 268,944 people.

Site 3: Upper Kongshaw-Malijhee River Basin

- **Location:** The wetland portions of Sherpur, Jhinagati, Nalitabari, and Nokhla Upazilas of Sherpur District.
- **Wet Season Water area:** 8,000 ha.
- **Total Population in actual project area:** 623,000 people.

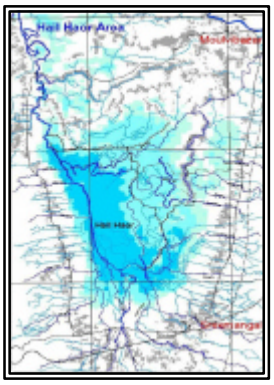
Site 1: Hail Haor

General Description

Hail Haor is a basin between hills that becomes a large single body of water in the rainy season and many small (17 seasonal/47 perennial) beels in the dry season. It is surrounded on three sides by a chain of tea gardens, pineapple fields, groves of rubber trees and remnants of natural forest blocks. Areas above flood level are intensively cropped (2-3 crops/year) with rice mono-cultures. The surrounding hills, formerly forested area, now cleared are either used for agriculture or tea plantations.

Fishing activities in the Haor occur year-round. During the wet season, subsistence and gill net fishers predominate. Larger fish are collected from the drying beels in the dry season.

Overall Catchment Area: 60,000 ha.
Wet Season Haor Area: 12,490 ha.
Dry Season Water Area: 4,009 ha. (March 2000)
400ha. (1999 dry season)
Adjacent Floodplain: 20,000+ ha.



Location

Hail Haor, in the Sylhet Basin, is located in the anticline between the Balishara and Barshijura Hills in the east and the Satgaoan Hills to the west. Water originates from the surrounding 350 small hill streams and the Lungla/Bilashi River. Hail Haor's only discharge point is the Gopla River which connects directly to the Upper Meghna.

District: Moulvibazar.
Upazila: Sreemongal (Unions-Mirzapur, Kalapur, Sreemongal, Ashidrone, Bhunobir).
Upazila: Moulvibazar (Unions-Nazirabad, Giasnager).

Socio-Economic Status

Population:	160,000 people
Average Family Size:	5.78 persons
Literacy Rate:	47.36%
Households Involved in Fishing:	84%
Full-time Fishing Households:	53%

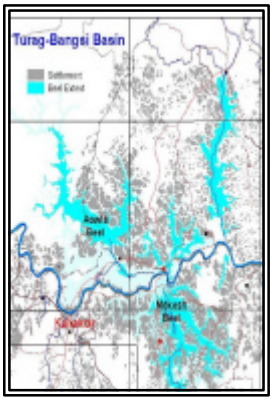
Site 2: Lower Turag-Bongshi River Basin

General Description

This is a deeply flooded area in the low-red soil plateau of Madhupur tract. The floodplain increases in size as water overflows the banks of the Turag-Bongshi River in May-June. During monsoon the low areas become a connected sheet of water. By late November, most flood water recedes and "T-boro" or winter rice is planted (in January) in almost all low lying areas.

Settlements within this area are established on highlands and increasingly on raised earth platforms.

Overall Catchment Area:
14,574 ha.
Wet Season Haor Area:
4,374 ha.
Dry Season Water Area:
37 ha.
Adjacent Floodplain:
23,230 ha.



Location

The lower Turag-Bongshi Basin is connected via the Dhaleshwari-Pungli River to the greater Jamuna Floodplain and formerly the Old Brahmaputra. Dry season water flows from the Madhupur forest belt. At the lower end of the river, it is connected through the Tongi River and eventually connected with the Buriganga-Meghna River Systems. The Upper Turag/Lower Bongshi is the main source of water in the region and flows through the site. All associated beels and other floodplain areas are connected to the main river through a series of khals and other channels.

District: Gazipur.
Upazila: Kaliakoir (Unions-Mouchak, Chapair, Boali, Madhyapara, Fulbaria, Sutrapur, Sreefaltali).
District: Tangail.
Upazila: Mirzapur. (Unions-Azgana).

