Local Governance and Empowerment of the Poor for Improved Wetland Management in Bangladesh

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Despite its small area (144,000 km^2), the inland freshwater fish production of Bangladesh ranks third in the world behind China and India. With extensive rivers and floodplain wetlands of the Ganges-Brahmaputra delta, over half of the country can be termed as wetlands that are a source of food and income for perhaps 70 million rural households. Two negative trends seriously impacted this vital resource:

- Most permanent waters are government property and were administered to maximize government revenue by awarding short-term fishing rights through leases to the highest bidder. This policy encouraged maximization of short-term income at the expense of sustainable yields and conservation. It concentrated much of the returns from fishing in the hands of powerful leaseholders, making traditional resource poor fishers dependent on them for access.
- Physical changes in watersheds and floodplains have drastically reduced the area and quality of wetlands: flood embankments and water control structures have blocked fish migration routes and expanded cultivated areas; irrigation and expanding areas of winter rice cultivation have reduced the water available for aquatic life to survive in the six-month dry season; industrial development causes locally severe pollution; and loss of tree cover and poor slope cultivation practices in watersheds cause high rates of siltation in rivers and loss of floodplain wetlands.

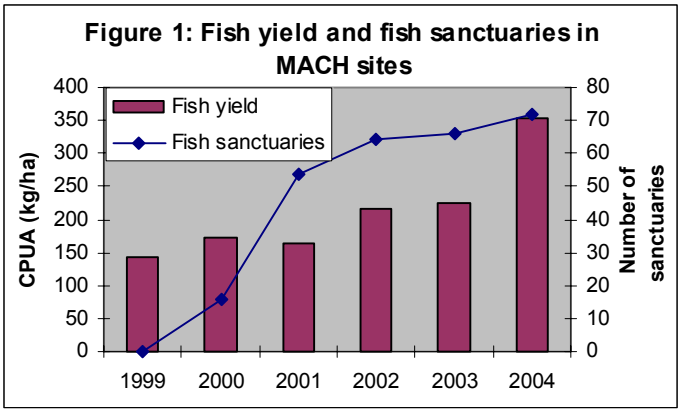
Since the early 1990s, several projects working mainly with the Department of Fisheries and national NGOs have addressed these trends through community based management and technical interventions. Since 1998 USAID has supported the MACH (Management of Aquatic ecosystems through Community Husbandry) project, which translates as “fish” in Bengali. MACH has addressed sustainable wetland resource management at the ecosystem level rather than just in individual rivers and lakes, working in

three wetlands covering about 25,000 ha. Over 110 villages inhabited by over 184,000 are directly involved in the project, while the total benefited population may exceed 500,000. MACH has done this through:

- Mobilizing communities into registered organizations that are empowered to conserve the resource;
- Helping them make resource management maps and plans;
- Undertaking habitat restoration;
- Adopting conservation measures for sustainable harvesting;
- Introducing alternative sources of income to reduce pressure on wetlands and enhance incomes.

Community organization and conservation. The key building block has been establishing 16 Resource Management Organizations, each representing the whole user community of the management area. These are registered with the government, with approved constitutions and annual budgets. They have secured access for 10 years to certain water bodies where their elected executive councils, in consultation with the wider community, make management plans and set rules for wetland use. About 60% of the members come from and represent poor resource users who through separate organizations receive training and credit (see below). They have adopted best practices in wetland management through their local plans, such as making 72 fish sanctuaries (areas from less than one hectare to 50 ha that retain water through the year and where the community has banned all fishing so that fish can over-winter and repopulate the wider floodplain), adopting closed seasons when fish breed, and implementing habitat restoration works. The latter includes excavation of link channels to improve fish and water movement and excavation of deeper pockets as dry season refuges for fish (water bodies that covered 717 ha have been made perennial where many were not in the past). All of this has impacted the fisheries in 20,361 ha of wetlands by 2005.

Fish catches, consumption and biodiversity have increased. The management practices adopted by the communities are based on their own problem and solution analysis complemented by specialist biological and engineering expertise, but from the outset (the baseline pre-intervention year of 1999) a rigorous monitoring program was set up to quantify impacts. Fishing catch and effort are recorded at 10-day intervals in 23 fixed monitoring locations covering 1,825 ha. and representing the range of

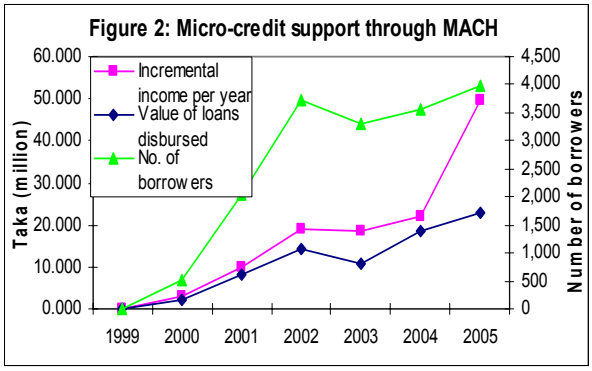


wetland habitats present. In addition, every three days, local women weigh by species fish being prepared for consumption for a panel of 1,050 households from 29 villages. This data shows that catch per hectare has increased by about 140% between 1999 and 2004 (figure 1). In addition several locally rare fish species have been restored. As all species are consumed and form a staple part of the diet, fish consumption has also increased. By 2004 fish consumption was on average 52% higher than

before MACH started, at 17.5 kg/person/year in 2004, which compares with a national average that declined between 1995-96 and 2000 by 14% to 11.1 kg/person/year.

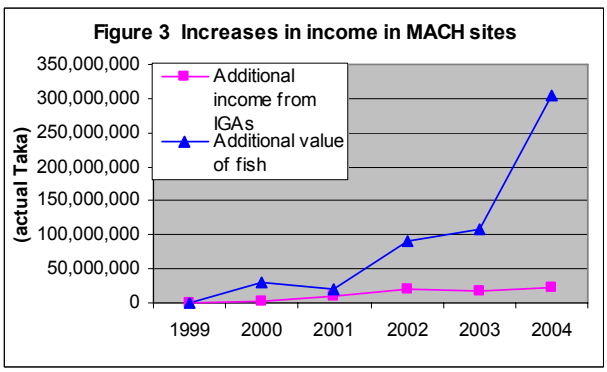
Improved watershed management has included introducing contour planting of pineapple in the hills surrounding one site where siltation was raising the wetland bed by 5 cm per year. This has reduced runoff and erosion rates and at the same time permitted denser planting and improved soil fertility which increased farmer incomes. Moreover by early 2005 about 125,000 trees have been planted to restore natural swamp forest and about 480,000 planted to stabilize river and stream banks and along roadsides and in other public spaces. By 2020 the standing value of trees should be about US$ 3.9 million at current prices. Swamp forest will be preserved as a long-term investment in ecological restoration. However, the return from the first felling cycle of the other trees should be US$ 3.2 million by 2020 (net of replanting costs).

Alternative and enhanced livelihoods. Over 5,500 of the poorest wetland resource users have joined savings and credit groups. These have helped the fishing communities refrain from fishing in protected areas and during critical fish spawning periods by providing training and credit to take up alternative income generating activities. This has helped reduce excess fishing, enabling fishing



households to take up new enterprises such as poultry and livestock, or skilled employment as mechanics and electricians. Borrowers have on average reduced their fishing effort by 20-30%. By 2005 almost 4,000 families had increased annual income of 65% over their previous incomes (Figure 2). Some were able to leave fishing, while others could reduce fishing during conservation closure periods while still increasing their incomes.

Enhanced incomes for poor wetland users. Fishers in the MACH project sites gained US$ 4.7 million in 2004 (figure 3) from higher catches associated with resource management improvements, as compared with baseline data from 1999. In addition, by 2005, those participating in training and credit activities earned an extra US$ 0.8 million, mainly from new enterprises supported by the project, as compared with their pre-participation incomes (daily incomes rose from about US$1 per day in 1999 to US$1.34 per day in 2005). This primarily impacted the poor who are most dependent on aquatic resources. Over 85% of households in the project areas are involved in fishing, and all of those supported with training and credit were low income households owning less than 0.2 ha of land, and therefore the poor have benefited the most from the project impacts.



Enhanced governance and precedents implemented to sustain this impact have been the formalization of community-based organizations of resource users and their empowerment. The leaders of these organizations now sit along with local government officials and councilors in co-management committees that oversee wetland management. These co-management committees are in the process of being endowed with funds that will generate an annual return to be used for operations and small-scale wetland restoration. Similarly, the savings and credit groups are now federated into 13 legal entities – registered membership-based social welfare organizations with elected leaders who also sit on the co-management committees. By 2006 they will employ former NGO staff to help their operations and will have received revolving funds totaling about US$ 0.35 million by 2006 to sustain their programs after direct USAID support ends. Moreover in a landmark policy decision, the government has designated eight "national" sanctuaries permanently set aside to protect wetland biodiversity that are managed by the community organizations. The government no longer auctions out fishing rights in these sanctuaries. The Department of Fisheries, through its national Inland Capture Fisheries Strategy is in process of adopting these institutions and the sanctuary approach on a larger scale as part of a policy shift towards community based co-management.

