Awareness Raising in Sustainable Floodplain Resource Management

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Foreword

Bangladesh is a country of wetlands. But unfortunately, these ecosystems are degrading rapidly due to unsustainable resource utilization systems, ill-organized practices and an absence of effective law enforcement structure. An effective way to reverse this situation is involving people of the wetlands in concern. No such participatory project could be successful unless people’s understanding of environmental issues and concerns are enhanced. Awareness programs are, therefore, crucially useful activities for improving the knowledge, perception and behavior of the community people dependent upon valuable wetland resources.

Therefore, the main objective of awareness raising activities would be to generate a greater understanding among the people of the functions, services and values of wetlands. Activities may include meetings with the stakeholder groups, discussion sessions and debates on specific issues, observation of especial days with national and global importance, staging folk dramas and holding workshops and seminars on the conservation and management aspects of wetland and biodiversity resources. To further bolster and sustain the awareness activities school programs, nature clubs, community meetings and demonstration of sustainable farming systems could also be established and implemented on a regular basis.

The present report compiles the awareness raising initiatives take under the Community Based Floodplain Resource Management project, a component of the
SEMP. It details out the justification of such interventions, approaches considered and chosen activities to enhance people's awareness level at the project areas in the floodplains. A number of recommendations are also suggested to make the initiative more participatory and effective in attaining the targeted impacts. I believe that this report will help other agencies and individuals interested in undertaking community based awareness programs in developing countries.

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Under the Community Based Floodplain Resource Management project implemented by IUCN Bangladesh, various environment quality enhancement interventions have been carried out with the people of the project area. One of the major interventions was to improve local people’s understanding of environmental problems and helping them to be aware of possible solutions. Nature Conservation Management (NACOM) and Bangladesh Centre for Advanced Studies (BCAS) have been associated with IUCN Bangladesh in implementing this project in some selected floodplains in Manikganj, Gazipur-Mymensingh and Gopalganj-Madaripur Districts. They have been active, methodical and technically sound during the awareness campaigns among the communities, and their cooperation is hereby duly acknowledged.

This report is an output of the awareness initiatives taken under the SEMP over its first six years. This document was not possible without the participation from many resource users including farmers and fishermen, school teachers, students, local knowledgeable persons, government officials, local government representatives and community organizers of the Padma-Jamuna, Brahmaputra-Shitalakshya and Madhumati Floodplain areas. We duly appreciate their efforts.
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Abbreviations, Acronyms and Indigenous Terms

Amon  Rice planted before or during the monsoon beginning in July-August and harvested in November
Aus    Rice planted during March-April and harvested during July-August
Bazar  A permanent market of an area
BCAS   Bangladesh Centre for Advanced Studies
BCSIR  Bangladesh Council for Scientific and Industrial Research
Beel   A saucer-shaped depression, which generally retains water throughout the year
Bhita  Purposefully raised land mass (mainly refers to homesteads, orchards etc.)
Boro   Winter rice planted in December-January and harvested before the onset of monsoon in April-May
CNRS   Center for Natural Resource Studies
Ejimali land  Common land resources
FRMC   Floodplain Resource Management Committee
Haat   A big village market which sits once or twice a week
IPM    Integrated Pest Management
IUCN   The World Conservation Union
IUCNB  IUCN Bangladesh
Kathha Pile of branches of trees submerged in the water bodies to attract fish to come and live therein
Kua    A deeper site in the flat agricultural fields in the floodplain that continues to carry water during dry periods
Madrasah An Islamic school
NACOM  Nature Conservation Management
NEMAP  National Environment Management Action Plan
NGO    Non-government organization
PRA    Participatory Rural Appraisal
RDO    Rural Development Officer
SEMP   Sustainable Environment Management Programme
Thana  The lowest tier of formal administration; literally a police station
UAO    Upazila Agricultural Officer
UEO    Upazila Education Officer
UFO    Upazila Fishery Officer
ULO    Upazila Livestock Officer
UNO    Upazila Nirbahi (Executive) Officer
UP     Union Parishad; the lowest local government unit
Upazila Previously known as Thana; the lowest tier of formal administration
UPO    Upazila Project Officer
INTRODUCTION

1.1. Background

The wetlands of Bangladesh have been drastically affected by the impacts of the growing human population. The human interferences include flood control, drainage and irrigation development, severe erosion in the catchments areas causing siltation, conversion of wetlands for other purposes (settlements, industries, agriculture and aquaculture) causing irreversible changes in the landscape. Degradation of swamp forests, decline of fish, reducing numbers of migratory birds, decreasing wildlife population, increased wave-erosions and increased need for fuel are a few consequences of these unsustainable, unwise practices. All these are not only reflecting gaps in government policies, but more importantly, a lack of community awareness of wetland functions, services and values. Therefore, urgent actions are desperately needed to reverse this worsening situation that is weakening the viability of the wetlands.