Socio-Economic Status

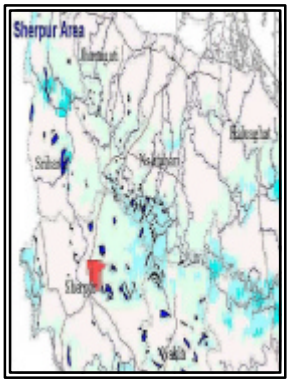
Population:	268,944 people
Average Family Size:	5.31 persons
Literacy Rate:	48%
Households Involved in Fishing:	88%
Full-time Fishing Households:	15%

Site 3: Upper Kongshaw-Malijhee River Basin

General Description

Topographically a low-lying plain generally sloping from the north-west to south-east, this site was once a large lake. The higher land surrounding the site is intensively cropped. The entire floodplain area, including the connecting canals, streams, and rivers, are intensively fished with a large variety of gears. Interviews with local residents indicate massive change in the last 20 years with rapid and almost complete deforestation of upper watershed and lower wetland areas, followed by a rapid loss of connections due to embankments and increased sedimentation.

Overall Catchment Area:
21,239 ha.
Wet Season Water Area:
8,210 ha.
Dry Season Water Area:
896 ha.
(An additional 42 km. of rivers with less than 50m width and 35 km. of rivers with less than 20m width)
Adjacent Floodplain:
17,864 ha.



Location

The basin is part of the greater Sylhet Basin and Northern Piedmont Plain. The area forms the upper portion of the catchment area of the Kongshaw-Malijhee River. Floodwaters come from the Garo/Meghalaya Hills through a number of hill streams and rivers. These flow to the Kaliganga/Kongshaw Rivers, which are part of the greater Sylhet Haor complex of rivers and streams.

District: Sherpur.
Upazila: Sherpur Sadar (Unions-Pourashabha, Pakuria, Bajitkhila).
Upazila: Jhenaigati (Unions-Malijikanda, Hatibanda, Dhanshail, Jhenaigati, Kongshaw).

Socio-Economic Status

Population:	623,000 people
Average Family Size:	4.25 persons
Literacy Rate:	19.5%
Households Involved in Fishing:	90%
Full-time Fishing Households:	9%

Resource Management Activities

Wetland Sanctuary Establishment

MACH cooperates with communities and local governments to establish larger and more diverse fish stocks in order to promote sustainable and increased production as the flood waters arrive during the monsoon. The community interventions that support these goals include sanctuaries in the deepest areas of rivers and beels and self-directed fishing regulations to promote the improvement of dry season residual fish stocks.

Watershed and Wetland Restoration

Bangladesh is experiencing increased erosion in the watersheds of its major floodplains as a result of deforestation and the loss of forest cover. Coupled with inappropriate land use policies and practices in both Bangladesh and India, this is causing the rapid rise of bed levels of rivers and previously rich fishing grounds. Moreover, this along with inefficient irrigation practices has resulted in reduced dry season water flows into almost all of Bangladesh's rivers and wetlands.

MACH is working with the communities and local government to restore wetland function through revegetation of selected upland watersheds, excavation of key dry season perennial beels and canals, and establishment of fish sanctuaries aiming at the sustainable supply of fish and other wetland products.

Assessment Activities

MACH has developed a robust monitoring system that evaluates project impacts on wetland biodiversity and production as well as impacts on community income and quality of life.

Problem Identification

Based on on-going studies and surveys, meetings with community members, GoB officials, and MACH biologists, it has been agreed that the following environmental problems are of major concern at all sites:

- Lack of dry season water.
- Loss of connection between floodplains, rivers and beels.
- Sedimentation.
- Destructive and over-fishing activities.

A baseline status of various parameters were collected for the project sites through rapid rural appraisal, physical resource inventory, household census, socio-economic baseline survey, fish catch monitoring, fish consumption and resource harvest monitoring, bird, wildlife and vegetation surveys.

Community Development and Group Formation

To ensure equitable access to resources by poorer fishers and other community members, MACH has identified and is working with over 150 direct beneficiary groups. These are made up of over 3,000 poor wetland dependent men and women.

Awareness Raising

All MACH awareness activities have a common theme stressing the importance of the environment in the lives of community members and their responsibility in maintaining and bringing about improvements. Awareness raising activities include a variety of traditional and innovative activities: including large rallies on auspicious days (World Environment day, World Wetland Day, etc.) and 'dramas' with environmental themes. To date in excess of 20,000 people have taken part in MACH awareness activities.

Planning Activities

From the very beginning, MACH has emphasized community involvement in the program planning and monitoring. At all sites, MACH personnel have identified those community members who are most important for the overall success of the project. Participatory Community Planning meetings were held to identify problems, find solutions and site-specific interventions to address the problems and enhance the natural resources.