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CASE STUDY

Community Based Wetland Conservation

Jethua Unnayan Sanghaton or the Jethua Resource Management Organization (RMO) was formed in 2000 for the sustainable management of wetland resources on the eastern side of Hail Haor around *Jethua Beel.* The organization was formed to improve the lives of local people by restoring the wetland and adopting sustainable management practices. The RMO was registered with the local Social Welfare Directorate and is made up of 42 general members from the local communities surrounding the Jethua Beel wetland. A 13 member Executive Committee looks after the day-to-day activities.

Controlled harvesting allowable during harvest period.

The members place great emphasis on the sound functioning of their organization by relying on democratic principles and ensuring sensible use of wetland resources. They hold regular meetings, maintain their account books, share ideas and information among all members, protect and restore wetland plants and organisms, and organize rallies and meetings to raise local awareness of resource management issues. They also regularly receive support and advice from the Union Parishad (local council), and local government structures to further strengthen and support their efforts. These forged relationships are meant to be sustainable and will be maintained after the MACH's participation in the project is completed.

The RMO started by leasing a small 6-acre beel (perennial water body) that had silted in. The organization, through the MACH Project, excavated the beel making it perennial once again. Within the beel, it also created a sanctuary or conservation area of nearly an acre. Trees were planted on the higher ground created through the excavation, to stabilize the bank, to restore wetland forest cover and to increase the bird and fish habitat. In addition the RMO re-introduced six previously resident species of fish which had become extinct or rare in the area. Among those, two species, *Pabda* and *Foli* have become re-established in the area and are regularly caught. Project monitoring over the past 5-6 years reveals that fish catches have increased from 122 kg/ha in 1999-2000 to 231 kg/ha in 2004-2005. Fish consumption has also increased according to household monitoring.

Resource management planning session determining location of Best Management Practices.

The RMO borrowed 42,000 taka from the project to create its sanctuary, and was able to repay this within two years. In addition the organization paid the government over 10,000 taka per year to lease the beel, while still managing to save enough money to continue to protect and maintain the wetlands in their area.

In 2004 the RMO took a big step toward its advancement when it obtained (with project help) the lease for the Lalerdoba and Alniberi Beels covering 619 acres of the Hail Haor basin. The RMO, after a struggle to gain these fishing rights, is optimistic that it can establish sanctuaries, increase the income of fishers in the area, and expand the tree plantations in the area. The once skeptical people of the locality now fully support the Jethua RMO and recognize that it has made a very positive impact on the community by increasing fish resources and improving the environment.

Case Study 1: Jethua RMO ,Sreemongal, Sept 2005

CASE STUDY

Standing Up For Their Rights

Dumer Beel is one of more than sixty depression lakes or *beels* (dry season pockets) within the large wetland complex known as Hail Haor. Just like all the other beels in the haor, the fishing rights used to be leased to one person, who then sub-contracted fishing each year to a few fishers with the aim of earning as much money as he/she could. This was done largely without regard for the conservation of enough fish to sustain the population. It was a "take as much as you can while you can get it" system that left most of the poor fishers living in the area with little or no access to the resource during the peak fishing time.

Rights training at the Resource management Organization level

This has all changed with the support provided by the MACH project. Through consultations and meetings local people realized that they could work together and adopt better practices that would help to restore their damaged fishery and battered livelihoods. To do this, they formed a 51 member Resource Management Organization (RMO) whereby 60% of the members, including the president and the treasurer, are fishers. The others in the group are local landowners and opinion leaders who support their common interests in the wetland.

After submitting proposals and lobbying at the ministry level, the government agreed in 2002, to reserve the lease for Dumer Beel for the RMO instead of auctioning off the fishing rights to the highest bidder. After discussion with the rest of the fishing community, the RMO established two fish sanctuaries in the beel where all fishing is banned. The RMO has also banned the catching of young fish (fingerlings), brood fish, and hunting birds during certain periods in larger areas of the beel.

Fishers of the Dumuria Resource Management Organization.

The RMO has restored the access of local fishers who can now fish and earn an income. Other poor people are also allowed to fish for their subsistence during the unrestricted fishing periods. According to the community the conservation measures have worked. With fishers reporting larger catches, all are willing to continue to observe the conservation rules. The entire community has noted the marked increase of fish yields and the diversity and number of fish available in the local market. The Dumuria RMO has shown that by ensuring the participation of fishers and community members in wetland resources management, and by securing their access rights, that decades of over-exploitation can be negated and the health of fisheries and wetlands can be restored.

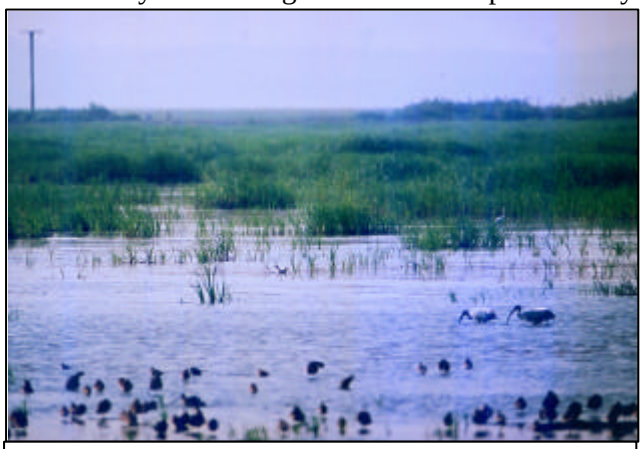
Through this process and with the help of the MACH project, fishers have begun to raise their voices at community and upazila (sub-district) level. Based on their proven success in demonstrating that they can manage and sustain the wetlands, as well as restore and repopulate the fisheries, they have gained respect and a new found bargaining power with government agencies and policy makers.

Case study 2: Dumuria RMO , Sreemongal, Nov, 2005

CASE STUDY

A Permanent Wetland Sanctuary

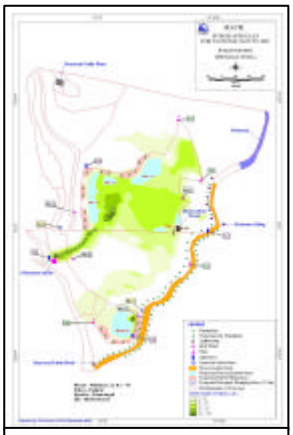
Years of over-fishing had taken their toll in Hail Haor. In this large, nationally and internationally renowned wetland in north-east Bangladesh, the number of fish species caught was falling, as were total catches. Human disturbance and hunting had reduced past flocks of wintering migrant water birds to just a handful.Yet the haor remained vital to local livelihoods and of great conservation interest, in need of protection and restoration. In the middle of Hail Haor an area of about 50 ha was identified by the community as the most critical area for the protection of wetland habitat, plants, fish, birds and other wildlife. With support for the proposal from the local and district administration, the Ministry of Land agreed in 2004 to permanently set aside this area as a sanctuary, waiving the previous lease income from the fishery.



Water birds also have been attracted to this safe heaven

Since this sanctuary lies within the area managed by Borogangina RMO (Resource Management Organization) they have taken a lead in planning for and protecting the newly anointed sanctuary. The RMO, like others in the MACH project, aims to use and manage wetland resources on a sustainable basis. The group's 48 members, all of whom come from neighboring villages see it as their responsibility to protect the many species of fish that reside in the safe haven and breeding ground that the sanctuary provides.

The RMO has been proactive in informing local people about the benefits of a permanent sanctuary.



Habitat restoration plan of Hail Haor National Sanctuary.

Community guards protect fish & wildlife within the sanctuary.

With the help and endorsement of their local council (Union Parishad) chairman, they successfully campaigned against local vested interests that initially made propaganda against the sanctuary. They regularly hold village meetings and workshops, set up stalls in local "melas" or fairs, conduct village theatre shows, and use loudspeakers to broadcast their message on the importance of the sanctuary.

Recognizing that fish from the sanctuary repopulate the haor and benefit all users, the RMO, local government, other leaseholders and fishers in the haor, and other opinion leaders have supported plans for the sanctuary. Through a workshop the sanctuary has been universally welcomed with pledges of moral and financial support. The RMO has organized permanent guards. Poachers have their fishing gear seized, although the members proudly state that poaching is of little problem now. Other signs of their success are evident as well with more water birds flocking to the area in winter because of a reduction in the level of disturbance.

When asked about the future, the RMO members were all very optimistic, stating that the diversity and density of plants, animals and fish will continue to grow. There are plans to restore swamp forest and open a visitor center. And, with the help of an endowment fund established by MACH, and contributions from all the other RMOs and fisheries leaseholders of the haor, they have little worry about funding their efforts. "We are extremely hopeful," states RMO member, Md. Thaybul Islam, "I see a bright future for us and for the sanctuary."