Over the last couple of decades it has been realized that the success of any environmental initiative depends upon the involvement of the people in concern. One of the major ways for truly involving community people into such a scheme is by conveying the necessity of environmental restoration and sustainable resource management to them. The need for environmental understanding and education has already been identified in important national environmental documents such as the
NEMAP (MoEF-GoB, 1995). The NEMAP, however, has identified that low literacy rate is a serious constraint for creating environmental consciousness among the majority of the population. So, environmental awareness tools dealing with different issues have to be prepared keeping the target groups in mind. Knowing the target groups means appreciating their knowledge, perception of the problems and solutions, and action towards certain environmental and related issues. In addition to this, steps should be taken to ensure adequate female participation at all levels of awareness campaigns.

The SEMP, a genuine outcome of the NEMAP, was initiated in the late 1998 and included the Community Based Floodplain Resource Management project among other components. This project has been implemented by IUCNB, in association with NACOM and BCAS, in different floodplains of Bangladesh since 1998. NACOM was initially involved in Arua and Gopinathpur Beel areas in the Padma-Jamuna Floodplain, Manikganj District (SEMP Component 2.2.1/B). Later on, in 2001, the project area was extended to Trishal (Mymensingh District) and Kapasia (Gazipur District) Upazilas in the Bramhaputra-Shitalakshya Floodplain. BCAS, on the other hand, has been working in Chanda Beel and the Kadambari-Chowaribari Beel complex in the Madhumati Floodplain in Gopalganj and Madaripur Districts (also the SEMP Component 2.2.1/B). Activities undertaken by the project is contributing to the attainment of the overall objective of the SEMP, furthering the process of detection of key environmental concerns and field confirmation of solutions. This will consequently help to tackle environmental degradation through conservation of resources, to promote sustainable development, and also to raise the quality of human life. The project precisely envisages preventing and reversing the present trends of wetland destruction, confirming wise-use of wetland resources and ensuring people's participation in the development and implementation of management plans. It also focuses on the improvement of the quality of life for community people, especially that of the women, development of local wetland centers for ecosystem management and ensures the capacity building of the community for the management of natural resources. Hence, one of the basic jobs is to educate the people in concern about environmental problems, issues and concerns. Environmental awareness programs, therefore, is of great importance in a community based natural resource management initiative like the SEMP.
1.2. Project areas

1.2.1. Padma-Jamuna Floodplain

The project area in this floodplain includes Arua Union of Shibalya Upazila and Gopinathpur and Kanchanpur Unions of Hariarpur Upazila in the district of Manikganj, Bangladesh. The GPS reading of Arua (Arua Union Council Office) is latitude 23°45'47" N and longitude 89°51'53"E. Arua Union consists of 24 villages and has a population of around 13,800, while Gopinathpur Union has nine villages and a population of about 13,000. However, Kalairtek and Pachuria villages of Arua Union were lost to erosion in 2003 and 2004 respectively. The area of Arua Union is about 9.62 sq km and that of Gopinathpur is about 9.75 sq km. Kanchanpur Union, on the other hand, covers an area of about 3.45 sq km. It consists of seven villages and has a population of around 7,250. All the sites are situated at the lower reaches of the Jamuna basin and at the confluence of the Jamuna, Padma and Ichhamati Rivers (Map 1).

Map 1. The SEMP project sites in the Padma-Jamuna Floodplain, Manikganj. (Source: CNRS, GIS Unit)

The project area represents a typical floodplain ecosystem in Bangladesh. In Arua, open agricultural fields encircled by villages consisting of adjoining homesteads. Every year the open land experiences both aquatic and terrestrial phases. The deepest part of Arua Union forms a *beel*, Arua Beel, which retains perennial water. Gopinathpur Union is also characterized by the presence of an extensive wetland area, called
Gopinathpur Beel. This beel retains water during the dry seasons, but sometimes is drained out for cultivation of boro rice in winter. Gopinathpur Beel basically represents the old course of the Padma River. All the nine villages of the union surround the beel, except the southern part that faces the Padma.

The soil of this area is mainly alluvial. Sandy soil is encountered near riverbanks that support some dry area plants. Traditionally, deepwater amon is grown in most of the areas during flood season. Since the mid-sixties high yielding varieties of paddy have been cultivated extensively in the dry season. Other winter crops, including horticultural crops, are also grown extensively in the agricultural fields and homestead gardens. Some horticultural commodities are grown commercially year round in bhita.

The area is initially fed by local rainfall during April-May and subsequently, by backwater of the Ichhamati River and monsoon rainfall. The river water enters the floodplain as early as the beginning of June through the connecting canals. Further inundation of the area occurs due to over spill of the Padma. The area is deeply-flooded in the range of 0.7-3.3 m in Arua while 1.3-4 m in Gopinathpur. The peak flooding occurs in late August to early October. The water starts receding from mid October, and by November most of the floodplain area dries out. The central part of Arua Beel, covering an approximate area of about 280 acres, retains some water during the dry season. Gopinathpur Beel, however, retains more water, covering a relatively extensive area (ca 900 acres).