Establishment of MACH Local Government Committees (LGCs) as MACH partner

The LGCs act as partner to MACH, reviewing program activities and offering recommendations and assistance when required. The Committees were developed by Union and Upazila officials in participatory meetings. At these meetings, the committees agreed to terms of references and membership. At all sites LGC's are chaired by the respective UNOs. Members include concerned UP Chairpersons, Upazila Officials, MACH representatives, and other stakeholders as necessary.

Establishment of Resource Management Organizations (RMOs)

The central theme of MACH is local management of resources. The key to project success is the formation and successful operation of RMOs. At each site, RMOs are being formed with the cooperation of the communities and LGCs. MACH is using a two or three tier system specific to each site: RMOs for specific beels, khals, sanctuaries, at the lowest level; Union-based RMOs for larger areas; and in some areas (Haors, River Basins) apex RMOs that involve several Unions.

Awareness Activities

MACH staff, in cooperation with local communities, have held environmental awareness meetings and workshops. Introductory meetings have been held at District and Upazila levels to explain program goals and objectives. Following the introductory meetings, Upazila level workshops were held where members and Chairmen of concerned UPs, local level government representatives, the local elite, and participatory group members pointed out the major problems related to their respective wetland resources.

World Environment & Wetland Day Observance

The project uses national and international day celebrations to carry its environmental messages to the communities. At a recent World Environment Day program at Hail Haor over 600 participants, including fishers, students, teachers, and other community members took part in activities.

Environmental Education Training Program

Training programs have been developed based on existing knowledge. Environmental education materials such as posters and leaflets have been distributed to provide information on the environment and to build awareness.

Community Level Meetings

Village meetings (uthan baithaks) organized by MACH staff are continually taking place throughout the project area. Villagers including: fishers, farmers, landless day laborers, and women discuss environmental issues of concern. They highlight the sharp decreasing trend of the fisheries and the loss of other natural resources.

Summary

The Management of Aquatic Ecosystems through Community Husbandry, or MACH, is a Government of Bangladesh program sponsored by USAID. MACH was born out of the awareness by the governments of the continuing decline of the wetland ecosystems of Bangladesh and the impacts of that decline on the biodiversity and the people of this country. Over the years - the GoB, donors and various international organizations have responded to these problems with a variety of projects and programs - the Bangladesh and the US governments have utilized the lessons learned, both positive and negative, from those programs in the development of MACH.

The MACH approach differs from other Bangladesh community based wetlands programs in that it addresses the needs of the community in increasing sustainable productivity over an entire wetland ecosystem. Additionally, MACH recognizes the need for broad community support by all resource users - fisher, farmer, women, local elites and government - and ensure their participation in the MACH process. MACH has components that address each aspect of the ecosystem as well as programs to reduce the pressure on the ecosystem by supplemental income-generating activities.

MACH is currently working in three sites that are representative of wetland ecotypes of Bangladesh: Hail Haor in Moulvibazar District , the Lower Turag-Bongshi River Basin in Gazipur and Tangail Districts, and the Upper Kongshaw-Malijhee River Basin in Sherpur District. In all of these areas, MACH continues with community support to restore wetland physical and biological functions through management and physical interventions that include: re-vegetation, excavation of key beels and canals, and establishing fish sanctuaries and other activities. MACH has also been active in problem identification, community development, group formation, awareness raising, needs assessment, resource management organization establishment for local and resource support, environmental education, and community level meetings to ensure that the villagers voices are heard.

MACH is an active partner with its communities ensuring that this valuable resource, Bangladesh's wetlands and the bio-diversity of those wetlands, are protected and conserved for future generations of Bangladeshis.

Participating Organizations

Management of Aquatic Ecosystems through Community Husbandry (MACH)

Bangladesh Centre for Advanced Studies (BCAS)

- Coordination
- Policy Issues
- GIS
- Hydrology
- National Level Awareness Raising

BCAS

Winrock International

- Project Management
- Financial Management

Center for Natural Resource Studies (CNRS)

- Awareness Raising
- Monitoring
- Biological Interventions
- Resource Management

CNRS

CARITAS Bangladesh

- Awareness Raising
- Beneficiary Group Formation
- Credit
- Alternative Income Generation

MACH Headquarters
House No. 2, Road No. 23/A
Gulshan - 1, Dhaka 1212
BANGLADESH

Phone : 8814598, 8826556
Fax : (880-2) 8826173
Email : mach@agni.com

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