Case Study 3: Borogania RMO , Sreemangal Nov, 2005

CASE STUDY

Re-Excavation of Bagadubi Canal

Bagadubi canal in Jhenaigathi Upazila was once an important route by which fish and other aquatic animals moved between the Malijhee River and Dholi Beel. The movement of water through the canal enriched the aquatic biodiversity of both river and beel. Moreover, hundreds of farmers used its water to irrigate their agricultural land during the dry season. However, rapid deposition of silt washed down from the neighboring hills (in India) silted up the canal, affecting the lives of all local people who lost fish, lost water for irrigation, and suffered more frequent flood damage to crops.

The members of Dhali-Baila Resource Management Organization (RMO) represent all these interests and wanted to address this problem. In 2003 through their general meetings they came to a consensus and approached the investment support program of MACH to help excavate the canal. They took opinions of the Union Parishad Chairman, local administration, and MACH specialists who agreed that the proposal was justified. However, concerns were raised that there was only a very narrow fringe of land along the canal edge where excavated earth could be dumped. The RMO along with adjacent land owners in their enthusiasm volunteered use of part of their land for dumping the soil. Finally on 23 September 2003 after thorough discussion the Jhenaighati Local Government Committee approved this scheme.

Excavation was launched on 7 January 2004. The RMO and UP Chairman supervised the work. More than 200 laborers, mostly local poor people, got an opportunity to earn an income in the lean season and worked daily for about two months to excavate 1.16 km of canal. Excavated earth was dumped all along both sides of the canal.

Excavation work in full swing

Completed excavation of Bagadubi Canal

When the local people see this long stretch of canal once again looking like a river full of water throughout the year, they are proud to explain their joint efforts. After re-excavation rice crops on more than 100 acres (40 ha) of adjacent land have been saved from the damage of sudden flash floods. Long term connectivity between two perennial water bodies - Dholi Beel and Malijhee River has been restored. Combined with further excavation in Dholi Beel to create a deeper sanctuary for fish and other aquatic life, this has helped restore the fishery and increased fish catches in the RMO's area. This has benefited poor fishermen surrounding the water body.

In addition about 6,600 tree saplings of 12 varieties were planted along both sides of the canal which will in future create a congenial environment for wildlife, reduce soil erosion into the canal, and provide a future source of income to the community.

Upazila and Union Parishad officials inspecting the completed works

Mr. Siddiqur Rahman, Jhenaighati Upazila Nirbahi Officer, on his visits to the site noted with satisfaction that this work was well executed and is a model of coordinated effort by the community through the RMO, local government and the MACH Project.

Case study 4: Excavation, Sherpur, Jan, 2006

CASE STUDY

Fish Sanctuaries Work

The Turog-Bongshi River and its floodplain are located just north of Dhaka in Kaliakoir Upazila (Gazipur) and Mirzapur Upazila (Tangail). The MACH project initiated improved flood plain management along parts of the Turog River Basin through formation of four Resource Management Organizations (RMOs) that are comprised of local fishers and other resource users.

Since 1999 these RMOs have established 19 fish sanctuaries covering nearly 10 hectares of water area. The Ministry of Land has permanently established three sanctuaries in the Turag River, with their day-to-day co-management carried out by the Turag RMO and local government. Nine sanctuaries in *Mokesh Beel floodplain* and seven in *Aowla Beel floodplain* have been established by the local communities in parts of fisheries where they have fishing rights. Each sanctuary has its own committee from the surrounding community to protect it and the membership of the local committees makes up the general bodies of the four RMOs. In turn the RMO executive committees coordinate with one another to ensure that everyone observes the areas and times designated for no fishing.

With the aim of protecting fish in the dry season when water dwindles to only 7 % of its monsoon extent, the river sanctuaries are positioned in deep scour holes, locally called *kum*, and the beel sanctuaries were likewise located in the deepest points, locally known as *doho*. Where most of a beel was silted up, MACH supported excavation to deepen the pools of the sanctuaries and increase their water and fish holding capacity.

With the establishment of the sanctuaries, the restricting of fishing during the early monsoon, and the reduction in fishing effort by MACH supported resource users; fish catches in three large wetlands have increased markedly. This increase is borne out by data from regular monitoring of fishing in sample areas. Over four years (2000-2004) with the existence of sanctuaries and the advent of closed seasons, the average catch has remained nearly 200% higher than baseline figures. The baseline catch in 1999 was 57 kilograms per hectare whereas the average over the next 4 years was 171 kilograms per hectare.

National River Sanctuary at Lal Khar Kum in Turag Bangshi River, Kaliakoir.

Species diversity has also increased from a baseline (1999) average of 82 species of fish recorded in the sample catches to as many as 95 species since sanctuaries and improved habitat were established. Some of these additional fish species naturally returned when their habitat was restored and protected, but also the RMOs successfully reintroduced some key species that had been lost such as *meni, foli, pabda, and kalibaush.* The re-introduced species are in many cases breeding in the area and successfully maintaining a viable population.

Per capita daily fish consumption in the area has increased as well, from 27 grams in 1999 to 37 grams in 2003, a 36% increase. It is not only the rigorous monitoring program that tells the story, community members themselves testify that they can catch more fish in the floodplain to feed their families. Communities nearby have heard of these successes and are proposing and establishing sanctuaries in their own areas through the support of their local governments.

Case study 5: Turag- Bongshi sanctuary Kaliakoir, Nov , 2005

CASE STUDY

Managing An Aquatic Natural Resource

Call them sanctuary crusaders, leaders, planners, and guardians. The 122 members that make up the Darabashia Resource Management Organization (RMO) take the responsibility of protecting the fish sanctuaries and enhancing fish yields in their area very seriously. "Because of our efforts, the entire community has been made aware," says RMO president Mumtaz Uddin.

Resource Management planning and mapping by the Takimari Darabasia RMO.

The group has marked its sanctuaries with signboards and red flags, to clearly identify restricted sanctuary areas. They regularly patrol the sanctuaries to prevent fishing, and remove harmful fish traps.

Extremely proactive, they hold village meetings to promote awareness of the value of the improved management and conservation measures, and have developed a resource map to help others identify the sanctuaries and resources in the area. They have also become village philanthropists, distributing relief to flood victims during last year's (2004) monsoons.

Since 2002, the RMO members, in conjunction with MACH, have established seven sanctuaries that cover a total of 5 acres. MACH provided the RMO with technical support and funded the original excavation of key fish habitats and the introduction of fish aggregating devices. The RMO with support from local government has taken over from there vowing to maintain the new sanctuaries. "We have to guard and maintain our resources," says Mumtaz Uddin. The members know that this guarding and maintaining consequently requires funding. The RMO's Executive Committee, which meets monthly, and the General Body of all members, which meets every three months, pay dues of 5 taka at each meeting. The RMO also benefits from the five harvest areas that have been established where fish are taken 3 times a year. The group claims that they can earn at least 4,000 taka per year harvesting from these five areas. To date, they have saved 33,676 taka in a "Post MACH" fund so that they can maintain the seven sanctuaries and take up other conservation activities even after MACH has fulfilled its tenure. In addition MACH is setting up with local government an endowment fund, the interest from which may be used by RMOs for critically important ecosystem restoration after the project closes.

Although the group is preparing itself for self-sufficiency, it says it will continue to pursue its links with the wider community, and with the local government, which currently back the group's efforts. Their efforts are now receiving national support and recognition as well. During July of 2005, the Darabashia RMO was featured on a BTV (Bangladesh Television) newscast, detailing the RMO and MACH's combined efforts. "We are proud," says Mumtaz Uddin. "We are happy that everyone in Bangladesh can see what we are doing, and they can learn from us. We are doing good work here." It is work that Uddin and the rest of the members plan to continue indefinitely for the betterment of their own community resource.

Some of the members of the Takimari Darabashia RMO.

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CASE STUDY

Aquatic Fruits Are Once Again Our Livelihood

Aquatic plants play a vital but unsung role in wetland ecosystems and the livelihoods of people dependent on wetlands. They have economic and nutritional value in addition to their value as a substrate for aquatic plant and animal attachment in the wetland ecosystem. Among the many aquatic plants of Bangladesh, *shingra* (*Trapa bispinosa* and *T. maximowiczz*) bears edible fruit that is a popular free food of rural people. In Baila Beel in Jhenagathi Upazila (Sherpur) s*hingra* was plentiful a decade ago, but gradually disappeared due to the mismanagement of the beel fishery especially widespread use of *kheta jal* (fine mesh drag nets). Consequently, poor people in this remote area were hard hit when food was scarce, as they had once depended on *shingra* as a food and income source. With the decline in shingra, fish also lost a source of food – the plankton that attaches to the stems and leaves.

With support from MACH, the Dholi Baila Resource Management Organization (RMO) was formed and has helped to restore the wetland and its biodiversity. The RMO established six fish sanctuaries covering three acres within the 20-acre dry season water area of their beel. They also stopped using harmful fishing gears including *kheta jal*, universally regarded as one of the most harmful gear as it removes fish hatchlings as well as aquatic plants.