The homestead gardens provide the main vegetation cover in the project area. Vegetation also occurs along the roads. Rice is the main crop of this area. Agricultural fields harbor varieties of lower plants, mainly the herbs (creeping, floating, emergent, submerged etc.) in the wet season. Permanent water bodies like ponds, along with the margins, support a wide range of aquatic plants with diverse life forms.

1.2.2. Brahmaputra-Shitalakshya Floodplain

Boka and Nali Beels and their surrounding areas were two wetland areas chosen in this floodplain to carry out SEMP activities. Boka Beel, located in Trishal Upazila of Mymensingh District, is a deeply flooded floodplain system in the Brahmaputra River basin and represents the course of a dead river (Map 2). The project area (the beel and its adjacent area) consists of six villages in two unions, namely Singrail, Kanthal Hodderbhita and Baliarpur villages of Kanthal Union, and Bailor
Mathhbari, Bhoradoba and Charpara villages of Bailor Union. The intervention area is about 16.49 sq km and is populated by more than 11,200 people.

Boka Beel is connected by a canal to a nearly tertiary river, Pagaria River, which in turn is connected to the Brahmaputra River. The river acts both as a feeder and drainage canal. The beel is also connected to the adjacent floodplains by three feeder canals. The central part of the beel is about 20 acres, and retains water perennially. In the dry season, the water depth is about 0.5 m, but the depth varies from 1 to 4 m in the rainy season. The initial flooding occurs in late May due to local rainfall. Later in the year flooding is caused by back up water from the river and monsoon rains. The peak flooding occurs in August-September. During that time the maximum flooded area can reach about 1000 acres. The drying out starts in the middle of October, and the major part of the floodplain becomes exposed by November. There are about 30 excavated pits (locally called khada or kanda) scattered in this area. Many of these hold water in the dry season and act as a refuge for resident fish species in the floodplain.

Map 2. The SEMP project sites in the Brahmaputra-Shitalakshya Floodplain, Boka Beel (above) in Trishal, Mymensingh and Nali Beel (right) in Kapasia, Gazipur. (Source: CNRS, GIS Unit)

The second project site in the Brahmaputra-Shitalakshya Floodplain is Nali Beel and its adjacent area in Kapasia Upazila, Gazipur District (Map 2). A part of Nali Beel has been included in the SEMP and contains five villages, namely Mashak, Fulbaria, Palashpur, Durgapur and Kamra of Durgapur Union. This project area covers an area of about 11.36 sq km, and has a total population of around 12,000.
Nali Beel is an extensive network of interconnected individual beels, locally called ghop, and represents an extensive low-lying floodplain area in the locality with some perennial waters in the individual ghops. The beel is surrounded by a number of hillocks, on which the homesteads are located and form the village lines. The Lakhia River, a tributary of the Brahmaputra, flows on the east of Durgapur Union and is connected to Nali Beel by two canals.

The most part of the floodplain area dries out during the lean period, leaving about 30 acres of perennial waters. The initial flooding of the beel is caused by local rainfall during April - May. The complete inundation of the floodplain occurs by mid July due to local rainfall and floodwaters from the Brahmaputra, by when connection between the river and floodplain is established. Peak flooding occurs in August - September, and the area becomes flooded in the range of 0.6-2.7 m. The floodwater starts receding between late September and early October.

The soil of Boka Beel and Nali Beel is alluvial; but in the latter area it is slightly reddish and acidic in nature. The cultivation of traditional amon variety of rice has reduced greatly in recent years, and is now grown only in very limited areas of the peripheral part of the floodplain during the monsoon. Improved varieties of boro are grown extensively during the pre-monsoon period. Horticulture is practiced more or less widely in these areas.

Plant diversity has degraded extensively over the last two to three decades in these areas. Wetland trees, like hijal (Barringtonia acutangula) and karoch (Pongamia pinnata), which were once abundant are now almost non-existent. Homestead vegetations are important in the Boka Beel area. There is a small area of designated forest in the Nali Beel area dominated by shal (Shorea robusta).

There has been serious degradation in the local biodiversity and in the environment as reflected by the situation in the beels and canals, a reduction in natural vegetation, reduced fish production and low abundance of wildlife and plants.

1.2.3. Madhumati Floodplain

The project site in the Madhumati Floodplain comprises Chanda Beel and Kadambari-Chowaribari Beel complex and their surrounding areas (between latitude 23°08' and 23°15' N and longitude 89°54' and 90°01' E) (Map 3). Chanda Beel is one of the most important beels in this floodplain ecosystem in the south of Bangladesh. It is an interesting wetland situated in a relatively less disturbed floodplain of the inland
open water system. The beel lies within the Madaripur-Gopalganj peat basin and is surrounded by a number of important roads on all sides except the east, which is exposed to the Madaripur Beel Route Canal (MBRC). The Kadambari-Chowaribari Beel complex is also situated in the Madaripur-Gopalganj Beel depression on the east of MBRC. The project site in these beels covers 31 villages, eight unions (Ujani, Kasalia, Nanikhir, Satpara, Jalirpar in Chanda Beel, and Khalia, Kadambari and Raajor in the Kadambari-Chowaribari Beel complex), three upazilas (Muksudpur, Gopalganj Sadar and Raajor) and two districts (Gopalganj and Madaripur). Out of 44 villages of Chanda Beel 16 were selected for the project interventions. Another 15 were selected from the Kadambari-Chowaribari Beel complex covering most of the villages of this part of the Madhumati Floodplain. The population of the project area is more than 32,500.

Map 3. Chanda Beel and Kadambari-Chowaribari Beel complex- project sites of the Community Base Floodplain Resource Management Project (SEMP) in the Madhumati Floodplain. (Source: BCAS, GIS Unit)

The water level of the beel is mainly governed by the water level in the MBRC, but seasonal rainfall also increases water levels. The physical and hydrological features and processes of this floodplain differ significantly from those of other wetland ecosystems. Seasonal variations from predominantly aquatic to predominantly terrestrial environments are the result of large annual fluctuations in river and
floodwater. During the monsoon (from June to October) the Chanda Beel area remains inundated with deep water, up to three meters. The beel is connected to the adjacent MBRC and the Kumar River by sixteen canals. In the wet season, the beel harbors a good number of species of fish, several species of prawns, bivalve molluscs, gastropod molluscs, frogs, turtles and aquatic snakes. The beel also supports a large variety of aquatic plants. Similar diversity could also be seen in smaller Kadambari and Chowaribari Beels.

At the end of October, the water starts to recede from the beels, and by December most of the beels become dry except some natural trenches and artificial ditches that act as perennial water pockets, locally know as kua. These water bodies are dug by the landowners to allow fish and prawn to take refuge for subsequent harvesting. During the dry season, the land is basically used for agriculture, especially for rice cultivation. Moreover, most of the beel area contains peat as a subsurface layer. The local people extract it for use as fuel. The ecology is massively influenced by the alternation between aquatic and terrestrial phases.

1.3. Need for awareness programs

During the discussion with the local people and stakeholders of the project sites and from the reconnaissance made by the project staff, a number of major environmental problems were identified. Some of these were siltation of canal, river and deeper beel areas, loss of wetland forest, lack of fuel, excessive use of chemical fertilizers and pesticides, scarcity of land for establishing floral and wildlife habitat, and decline of fish, wildlife and migratory birds because of habitat loss, and other ill practices. All these issues are common for a floodplain of Bangladesh. But some site-specific issues were also present, for example unsustainable snail harvesting, monitor lizard-killing (Varanus salvator, local name kalo gui, in Gopalganj called gharial), road-side-animal-killing by vehicles, and lizard- and snake-killing in Chanda Beel.

These findings supported an important realization of recent years, the need for involving people of the ecosystem in sustainable management of the natural resources of that ecosystem. The local people should be engaged in every step of sustainable development from problem identification to the implementation of project interventions. For proper maintenance and use of wetland resources, locals should be made conscious and capable of playing their proper roles. It is also important to bring changes to the policy and execution levels to keep the ecosystem in order. So, it was envisaged that raising the level of environmental awareness and education of the user communities and other stakeholders would be an effective way
to combat the depletion of nature. Accordingly, awareness became one of the major activities of the Community Based Floodplain Resource Management project.

The aim of the awareness activities was to improve the quality of rural life through efficient management of wetland ecosystems. The goal of environmental education and awareness is to encourage and assist the communities in conserving the integrity and diversity of nature, and to ensure that the use of natural resources is equitable and ecologically sustainable. They also acquire and exchange knowledge, values, skills and determination, which will enable them to act individually and collectively, to solve present problems and prevent problems in the future.

Through education or awareness campaigns, community people are basically prepared for the major project interventions. In many cases, awareness cannot be separated from other project interventions. For example, an awareness campaign regarding wildlife conservation would in turn facilitate in establishing and maintaining wildlife conservation areas by the community, a separate project intervention.

1.4. Scope of the report

This report is a part of a series of reports documenting the major activities carried out under the SEMP component 2.2.1/B. The component has been implemented in three sites: 1) Padma-Jamuna Floodplain, 2) Brahmaputra-Shitalakshya Floodplain and 3) Madhumati Floodplain, by IUCNB in association with NACOM (sites 1 and 2) and BCAS (site 3). Awareness activities occupy a very significant portion in the project interventions. The following chapter describes the approach considered in the environmental communication and education activities of this entire project component. The awareness measures taken under this project, from October 1998 to December 2004, and subsequent achievements are detailed out in a site-specific manner. In the fourth chapter, impacts of these awareness interventions on the local community and the environment are discussed for the project sites. Finally, some recommendations are suggested for future consideration.
CHAPTER 2

APPROACH

An awareness campaign is an integrated part of any community based initiative. The main purpose of such a movement is to send a message across a target group. To educate the target group about the existing condition and to motivate them to take effective actions to improve it, proper communication and awareness is needed. More precisely, communication tools can be used for problem solving, to draw attention, to motivate on a particular issue, or to change certain behavior or practices.