After the introduction of these management actions, *shingra* staged a comeback in the beel, especially in the sanctuaries and their vicinities. Growth of *shingra* is now uninterrupted and there are enough again to harvest. Besides local people collecting s*hingra* casually for food, 40-50 poor families regularly collect *shingra* fruit from the beel for four months after the monsoon, each harvesting about 4-5 kg per day. They consume themselves about half of these aquatic fruits and either barter the rest for paddy, fish or vegetables with their neighbors or sell the balance in the local market where it fetches a price of 12-15 taka per kilogram. On average, in 2003, a family that harvested *shingra* earned more than 7,000 taka during the four-month season. This is a substantial contribution to their livelihoods.

Improved management of Baila Beel thus markedly contributed to the reappearance of *shingra* in the wetland and yielded a triple benefit to the locality. First of all it has contributed to food security, secondly it improved employment and earnings of the poor, and thirdly it has helped improve the fishery. The fully-grown *shingra* is a veritable barrier to easy fishing, and thus provides a shelter for fish. This provides additional security making poaching in the sanctuaries difficult. S*hingra* also both directly and indirectly helps to maintain good water quality, and many indigenous fish species rely on the stem and leaf surfaces to gather attached plankton, which are a highly nutritious food.

Shingra (*Trapa bispinosa*)

Case study 7: Baila Beel RMO, Sherpur, Sept 2005

CASE STUDY

Chenguria Reborn

Chenguria, a village located in the Jhenaigathi Upazila of Sherpur, has a population of around 1000 people, all of whom rely on fishing for their livelihood. Once, large bodies of water thronged with fish, providing the village with a rather comfortable life. But the beels (depressions that hold water in the dry season) had gradually shrunk and the number of fish had dwindled toward the end of the 90's. This decline caused much hardship to Chenguria's residents.

To reduce the stress put on the fish population, MACH helped the villagers to establish seven sanctuaries in the locality and gave loans to struggling fishers to encourage them to stop fishing and pursue other vocations such as small businesses, cow fattening, and poultry farming during April – June when fish are breeding.

The fishers worked with MACH to release native species of fish into the waters, and then to maintain the sanctuaries. The benefits of their efforts are evident. Fisherman, and president of the local Federation of Resource User Groups (MACH formed organizations of poor fishers for savings, micro-credit and training), Wahab Ali, says before the establishment of sanctuaries in the area, he would spend 15 hours a day fishing. "I couldn't collect even 1 kilogram of fish," he says shaking his head. "Now I fish only 8 hours a day, and my catch is larger than before." The nets of fishers like Ali are also seeing the return of rare species like *Shorputi*, *Pabda, and Tengra*.

The village is again thriving, and will continue to do so with the support of its fishers. "We are grateful to MACH," says Momtaz Uddin (president of the local Resource Management Organization which sets rules and norms to ensure the fishery is sustainable), "and we know that the project will continue to give until its last day of operation. But when they are gone, the good work of Chenguria fishers will continue."

Planning session of the Resource Management Organization.

Lift net fishing

Cast net fishing in permitted section of RMO managed waterbodies.

Case Study 8: Chenguria Village Fisher, Sherpur, July 2005

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CASE STUDY

The Pineapple Pioneer

Masud Ahamed is a self proclaimed "pineapple pioneer." When he started working with MACH in 2002, "The other farmers called me crazy," he says. The pineapple field contouring technique introduced by MACH was unconventional and therefore initially unpopular. However, after MACH staff explained the benefits of contouring, Ahamed was persuaded to set up a demonstration plot on 69 decimals (0.28 ha) of his pineapple fields, near the roadside, as a test and model for other farmers and the community.

Masud Ahmed in one of his contour planted pineapple fields.

"We had never seen fields like this before," he says, "But I began without hesitation, MACH told me that they would provide me with technical support and by following the contouring method, I could reduce erosion and improve my output of pineapples."

Ahmed's crop output was not only improved, it was nearly doubled. He has since contoured 12 of the 25 acres he cultivates and has plans to contour the remaining land over the next 2 to 3 years.

When using the traditional system, farmers can make approximately 1 lakh taka (US$ 1,800) per acre in 3 years. When the contouring system is used, farmers can make an additional 50,000 taka in the same amount of time, using the same amount of land. Aside from the financial benefits offered, the countering of soil erosion is an important long term benefit. The contours and extra coverage offered by the contouring of the plants, reduces the amount of surface area exposed to direct rainfall thereby reducing soil erosion during the monsoon. This in turn benefits downstream wetlands by reducing the siltation rate on the valuable resource (see box).

Background

Due to deforestation and poor land use on the hills around Hail Haor, the haor has been silting up much faster in the last 20 years. Consequently, wetland habitats that support diverse animal and plant species are being lost. MACH identified the local practice of planting pineapple in rows up-down slopes as the most damaging land use practice around wetlands in Sreemongal's Hail Haor region. To help address this, MACH, through the assistance of the USAID Farmer-to-Farmer program (managed by Winrock in Bangladesh), brought an experienced US based pineapple farmer volunteer out. The volunteer expert worked with local farmers to demonstrate contour planting for soil conservation using higher planting densities with notable success for the farmers and the wetland.

Ahamed was a pioneer contouring convert in 2002, with an additional 20 farmers following in his footsteps. With increased MACH efforts, there are plans for another 20 farmers to begin the transition towards contouring their fields in 2005.

Case Study 9: Pineapple contouring project – Masud Ahamed
Sreemongal, July 10, 2005

CASE STUDY

Trees Offer Branches Of Hope

A large, six-acre pond sits at what is the Bagervita Kanduli Asrayan village's epicenter. An additional two acres are home to sixty families, who depend on the pond, for food, for water and for survival. "The pond is our livelihood," says community member and local Resource Management Organization representative Khorshed Alam. "It was our only resource and it was being destroyed." Heavy siltation of the pond, degraded and disappearing banks, along with pollution and years of misuse had crippled the small community's life support from the water body.

MACH recognized the problems in Bagervita Kanduli and they met with the villagers and educated the community about the environment and the major issues and problems facing them. MACH motivated them to end the practice of disposing of large quantities of garbage in the pond, an act that was killing the fish population. They also identified the need for extensive reforestation in the area to control the bank erosion and reduce runoff siltation. "Through MACH, we saw that our pond could be saved and even enhanced," says Khorshed.

In 2002, MACH planted 3,000 trees surrounding the pond and its neighboring areas. Today, the villagers maintain the thriving trees, hoping to soon reap the financial benefits. They anticipate that after another 5 years, the trees will bring in more than eight hundred thousand taka in profit over the maintenance costs. This will be shared amongst the 60 families after using some of the funds for sapling replacements.

However the trees have more than monetary value to offer the people of Bagervita Kanduli. Hundreds of mango, jackfruit, coconut and berry trees provide the villagers with a free food source as well as roosting and nesting habitat for birds. The bark of the Arjun tree is said to be medicinal, providing relief for heart problems and dysentery. The leaves of another, Nim, when boiled are said to cure skin diseases and act as a natural pesticide. Some of the tree branches are put into the pond to create safe havens for broods of fish and act as substrate for algae production serving as a fish feed. "We take rest in their shade, our children climb in their branches," says Alam. "The trees have brought new life to our village. They have brought us joy and they have brought us hope."

"We take rest in their shade, our children climb in their branches," says Alam. "The trees have brought new life to our village. They have brought us joy and they have brought us hope."

Case study 10: Bagervita Kanduli Asrayan village,Sherpur, Oct, 2005

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CASE STUDY

From Eggs To Riches

When Mossamad Sofia Begum first got involved with MACH she never imagined the success to which it would eventually lead. After hearing about MACH in a village meeting, she borrowed 3,000 taka in 2002, which she used to buy wood. She commissioned her husband to use the wood to build 3 display cabinets.

The cabinets were sold for 4,000 taka each, earning Sofia and her husband close to 9,000 taka in profits. But her husband's labor was unskilled, so she encouraged him to become an apprentice at a furniture shop. "I knew if we could build more things, better things, we could make more money. I told him, I will continue to take loans and you will build," says Sofia.

Sofia and her husband used a second loan of 5,000 taka in 2003 to open their own furniture shop. A third loan was used to lease 25 decimals (0.1 ha) of land for rice cultivation. They harvested over 800 kilograms of paddy that in the market sells at 12 taka per kilogram. Instead of selling the paddy, however, Sofia and her husband kept it for their own consumption. They were able to easily repay the loan using the profits of the furniture shop. Gradually they were becoming self-sufficient.

With a fourth loan of 10,000 taka, Sofia decided to start a second business that she could tend from home, while her husband continued to run the furniture shop. So she participated in a 2-day training session on poultry farm management, and then purchased 144 chickens. Sofia's hens lay 120 eggs per day and these have a market value of 320 taka per egg. The hens produce over 11,500 taka in eggs per month for approximately 18 months. After the egg laying frequency drops the hens can be sold in the market with the profits used to buy new layer hens and the cycle starts again.

The work ethic Sofia exhibited at her poultry farm was recognized and rewarded, when she was recently selected by the Winrock BREAD II poultry promotion project. That project loaned an additional 46,000 taka for Sofia's farm, providing her with a new shed, cages, chicks, feed, fans, and vaccines. Suddenly the hen house she ran was as large as her own home. It's an amazing opportunity, which this mother of two isn't about to squander. "It's a lot more work," she concedes, "but of course I am grateful."