A number of issues or steps need to be considered while carrying out an awareness program. These more or less could be identified as 1) issue identification, 2) target group and stakeholder identification, 3) fixing targets, 4) awareness tools development, 5) planning and execution of planned activities, 6) monitoring and evaluation, and 7) impact assessment. In the present project, all these steps were considered since the project inception, but have not formally been documented until recently. Field experience and consultation of awareness related accounts (e.g. IUCN-CEC, 2003) were useful in describing the approach taken under the SEMP awareness programs as presented below.

2.1. Identifying the issues

Analysis of the existing situation is an essential prerequisite and the first step of any environmental project. Identification of problems includes the extent, cause and
urgency of the problems. One of the ways to learn about these is to hold broad discussions with the stakeholders with different interests. The other mode of issue/problem identification and prioritization involves focused discussions with specific user groups. Both approaches were followed at the inception of the present project.

The environmental problems could grossly be divided into three categories on the basis of the role of awareness raising/communication in overcoming the crisis. These problems are 1) those that could be solved with communication interventions only, 2) those that could be solved with a combination of communication and other supporting measures, and 3) those that could only be solved by tools other than communication. An example of the first category of problem solving is informing people about the uniqueness of wild-birds and the need for their conservation in floodplains. Similarly, through campaigns, people and traditional fishermen could be made aware of fish conservation and fisheries laws, and encouraged to stop fishing in breeding season.

However, in a community based project many of the environmental problems belong to the second category. For example, promotion of alternative or environment-friendly livelihood options require demonstration plots and funding options for the interested people/households. There is no scope for the third type of problem solving approach in a participatory environmental project.

2.2. Knowing the target groups and stakeholders

It is very important to know the target groups who are being taught about environmental concerns. We need to know their knowledge levels, outlooks, beliefs, traditions and interests. Composition of these groups in terms of age, income, education, social status, gender and religion should also be noted. Socio-economic baseline data of the project area collected as a part of the project would be useful in this connection. These particulars could also be documented by having group discussions with different resource users. We also need to identify other stakeholders in relation to the project and identify these issues for them as well.

Similar stocktaking was done for the present project sites at the beginning of the project. These understandings could facilitate in efficiently designing suitable awareness activities. A number of target groups and stakeholders were identified as important for the awareness raising activities for their relevance and direct impact on the wetland and management, for example farmers, natural resource harvesters (e.g.
fishermen, wood-collectors and peat-collectors), groups with special concerns (e.g. poor and vulnerable women), students, groups of young people, elites and wealthy people, teachers, religious leaders, local social and political leaders, local NGOs, local government representatives (e.g. member of parliament, UP chairman and members) and government officials (e.g. UNO, UAO, UFO, ULO and UPO).

From the understanding of the knowledge levels of all important stakeholders, it would be possible to identify local resource persons for awareness campaigns, like local knowledgeable persons, local political and religious leaders, members of local government bodies, and school and college teachers. The teachers get involved in many awareness initiatives because they are honorable and acceptable persons to the rural communities, and their opinions and views are often respected by the villagers. These teachers often participate in various social gatherings and they deliver speeches on various issues for the general people. It was also identified that, they could be the motivators, trainers and also could demonstrate social changes in the society. Local government officers were also identified as potential resource persons because of their knowledge on government rules and regulations on environment and biodiversity.

2.3. Setting up targets

Any awareness activity should contain a set of targets. There are basically three potential targets for a given awareness program: it may 1) enhance knowledge base of the target group, 2) cause change in their attitude or 3) motivate people to alter their existing practices. Any proposed target should ideally be precise, quantifiable and acceptable to the stakeholders. It should also be practical and time-specific. A realistic target would ease the project planning and making it achievable. So, in the present project, similar target-orientation programs were considered in the planning.

2.4. Developing awareness tools

Humans communicate constantly with others. The important thing is what are being communicated and how it is done. Therefore, the messages are being conveyed and the tools are being used to communicate them should be well-thought. The disseminated awareness messages can be divided into three broad types, namely 1) information, 2) emotional and 3) behavior approaches. These could be explained by taking billboard as an awareness tool. For the first approach focus is given on functional information about the problem, its causes or the possible solutions. For example, a billboard message ”Dewatering beels and putting dams in rivers are against fisheries law; you would be punished for that”. An emotional approach
appeals to the lifestyle and values of the target community by images or messages, for instance, appealing photographs of endangered mammals with cubs or a message like "Migratory birds are our guests; please do not harm the guests". Finally, a behavior approach concentrates on the behavioral changes of a target group. Messages, for example, "If we cut one tree, we should plant five saplings" could encourage behavioral changes.