Mossamad Sofia Begum harvesting eggs from her profitable poultry egg laying operation.

Sofia's 140+ chickens lay 120 eggs per day worth an average 384 Tk/day.

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CASE STUDY

A Duty To Provide

Shree Krisno Sarkar's father says that he is proud of his son, because he is fulfilling his duty to the family, "No son of mine is allowed to be lazy. My boys must work."

Never wanting to disappoint, Sarkar learned the family trades from his father: fishing and farming. However even with the many hours he spent in the fields and the haor (or wetland), he wasn't able to adequately support himself and his family.

In 2002, Sarkar took a 5,000 taka loan from MACH and went into business as a middle man. He began collecting beetle leaves from local growers and then sold them in the market. He was able to make a 40% profit and became inspired to enter a second field, while still maintaining his beetle leaf collecting. So in 2003, he took out a second larger loan of 8,000 taka.

After participating in a one month MACH sponsored poultry training session, he used the money to buy 100 chickens. He built a shed, bought feed, and set up his own poultry farm. "MACH taught me how to care for the chicks, how to check for disease, how to properly manage my farm, and how to sell my product," he says. Sarkar is able to buy one chick for about 25 taka, and after 2 months of successful rearing, he can sell it for over 140 taka. In his first year in the poultry business, Sarkar made a 13,000 taka profit.

Giving up the beetle leaf collection business for good, he took out a third loan of 20,000 taka in 2005. He expanded his chicken farm, and now buys 400 chickens at a time, and sells them in under two months. He anticipates that each batch of chickens he sells in the future will earn him a profit of over 8,000 taka. He has taken additional steps to secure his family's financial security, by establishing a nursery on his family's property. He is growing trees, a portion of which MACH has guaranteed will be bought through project grants linked with the Resource Management Organizations for planting along canals and swamp areas as part of its habitat restoration work.

Sarkar is pleased to be doing so much to support his family, but recognizes that the benefits go beyond his household. "MACH's programs have benefited my entire community," he says. In fact, Sarkar is one of many shareholders of a roadside forest established by MACH in 2002, in which the shareholders reap 40% of the benefits earned from the timber and fruit the restored roadside forest band provides. Other village members have received nursery and small business training from MACH and a local boy was given a 1-year scholarship to train as an electrician at Caritas' technical training institute.

Shree Krisno Sarkar has become successful and no longer relies on the wetland for his families' income.

Grateful for all MACH has done, Sarkar sees it as his duty to further the reaches of the project by training other aspiring poultry farmers in his village free of charge. "He's a good boy," his father nods, "Doing what any good boy would do."

Case Study 12: Male RUG Shree Krisno Sarkar,Sreemongal, July, 2005

CASE STUDY

Household Energy From Poultry Waste

Poultry farming is a burgeoning business in the Turag-Bangshi floodplain, where MACH works in Kaliakoir, north of Dhaka. More than 200 farms house anywhere from 500 to 10,000 or more birds per farm. Some of these farms started with support from MACH while others have been operating for some time.

MACH, through its participatory planning process, found that the community was concerned about the farmer's disposal of poultry waste (droppings and litter). Their contention was that the waste led to serious environmental hazards with negative impacts on drinking water and wetlands of the area.

To address this waste issue, MACH organized a technical assistance program for the Kaliakoir poultry growers' association through Winrock Internationals Farmer-to-Farmer (FTF) program in January 2001. As part of this program, poultry waste management expert volunteer, Dr. Todd Applegate from Purdue University, USA, conducted an extensive training workshop for local poultry farmers. This emphasized sustainable use of poultry farm waste including how this waste could be transformed into valuable resources while maintaining a healthy environment.

One of the recommendations was to set up bio-gas units using poultry droppings that would enable the poultry growers to produce gas for cooking and lighting while at the same time reducing the impact of the waste on the environment. MACH facilitated a pilot program that included additional technical support from the Local Government Engineering Department (LGED) and the Bangladesh Council for Scientific and Industrial Research (BCSIR), a number of Kaliakor poultry farmers started setting up small-scale biogas units in their homes as a result of this. Where this has been done it has helped cut the poultry growers' fuel costs significantly. The use of biogas is also reducing the use of wood for fuel thereby reducing pressure on local forests. In addition, if properly dried, the waste from the biogas slurry is good- quality organic fertilizer.

Poultry farms that have established small-scale bio-gas facilities and are reaping the benefits of cheap domestic fuel, while contributing to an improved community environment with less pollution and more trees. This success has generated enthusiasm and adoption of this technology among Kaliakoir poultry farmers.

Intensive poultry farms have a waste problem.

Constructing a biogas unit with FTF technical advice.

Problem converted to resource: Cheap clean cooking fuel.

Case study13: biogas and poultry, Kaliakoir, Nov, 2005

CASE STUDY

A Place To Call Home

Before she was selected to be the recipient of a joint project between MACH and the Dhaka American School's Roots and Shoots program, in 2005, Shova Rani lived in a small mud hut the size of a bathroom with her husband, who is a peanut salesman, and her three children.

"We had nothing," she says. The hut she and her family inhabited was prone to flooding and the mud structure was full of cracks that Shova Rani says housed snakes. "It was unbearable. What is to become of a family without a decent place to live?" she asks.

The Roots and Shoots students in cooperation with MACH donated their time and money to give Shova Rani what she had always dreamed of, a home.

"I would have never thought I could bring them here for 100,000 taka," Shova Rani says, "and yet they came for free."

Inside the house now sits a sewing machine. "My daughter took part in a tailoring training offered by MACH-Caritas," Shova Rani says. "She is able to sell the clothing she makes and help provide for our family."

The Roots and Shoots group also helped her and her family by planting 30 avocado and other fruiting trees in the space around her homestead. The avocado when bearing fruit in future years will bring a large income to this very poor family. Avocado's sell for 120 taka apiece in Dhaka and a mature tree can have hundreds. Also planted were fruit trees such as jam, jackfruit, mango, leechee, and lemon that will provide a sustainable supply of fresh fruit for Shova Rani and the family.

The family's socio-economic status is gradually improving, with community members showing them more respect since the completion of their new homestead and the planting of MACH-provided trees on the land. "People here no longer pity us," Shova Rani says, "because we are not people to be pitied. We are a family, with a home and future."

"It was unbearable. What is to become of a family without a decent place to live?" Shova Rani asks.

"I would have never thought I could bring them here for 100,000 taka," Shova Rani says, "and yet they came for free."

The Roots and Shoots group also helped Shova Rani and her family by planting 30 avocado and other fruiting trees in the space around her homestead.

Case Study 14: Roots and Shoots,Kaliakoir, Oct, 2005

CASE STUDY

A Change For The Better

As a career fisherman, Jamir Uddin struggled to make ends meet. The resource he had fished all his life was in decline. He began collecting and selling peanuts to earn extra money, when fishing was slow. What started as peanuts, turned into a roadside stand that sold iftar, the traditional sundown meal when Muslims break their fast during the month of Ramadan.

Recognizing Jamir's efforts to break from fishing, MACH encouraged him to open his own shop, which would operate year round, as opposed to his one month a year, iftar stand. "I saw that if I quit fishing and devoted myself to a shop full time, I could make more money," says Jamir Uddin. To fund his new business, MACH provided him with a 3,000 taka loan in 2001. The following year he took a loan of 5,000 taka, then 7,000 taka, and then 10,000 in 2004. This year (2005), he took out an even larger entrepreneurship loan of 20,000 taka. The loans, he says, have helped him gradually build up his shop, which sells onions, lentils, soap, biscuits, oil and various other items.

Per year, Jamir estimates that he makes about 30,000 taka in profits from his shop, a sum unimaginable to him when he was a fisherman. Jamir Uddin, and many other converted fishers like him, are finding a never before known success pursuing alternative sources of income generation.

"This shop," he says, "has changed my life."

Jamir Uddin who has left fishing relieving pressure on the resource which were over fished in his area.

"I saw that if I quit fishing and devoted myself to a shop fulltime I could make more money" -- Jamir Uddin

Case Study 15: Jamir Uddin, Sherpur , July , 2005

CASE STUDY

Willing To Learn

When asked about his education, Sohrab Uddin thinks for a minute. "I attended class one," he says, "but I'm not sure I completed it." Following in his father's footsteps, he became a fisher at an early age. At times, to make ends meet, he dabbled in selling various goods at a small shop. But soon, fishing, even when supplemented with the money he earned from the shop, wasn't enough to support him, his wife and their son. Then in 1999, while weighing his fish that were to be sold in the market, he heard some of the other fishers discussing a new project, MACH, which was offering training in alternative income generating activities to local fishers. Intrigued, Sohrab carried MACH's name in his mind.

When project staff came to his village later that year to describe the deteriorating situation of Hail Hoar fishery and to motivate fishers to pursue other careers, Shorab eagerly agreed to join the RUG (Resource User Group) that was being established in his village.

With a 5,000 taka loan from MACH, he started a tree nursery and a vegetable shop, where he sold the produce of local farmers. He made about 50 taka per day and by the end of the year netted close to 15,000 taka from the sale of vegetables and other produce.