One should be very careful while designing an awareness tool so that it does not harm the religious, social or cultural sensitivity. In an area where people are mostly not literate, pictorial items would be more effective. Local dialects are a stronger tool for the campaign than the standard form of a language. Moreover, it is important to identify the limitations of each tool used.

Appropriate tools should be selected to reach the target audience effectively. Interpersonal methods to communicate with the target audience include dialogues, face to face conversation, home visits, meetings, group discussions, round tables, conferences, symposia, workshops, tours/excursions and exhibitions. Among these, group discussions, meetings with target groups (farmers, fishermen, students, herbal-healers etc.) and community in general, and knowledge sharing workshops with specific groups were considered as useful regular activities for awareness raising under the present project. It was also realized that organizing and participating in different exhibitions (photo and art exhibitions) and fairs could also help in awareness raising among the visitors. Tree fairs and agriculture fairs organized by the government departments at district and upazila levels are good examples in this respect.

Special attention should be given to the younger generation (students and the local youth) by conducting meetings, setting up nature/environmental clubs with school and college students to enhance their understanding of the environment and its problems. Club members could be involved in various activities like organizing rallies and meetings to celebrate environment days or on specific issues; publishing booklets, newsletters, wall-magazines and leaflets; maintaining a library with environmental books in it; and helping to establish nurseries/gardens, local herbaria and zoological museums. Some group-specific activities could also be organized such as art, quiz and essay-writing competitions and debates for the school and college students on environment days. Nature walks and camping are other two activities could be popular among school children. All these could create enthusiasm among younger generations, thus has a long lasting impact on the society.
A number of media outlets could be used, like newspapers, press releases, magazines, newsletters, field-guides, brochures, booklets, flyers, letters, radio, tapes, television, video, posters, stickers, banners, signboards and billboards, to spread information to a mass audience. Out of these, posters, newsletters, leaflets, flyers, wall-magazines, video shows, banners, signboards and billboards were identified to be useful in the present context. Rallies for environment related day observance was another effective means of mass awareness raising.

Erecting billboards/signboards at strategic points (in market place, by upazila complex, at highway junctions, by religious institutions, etc.) with appropriate pictures and messages could have a huge impact on the local people as well as the visitors of the area. Signboards clearly marking the habitats of vulnerable animals, for example turtles and dolphins or conservation areas, are also good tools for awareness raising.

Folk dramas are very popular in rural Bangladesh. Environmental issues and concerns presented in such dramas could be an excellent option to provoke thoughts among the target audience. Moreover, the impact would be greater if these are staged by local drama group(s).

Use of various international, national and local occasions is useful to create mass environmental awareness. Environment related days (the World Environment Day, the World Wetlands Day and the Earth Day), local festivals, and religious and cultural events are good examples in this regard. Such interventions can attract large number of people without much effort. These options should be explored as much possible.

2.5. Planning and execution

The need for awareness raising and issues to be addressed should be identified while developing a participatory action plan with concerned stakeholders under a project. A similar approach was taken under the present project. Programs like meetings, workshops, demonstrations, exposure, rallies, competitions among school students, cultural shows (e.g. folk dramas), video documentaries and information dissemination (e.g. billboards and leaflets) were recognized as the major methods of awareness raising. This development led to the drafting of a specific plan of action for environmental awareness. While planning, a number of issues were taken into account.

- Yearly work-plan was followed by quarterly/monthly work-plans specifying resources needed and responsibility distribution.
• Participation of target groups, with significant proportion of women, was ensured.

• Resource persons, materials, equipments, etc. were identified and arranged well in advance.

• Realistic budgeting for personnel, material preparation, material dissemination, media and venue was done.

2.6. Monitoring and evaluation

A Project Implementation Plan (PIP) of Community Based Floodplain Resource Management project was prepared at the initiation of the project. In that document Logical Framework Analyses (LFAs) were carried out maintaining the connections among the project goal, purposes, outputs and activities. The suggested performance targets were verifiable and the means to verify them were specific, measurable and time-bound. These LFAs have been used as the basis for monitoring and evaluation of all regular project activities like awareness raising. Initially, two years planning was done; it was later on updated in a revised PIP and included the LFA for the extended floodplain sites in the Brahmaputra-Shitalakshya Floodplain in Trishal and Kapasia Upazilas.

People’s involvement is the main concern in any awareness program either as contributors, participants or audience. Good records have to be maintained in case of smaller attendance like that in workshops, target group meetings and environmental clubs, including separate figures for male and female participants. In case of mass awareness programs, such as folk dramas, rallies and community awareness meetings, the record of participants has to be eye-estimated.