With a second loan of 8,000 taka he expanded both the nursery and the shop. Although all of his profits were coming from the vegetable shop, the nursery was seen to be a long-term investment, with trees taking 1-2 years to gain the size required for successful planting.

Sohrab's third loan, of 20,000 taka was used to further develop the now profitable nursery. In 2003 he sold saplings worth more than 100,000 taka for riparian and swamp forest planting sponsored by MACH and an additional 20,000 taka was made selling saplings in the local market. In 2004, he was hindered by floods, but still managed to sell 16,000 taka worth of trees. He estimates that in 2005 he will sell over 50,000 taka worth of all species both to MACH and the local market.

MACH is eager to support Sohrab's efforts, as his 45 decimal (0.2 ha) nursery provides the area and the Resource Management Organizations with *Hijal* and *Karoch*, two native trees to the low flooded lands of the wetlands. He has helped in the restoration of critical forest habitat along the margins of the wetlands with the nursery production of these species. In the past, the trees were cut for construction and as brush-piles to catch fish, now thanks to the project's initiative, this important habitat for juvenile fish and other wildlife is being restored. Sohrab is also gaining valuable experience in the tree nursery operation and the production of commercial trees as well.

Sohrab no longer goes fishing; in fact he's already applied for a 40,000 taka loan so he can further expand his nursery and his profits. He and his wife have also added a baby daughter to their family. He has high hopes for his new daughter and his now 12-year-old son. "My children," he says, "won't have to leave the classroom to fish the haor anymore."

Sohrab Uddin has made the transition from fishing to tree rearing while generating more income.

Case Study 16: Md. Sohrab Uddin, Sreemongal, July ,2005

CASE STUDY

Minera's Dreams Come True

Minera Begum lives with her husband, a fisherman, in Shinabau village on the periphery of Mokesh Beel in Kaliakor Upazila. Minera explains, "With our three children, my husband and I were finding it extremely hard to make ends meet prior to 2000." The income that her husband got from his subsistence level fishing in the beel was barely enough to feed the family. "Those were very hard days, just to manage two meals for the family. Our children were without schooling," she recollects.

Hearing about the MACH project and the Resource User Groups (RUG), she decided to join a RUG called the "Sinabau Ekota Mohila Samity" in October of 2000. Since then she has regularly attended the weekly meetings of the group and accumulated the prescribed weekly savings. She participated in various group development and resource awareness trainings.

"Apart from general training, I attended a one month training on milk cow rearing," Minera proudly explains. With some past experience of cattle rearing and having completed the training, she applied for a loan. In August 2001 with a 5,000 taka loan from the MACH project she bought a cow. Minera says "I worked hard and luck has also favored me in my venture." She repaid the first loan within the stipulated time and took a second loan of 8,000 taka to buy a second cow with a new calf for 10,000 taka. Her daily income increased to 60-70 taka, as the milk was selling locally for 16 taka per liter. After paying off her loan, she had enough to maintain her family, and to put aside something more in her savings.

This success, the skills she had acquired and developed through practical experience, and the new found confidence she developed through rearing two milk cows, led Minera to an interest in establishing her own milk cow farm. "To make this dream successful, I received further training organized by MACH on micro-entrepreneurship and bought a crossbreed cow and calf with a loan of 30,000 taka in May 2003. I am now getting 10-12 liters of milk per day from my cows, which brings a gross income of 150-200 taka per day," Minera explains.

Minera's husband has acknowledged her initiatives and regularly assists in looking after the cows. He has also reduced his fishing in the beel and their two children now go to school regularly. They have also added a room to their small house for the children. Minera plans to continue expanding her enterprise and plans to buy another crossbreed high yielding milk cow when she has accumulated enough savings. Says Minera "naturally I am grateful to the MACH project for the success that I have achieved so far and the prosperity that has come to my family."

Minera has helped her family go from a subsistence fishing income to a more stable one from livestock rearing.

Case study 17: Minera female RUG, Kaliakor, Nov, 2005

CASE STUDY

Vegetables Grow A Year Round Income

Mofizullah farms the fringes of Hail Haor wetland in Alisharkul village in Sreemongal Upazila. "The soil of my farm land is sandy and not so fertile. Each year I get only one crop due to flooding in the rainy season and lack of irrigation in the dry season," he complains. Because he owns only a little land of poor quality next to the wetland, Mofizullah used to be unable to make ends meet from that single rice crop each year and fishing.

In late 1999, he heard about the MACH project and its activities in natural resource management. Observing the good results of vegetable cultivation in the neighborhood, he was motivated to try his hand at vegetable cultivation. "I discussed the MACH supported vegetable growing demonstrations with like minded farmers in the village and we decided to organize and form a Resource User Group," Mofizullah explains. They received theoretical and practical training on the growing of 17 different types of vegetables depending on the time of year. With seeds and fertilizers provided by MACH, Mofizullah started vegetable cultivation in his fields and in the first four months (October to January) he earned 18,000 taka from selling brinjal (egg plant), dhania (coriander), cabbage, and amaranth (another leafy vegetable).

He also grows vegetables around his homestead in a kitchen garden following traditional practices and earns an additional 12,000 taka from these during the year. By using a range of methods including mixing the types of vegetables (inter-crop) and relay sowing among standing plants, Mofizullah has been able to get three or four crops from the same land in a year. The major advantage of producing vegetables is that there is a high demand for green vegetables in the local market and the price is good.

"My experience," says Mofizullah, "is that one can easily live on the income from vegetable cultivation on a relatively small piece of land, if one does it properly and receives technical assistance similar to what I have." With the income from vegetable sales, he says that his family's quality of life has improved, and he now has a better status within the community.

With the higher income generated from the vegetable business, he has improved his house by replacing the thatched-roof with corrugated metal sheets, and by making a new concrete floor.

"My experience" says Mofizullah "is that one can easily live on the income from vegetable cultivation in a small piece of land."

Mofizullah is happy now: "My children are going to school and they no longer have to work to bring additional income to the family. The MACH project has changed the pattern of my life and living standard and given me an opportunity to take up a new business."

Mofizullah is making more plans for the future, including investing in a permanent fruit-shop in the local market place, and continuing his children's education. After they complete their education, he wants his children to take a salaried job or start up in a business rather than go fishing.

Case study 18: Mofizullah, male RUG, Sreemongal, Sept, 2005

CASE STUDY

Mastering Her Trade

Nineteen-year-old Dilruba is sort of a lady-of-all-trades in MACH's alternative income generation circle. In 2002, she participated in a MACH-sponsored fish culture training, then utilized a 5,000 taka loan, buying fish and feed. Dilruba was able to sell the cultivated fish for more than 15,000 taka, for an overall profit of over 8,000 taka.

After her initial success, she borrowed a second larger sum of 8,000 taka the following year. She took part in a one-month cow rearing training and used the 8,000 taka to purchase a pregnant cow, which soon bore a calf.

The cow provided Dilruba with 2 to 3 liters of milk per day, which she could sell at 20 taka per liter from her home. The cow produced milk for 6 months and during this period Dilruba was able to make close to 11,000 taka. She then sold the calf for another 5,000 taka, allowing her again a net profit of 8,000 taka.

In 2004, Dilruba participated in a MACH-sponsored dressmaking training. She took a third loan of 10,000 taka and went into the tailoring business. She bought fabric and with the help of the project team, a sewing machine. She took orders from local women and used her home as a workshop. By the end of the year, she had repaid her loan and was the proud owner of a sewing machine and she had earned over 8,000 taka.

This year, Dilruba decided to once again rear cows. She borrowed 20,000 taka from MACH and purchased 2 cows and 4 calves. Things have gone well for Dilruba and she continues to work hard and learn new things. With the profits from her efforts she has been able to purchase land to secure a future income for her two disabled sisters and reconstruct the family home. She has constructed a much larger tin house replacing the former clay abode. It's easy to see that Dilruba is a lady who can be trusted to succeed in any trade she chooses.

Through profits from milk and cow sales, Dilruba has been able to purchase land to secure the future for her two disabled sisters.

Dilruba and the new family house she has built with money made from her livestock program.

Case Study 19: Dilruba female RUG, Sreemongal, July, 2005

CASE STUDY

Women Empowered

The women of Chenguria Shapla Mohila Samity meet every Wednesday, babies in their laps, on the floor of President Sofia Begum's home. They discuss the loans they've taken, the businesses they're pursuing, and the rules that they are laying down for their husbands, most of whom are fishermen. "We are all mothers here," says Sofia. "If a woman's husband is a fisherman and he brings her a pregnant fish, the woman will refuse to cook it. We tell them, a mother must be allowed to raise her children."

The initially difficult task of reducing the amount of fishing that takes place during the breeding season of April – June, has been accomplished in part because of the women's efforts. Aside from encouraging and informing their husbands, the women take out loans and establish their own businesses. The women say they are gaining more respect from their husbands, and are now being consulted on financial matters.

Most importantly the women are able to better provide for their children. Before, many of the women embarrassedly admit, their families subsisted only on fish. Now, with increased family incomes, women are able to buy milk, eggs, and other nutritious foods as well as the fish. "We are no longer beggars and borrowers, we are providers," says member Mosamud Tahura.