2.7. Assessing the impacts

Assessment of the impact of any community based project and its specific activities should be based upon the level of changes (planned or unplanned) experienced by the concerned primary stakeholders. These changes are rarely identified by conventional monitoring systems. However, in some cases certain monitoring information could be used as surrogates of actual indicators of changes. The reliability of impact monitoring practices depends upon the complexity of impact issues and indicators to be monitored. It also varies with the methods used, which expected to be conceptually right and technically practical. Again, different stakeholders interpret the impacts differently because of their fields of interest and outlooks. According to the interpretative approach of impact assessment, the views of stakeholders about
activity impacts should be documented and their area of agreement and
disagreement should be highlighted. These interpretations then should be discussed
for further understanding of the situation. Synthesis of the results of such impact
monitoring could contribute to a formal understanding of the activity impacts.

In the present project, above-mentioned issues were considered while evaluating the
impacts of awareness interventions. The impact of any awareness activity is necessary
to appraise its effectiveness. Furthermore, recording the responses to these
campaigns is necessary for improving the efficiency of the plans and tools, thus the
overall approach. In this project the impact monitoring system for awareness activities
included continual activities like participatory observation, stakeholder consultation,
process documentation, and occasional PRAs. These helped to make the program
more effective or to rectify them, especially, at the early stage of the project.
ENVIRONMENTAL AWARENESS ACTIVITIES

The strength of an awareness campaign can be immense if the awareness tools are used appropriately and efficiently. In the SEMP project, a lot of effort and resources were put into awareness activities. The specific awareness activities carried out under the present project could be divided on the basis of the two organizations, NACOM and BCAS, that assisted IUCNB. Hence, this chapter documents awareness initiatives of three floodplain sites under two broad headings, 1) Padma-Jamuna and Brahmaputra-Shitalakshya Floodplains and 2) Madhumati Floodplain. The activities are mostly comparable; but sometimes differ in i) their extent (number conducted and/or frequency), ii) the emphasis given upon, and iii) site-specific special activities.

3.1. Padma-Jamuna and Brahmaputra-Shitalakshya Floodplains

Various activities were carried out in the Padma-Jamuna Floodplain to raise awareness among the local community and other stakeholders about sustainable resource management. The major portion of these programs was awareness events in the schools followed by awareness meetings/workshops primarily targeting grassroots people of various occupations (Table 1). In addition to these, issue based folk drama performance, observance of environment related days, environmental awareness materials development and dissemination (billboards, signboards and leaflets), nature clubs establishment, IPM demonstration and participation in exhibition were also conducted. The programs or activities covered broad
environmental, biodiversity, conservation and management issues, but often depicted issues specific to the project areas.

| Table 1. Awareness initiatives in the Padma-Jamuna (October 1998 - December 2004) and Brahmaputra-Shitalakshya Floodplains (October 2000 - December 2004). |
|-------------------------------------------------|-----------------|-----------------|
| Types of awareness campaigns conducted          | Padma-Jamuna   | Brahma.-Shital. |
| Awareness meetings and workshops                | 91              | 115             |
| School level awareness programs                 | 148             | 173             |
| Nature clubs                                    | 5               | 11              |
| Environment related day observance (no. of occasions) | 12             | 8               |
| Billboards and signboards                       | 210             | 143             |
| Environmental folk drama shows                  | 97              | 45              |

The interpersonal awareness programs like workshops were facilitated by the local school and college teachers, and teachers and professionals from public universities and research organizations, NGO staff, local knowledgeable persons, local government officials (UNO, UAO, UEO and UFO) as well as the SEMP project staff. In a typical arrangement, the resource persons delivered speeches on environmental conservation, protection and management issues, and on the role of the community in nature conservation issues. These were often followed by open or group discussions, video show, etc.

3.1.1. Awareness meetings and workshops at community level

In the Padma-Jamuna Floodplain site, 81 meetings and 10 workshops were organized for community awareness on a wide range of environmental topics, and various community members attended these programs. In the community meetings, grassroots people from different walks of life such as fishermen, farmers, other resource
users, businessmen, teachers, local elites and others were invited and were informed about environmental issues and concerns through speeches and open discussions. About 3,370 males and 1,230 females attended those awareness meetings. On the other hand, the total participants of the workshops were around 400.

In the Trishal-Kapasia project site, 115 community awareness meetings were conducted to make the local communities aware of natural resource management and conservation. In total, about 5,000 people from 21 villages attended these meetings. The composition of the participants was similar to that of the Manikganj site.