The group has been able to provide not only for their families, but for their community as well. Tahura was recently elected as a Union Parishad (UP) member. She works as a grass roots level government representative, bringing the needs of her community to the attention of officials at the higher levels in the Upazila for example. Recently, she worked to secure 70 new sanitary latrines for her community. "We are extremely proud," says Tahura, both of her work and of that of the other women. "We are empowered." The women of the Chenguria Shapla Mohila Samity formed the group with the support and guidance of the MACH Project.

Women of the Chenguria Shapla Mohila Samity discussing results of income generating activities.

"We are no longer beggars and borrowers, we are providers," says member Mosamud Tahura

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CASE STUDY

Ideal Students Create New Forest Habitat

The members of the Carol Shurichala Ideal Students Club were looking to revive the spirit of their community's youth club history. "We would hear our uncles and our fathers talking about when they were young, the things they did, the clubs they started. In the past, the young people here were doing great things for the community. What were we doing now? Why should the spirit of giving, die with our fathers?" asks club president Jahangir Alam.

The 21 Ideal Students (5 of which are female) began their efforts in 2001, setting up a local library and providing assistance to the poor through collecting donations and accumulating meeting dues. Around the same time, MACH began working in local areas to preserve wetlands through reforestation projects. "We became interested in the work that MACH was doing because we saw the need for such a project here," says Alam.

In 2004, the Ideal Students approached MACH and asked for their assistance in implementing a reforestation project along the lake bank in their community. MACH, always eager to support the initiatives of local youth, decided to make the project a joint effort, inviting the students of the Roots and Shoots program at the Dhaka American School to join the "Ideal Students" in planting 1,500 trees provided jointly by the project and the Roots and Shoots program.

The Ideal Students have made maintaining the reforested area a club priority, keeping a member on constant guard to protect against cows and goats, while the trees are young and meeting bi-monthly to de-weed the area and reinforce the stakes and twine that support the saplings as they grow.

The students have set forth to educate others on the importance of reforestation, going door to door and holding club meetings that are open to the public. "Our club's constitution states that we are socially responsible to inform the community about environmental issues and to provide assistance whenever we can," says club secretary Nazim Uddin. "The trees protect against silting and loss of the riverbank, they supply protection against heavy storms, provide shade and cleaner air, and resting feeding and nesting habitat for birds and wildlife. When the rest of the community is made aware of these benefits, they too are eager to support our efforts."

"Our club's constitution states that we are socially responsible to inform the community about environmental issues and to provide assistance whenever we can," says club secretary Nazim Uddin.

The Ideal Students, the local RMO and the land owner will also see financial benefits from the plantation. Thirty percent of the profits will go to the Ideal Students. "This money will help ensure our club's future. We have noble intentions that will sustain through generations. The clubs of our fathers are gone. The future lies with us," Alam says proudly.

Case Study 21: Carol Shurichala Ideal Students, Kaliakoir, Oct 2005

CASE STUDY

Laila's New Life

Laila Begum is a changed woman. Once working only in the house, she now has a large tree nursery, a papaya plantation and a poultry farm in addition to still sharing responsibility in the house. "When MACH first approached me and the rest of the women in my locality about forming a mohila samity (women's group) I was nervous, but also very excited. As women, we'd never really had an opportunity to be earners before. We had always depended on our husbands and what they could earn from fishing" she says.

In 2000, MACH-Caritas began offering training and loan options to the women of the Sinabaha Ekota Mohila Samity, of which Laila was a member. Women were provided a variety of training options from which to choose, including tailoring, cattle rearing, poultry farming, and tree nursery implementation. Laila was initially attracted to the development of a nursery due to the assured profit and market provided through MACH's buy-back scheme, where trees that she raised were guaranteed to be purchased by MACH for use in local reforestation efforts.

Laila used a 5,000 taka loan from MACH to start her nursery and a second loan of 8,000 taka to expand it. Her efforts were rewarded with a hefty 10,000 taka profit. "I couldn't believe it," says Laila, "it was such a joy to be earning for my family." With her earnings, Laila discovered a new found-camaraderie with her husband. "I was respected as contributing to our family's welfare. He began consulting me on our investments. Together we decided that I should take out another, larger loan."

Laila's third loan of 30,000 taka was used to expand a poultry farm that had been started by her husband after he received training from the local youth development center. "We pooled our resources," says Laila. "Because we work together, because I was viewed as a partner, we have been able to make this work and make it profitable." So far, Laila and her husband estimate they have earned close to 20,000 taka in profits from their chickens.

Laila and her husband also rely on the other members of the mohila samity to support their activities. "When I'm in need, the women in my group help by feeding and caring for the chickens, tending to the trees in the nursery or caring for the papaya in our plantation " she says. Laila returns the favors offered by her friends, allowing poor community members to take chickens at times when they are unable to pay. "I know that I will be repaid when they are able. I know what it is like to fall on hard times, to have no money, she says, "I give them what I can. I give them friendship and trust." Laila also gives them hope. Inspired by her example, several other women in the area have under taken nursery and poultry farming projects.

We had always depended on our husbands and what they could earn from fishing" says Laila Akhter, her earnings increased "I couldn't believe it,"it was such a joy to be earning for my family."

Case Study 22: Laila Begum, Kaliakoir,Oct, 2005

CASE STUDY

Mokosh Resource Management Organization's Growing Success

"I was skeptical at first," says Md. Chand Mian, vice president of the Mokosh RMO (Resource Management Organization). "Many NGOs, they aren't what they seem. They aren't looking to help the people." But soon after MACH approached his community, Chand Mian and others like him saw that MACH was project to be trusted.

"They held a community meeting and helped us see the benefits of planning to understand the problems and help us with solutions," Chand says. "Things were to be done in the interest of the people." Community members were included in project implementation and decision making. They were provided with training on such things as wetland conservation, fisheries, capacity building, accounts keeping, tree restoration and sanctuary establishment.

Chand and the other 132 Mokosh RMO members now maintain a 2,650-tree plantation and a total of nine fish sanctuaries for the 2000 hectare beel or lake. Their tree planting continues to grow and sharing arrangements are instituted so that more areas surrounding the wetland can be restored as forests.

Chand and the other 132 Mokosh RMO members now maintain a 2,650-tree plantation

Through the shoreline forest restoration, the RMO will eventually see financial benefit as mature trees can be selectively harvested and the wood sold. The wetlands benefit from the trees, as organic matter and leaf rot are deposited into the surrounding water bodies providing valuable nutrients to the paddy fields and fish food production in the lake.

With the establishment of the fish sanctuaries, the more than 300-area full-time fisherman, have seen a 50% increase in their income, and a more diverse catch. Since the establishment of MACH

There are fish that had all but disappeared 5 years ago." This is what Chand Miah and the other RMO members like to hear

community-based management in Kaliakor, very large blooms (not seen for years) of the fish Chapila (*Gudusia chapra*) have occurred because of managed fishing. The managed fishing has resulted in aquatic vegetation returning, resulting in large quantities of this very nutritious species becoming available to the poor of the area. This species is popular and readily caught for consumption with gear typically used by the poor. The fish is small and is eaten whole providing a good source of vitamin A and calcium to the villages surrounding the wetland. MACH data has indicated fish yield increases of more than 200%

"There are more fish," says local fisher Shushil Raj Bonshi.

over the baseline. "There are more fish," says local fisher Shushil Raj Bonshi. "There are bigger fish. There are fish that had all but disappeared five years ago." This is what Chand Miah and the other RMO members like to hear, "Our work is helping and our work means something, we will continue it," he says. MACH's promises to Chand and his community five years ago were not empty ones, and according to Chand neither shall be the RMO's words of commitment to all those living around the wetland resource.

Case study 23: Mokosh RMO, Kaliakoir Nov, 2005

CASE STUDY

Monitoring and Reducing Pollution

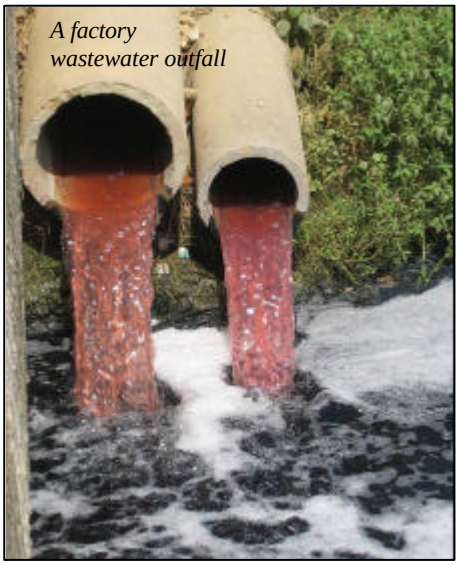
Pollution from industrial units is seriously damaging the aquatic ecosystem of Mokesh Beel in Kaliakor north of Dhaka, adversely affecting people who rely on it's waters for bathing, agriculture and fisheries. However, a team of experts are now working with industrialists and community members to assess and reduce this pollution.

Few systematic studies of water pollution have been carried out in Bangladesh. Industries are growing at 10% a year, but the pollution problems they cause are poorly understood. A four-year study has collected comprehensive data on water quality, from the point where industrial waste enters to the beel's outflow into the Turag River. This shows that in places the conditions required for aquatic life no longer exist. For example, in most of the khal there is no dissolved oxygen and the water is alkaline (pH greater than 9). In many places the water's biological oxygen demand (BOD) and chemical oxygen demand (COD) exceed the standards set by the Government of Bangladesh for factory effluent discharge.

Water sampling

Many factories in the area dye or print textiles. Their wastewater shows levels of pollutants above national discharge quality standards. Of particular concern are high sulphate, BOD, COD and pH; large quantities of residual dyes; and high temperatures.

A team supported by MACH, the UK Department for International Development, and the European Union has been working closely with industrialists to address these problems. Industries were found to be losing money due to inefficient dyeing practices that cause pollution. Several simple solutions have been identified. Trials have shown that waste can be reduced by more careful selection of compatible dyes and by better storage of dyes. The pH of the waste could be reduced by closer process monitoring and not adding excess alkali.



A factory wastewater outfall

Effluent treatment is another important issue. Since 1997 many factories, including dyeing units, are required to have an effluent treatment plant (ETP). The team has been encouraging the construction of such plants, and advising industrialists on design and management. In 2000 there were only three partly functioning ETP's in the area though there were about 25 20 factories. Now four more are being constructed, several more are being designed and the existing ETP's are managed more effectively. The team has also developed recommendations and best practices to help industry managers optimize their processes to reduce waste, reduce costs, and ensure national effluent quality standards are met.

Unfortunately pollution is continuing as the number of industries in the area has more than doubled in four years. The local community reports that fish from some parts of the beel are inedible, and has experienced fish kills in the Turag River in its fish sanctuaries. The Resource Management Organizations (RMO's) are lobbying for their right to cleaner water. However they lack evidence to support their efforts. To address this, the project has provided the RMO's with equipment to monitor water quality, and trained local volunteers. Five teams now regularly monitor water quality in the beel and river, and this is expected to sustain after MACH support ends.

The RMO's will be able to use their evidence on pollution to press industrialists to adopt cleaner production and effluent treatment practices identified by the project. It will strengthen their requests for local government to take action to enforce national environmental standards if pollution is not reduced. If adoption of best practices can be fostered, and the community can bring evidence of the problem to the public eye, then the situation can only improve.

Case study 24: Pollution, Kaliakor, January 2006

CASE STUDY

A Fish House

In 2001, MACH met with 40 community members from two villages that surround Bailsha Beel in the Kansha Malijee river basin of Sherpur District. Bailsha Beel is a deep wetland depression that retains water throughout the dry season, and spills over to create an expansive wetland during the rainy season. Women, fishers, farmers, carpenters, and day laborers took part in a three-day discussion to assess the problems and issues surrounding the status of the beels wetland resources. During the three day sessions they identified the problems and then came up with solutions for their natural resources and their village.

Decline of fish stocks, removal of all trees, and disappearance of dry season water due to overuse and siltation were identified as issues for the villagers. The communities with MACH support identified possible solutions and methods to solve the problems. Some of the methods recommended were sanctuary establishment and reforestation. An RMO (Resource Management Organization) was formed by the community to further develop plans and support and maintain the restoration methods.

The 105 members of the Bailsha Beel RMO (30 of which are female) are continuing the precedent of community involvement as the 105 members are representatives of all villages and vocations. "We make sure everyone is aware of the sanctuary's benefits for example," says RMO member Wahed Ali.

Last year, the RMO led a rally organized to raise awareness for Fish Fortnight, a Department of Fisheries initiative to build consciousness concerning wetland and fishery preservation. The RMO's meetings are regularly attended by interested villagers and conversely the RMO members attend monthly village meetings. Community announcements, where messages are broadcast to the villagers over loudspeakers carried by rickshaws is another tactic used by the RMO to keep the villagers aware and informed of closed fishing periods or other conservation measures. When local villager, Yakub Ali was asked to explain the importance of the sanctuary to the beel he put it very simply, "Well, it's a fish house," he said, "giving the fish a safe place to live."

With this fish house, the villagers are seeing the return of previously endangered fish species, larger fish, and an overall increase in the fish production. The daily income of local fishers has more than tripled, from 60 taka to 200 taka. Native aquatic fruit such as shingara and shapla are reappearing as well. The area is regenerating. "It's like a new life for our wetlands and our villages," says Wahed.

In describing the wetland sanctuary established by the community, Yakkub Ali says "Well it's a fish house, giving the fish a safe place to live.

Case Study 25: Bailsha Beel RMO, Sherpur, Oct, 2005

CASE STUDY

Fish Biodiversity Improvements In Sherpur Wetlands

The Kewta Beel RMO (Resource Management Organization), established with MACH's support in 2000, aims for no less than success. "We want the projects that we have implemented here to succeed. We've been given this opportunity to develop our wetlands and our lives. We won't waste it," says RMO President Shafiqul Islam.

The RMO's 89 members manage the local wetland of Kewta beel in the Kansha Malijee basin in Sherpur District. The RMO sets fishing regulations on behalf of the community and augments the fish diversity by reintroducing lost species back into the beel. Their efforts have included 10 previously near-extinct species of beel resident fish, three of which have successfully reestablished meni, pabda, and shol. The reintroduction takes place in the RMO managed sanctuaries that are located in the beel. The RMO has put more than 25,000 individual fish back into the beel over the past 3 years with the support of MACH.

Shafiqul says that the restocking efforts won't end, when MACH's involvement is complete. "We have saved money from our meeting dues so that we can continue to buy fish after the project is complete, and someday we hope to start our own nursery," he says. Under his leadership, Shafiqul and the RMO also plan to excavate the beel and double its number of sanctuaries from four to eight.

The beel's sanctuaries allow the fish population to thrive, as they live untouched there throughout the year. All restricted areas are clearly marked with red flags and have permanent structures that prevent unwanted netting in the conservation areas.

The RMO takes an active role in informing the community about their activities, leading village natoks or dramas and sponsoring singing events that raise awareness of wetland preservation. "I feel proud when I hear others talk of the benefits," says RMO member Abdul Mannan Munshi. "This is noble but difficult work, and if we want to succeed, we need all the people to hear us and we need all of the people behind us."

Diversity improvement stocking has helped bring back lost fish species and strengthen populations of other beel resident species.

Case Study 26: Kewta Beel RMO,Sherpur, Oct, 2005

CASE STUDY

Making Local Governance Work For Wetlands

Upazila Fisheries Officer Abdur Rouf smiles warmly, as the members of the Jhenaighati Local Government Committee of MACH enter the meeting room in this remote corner of Bangladesh near the northern border. "We're all friends here," he says. "I think MACH is a good project and I want to help in anyway that I can."

LGC meeting underway

As in all the MACH working areas, the Ministry of Fisheries and Livestock has authorized formation of this committee in Jhenaighati Upazila (sub-district), to coordinate and oversee work to restore wetland productivity. But this is not just a committee of government officers. Chaired by the Upazila Nirbahi Officer (the senior local administrator), with the fisheries officer as member-secretary, it also includes the elected chairmen from all of the Union Parishads (local councils) where improved wetland management is being introduced. It also includes as voting members the leaders of all three MACH-established RMOs (Resource Management Organizations) in the Upazila. Each quarter the committee meets to review the plans and activities of the RMOs, and to discuss and resolve any problems they may be facing. Md. Nuruzzaman, chairman of Bailsha beel RMO explained "now we meet face to face regularly with officials and councilors who listen to us and try to solve the problems that we face. Now we have status in the community and we have a way of getting support from the administration."

Upazila Fisheries Officer inaugurating beel restoration works

Members of the committee have gained local recognition through habitat restoration works in their areas. They visit the wetlands and

LGC earthwork review & inspection

help check on the quality of RMO programs such as excavation and the release of fingerlings, ensuring that plans are implemented. Local government has also provided access and made agreements for tree planting in public lands, and helps the RMOs enforce their fishing rules for the good of the community.

These good practices are set to continue after the project ends. Central government has approved plans to formalize the committee as an Upazila Fisheries Committee. The committee will use the annual returns from an endowment fund set up through USAID to finance small-scale habitat restoration and wetland management each year. Already in 2005 the RMOs have submitted proposals for small works. The committee has reviewed these, taken its decisions, and is now planning how to supervise the works. In the committee meeting of October 2005 Mr. Swapon Kumar Gosh UNO for Jhenaighati welcomed this initiative and told the committee "we must take up the challenge of operating the endowment as it is a new concept for Bangladesh and we must ensure that we use this fund wisely". In the same forum the RMO chairmen breathed a sigh of relief, they had been concerned for the future of their good work after the MACH project ends. Now they are confident that not only will there be some funds, but through the co-management committee they and local government will jointly ensure that the money is well spent. The future of the local communities' work and these new institutions is secure, says Abdur Rouf. "If we all work together, we will surely succeed."

Case study 27: Local government, Sherpur, Nov, 2005