Flip-charts, pads, pencils and other materials were provided for the ease of the participants. Issues discussed in the meetings and the workshops included over-exploitation of natural resources; causes of environmental degradation; environmental pollution; habitat destruction; waste management; participatory natural resource management; sustainable use of wetland resources; importance of biodiversity conservation; importance of wetlands, flora, fisheries, wildlife, migratory birds and their management and conservation; importance of plantation; importance and use of medicinal plants; agriculture and environment in general; role of farmers to protect the environment; adverse effects of the use of chemical fertilizers; importance of compost preparation and organic fertilizer; use of IPM in agricultural field; role of community in wetland resource management; environmental rules and regulations; the use of improved ovens and so on. The resource persons for these programs were university teachers from different disciplines of natural resources and government officials (UNO, UAO and UFO) along with local knowledgeable persons, local elites and project staff. Active participation from the local people made these programs successful.
3.1.2. Environmental education initiatives

In the Padma-Jamuna Floodplain, 148 awareness programs were conducted successfully in 42 schools and one college. In total, 9,030 students and 340 teachers attended those programs. These participants were from different schools, namely government primary schools, secondary schools, BRAC schools, Proshika schools, other private schools, madrasahs and a college.

In the Bramhaputra-Shitalakshya Floodplain site, 173 awareness programs were carried out in about 70 different educational institutions of Bailor, Durgapur, Kathal and Rampur Unions. About 7,600 participants attended those programs who were mostly students, but also included school teachers. These institutions were mainly government primary schools, but also included BRAC schools, high schools and a few madrasahs.

Experts from Dhaka went to the schools and delivered lectures on various environmental issues: habitat destruction especially in the wetlands; environmental degradation, pollution and remedies; banning of fish fry and brood fish collection and bird hunting; harmful fishing gears; importance, management and conservation of plants, wildlife and fishery resources; importance of planting wetland trees; importance of organic fertilizers (compost) and IPM; extinction of species and our duty; role of students in biodiversity conservation; use and importance of improved earthen ovens;
introducing solar cookers; use of biogas; depletion of ozone layer; homestead gardening; environment and religion, etc. These students also attended various workshops where they expressed their views and learned from each other with facilitation from the resource persons.

In the Manikganj site, the students were also involved in a nature walk where they learned first hand about the components of nature. For example, in a nature walk they were introduced to a number of bird species. It was explained to them what were the habits and habitats of those birds, and their importance in the environment. Similarly, a few more nature walks were also arranged focusing on fish, Gangetic dolphins and a variety of plant species.

3.1.3. Nature clubs

In total, five nature clubs were established in the Padma-Jamuna Floodplain area with a view to conduct organized environmental awareness activities with the local youth during and even after the end of the project (Table 2). Each nature club, consisting of 30 to 40 members, was formed with special focus on school students and social clubs or somity. In total, about 250 members were enlisted of which one third were girls. These clubs organized various activities such as debates on environmental issues, nature walks, inventorying the local status of different natural resources, and organizing and participating in programs for observing a number of environmental days. The club members were also active in implementing environment-friendly project activities as mentioned later. These clubs were mostly made up of school students, but local youth were also involved in a couple of them.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name</th>
<th>Address</th>
<th>Established</th>
<th>Member</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Compos.</td>
</tr>
<tr>
<td>1.</td>
<td>Maluchi Nature Club</td>
<td>Maluchi High School, Arua Union</td>
<td>28.02.02</td>
<td>School students</td>
</tr>
<tr>
<td>2.</td>
<td>Kanchanpur Nature Club</td>
<td>Kanchanpur Junior High School, Kanchanpur Union</td>
<td>27.03.02</td>
<td>School students</td>
</tr>
<tr>
<td>3.</td>
<td>Deghirchar Nature Club</td>
<td>Deghirchar-Bahadurpur, Gopinathpur Union</td>
<td>17.04.02</td>
<td>Local youth</td>
</tr>
<tr>
<td>4.</td>
<td>Maddhapara Nature Club</td>
<td>Maddahpara, Gopinathpur Union</td>
<td>15.05.02</td>
<td>Local youth</td>
</tr>
<tr>
<td>5.</td>
<td>Nali Nature Club</td>
<td>Nali High School, Arua Union</td>
<td>30.07.02</td>
<td>School students</td>
</tr>
</tbody>
</table>
In total, 11 nature clubs were established in the Trishal-Kapasia project site (Table 3). Each nature club, consisting mostly of 20 to 50 members, was formed with school/madrasah students and local youth. The total number of club members was 431. These clubs were provided with a large number of books, posters and leaflets, and other logistic support from the project. These clubs were involved in activities similar to those in the Manikganj site.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Club</th>
<th>Institution/Village, Union</th>
<th>Established</th>
<th>Member No.</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kakchar Pashchimpara Nature Club</td>
<td>Kakchar Pashchimpara, Rampur</td>
<td>21.10.01</td>
<td>53</td>
<td>Local youth</td>
</tr>
<tr>
<td>2.</td>
<td>Virrampur Vaipara Nature Club</td>
<td>Rampur High School, Rampur</td>
<td>17.11.01</td>
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</tr>
<tr>
<td>3.</td>
<td>Baliafar Nature Club</td>
<td>Baliafar, Kanthal</td>
<td>20.11.01</td>
<td>51</td>
<td>Local youth</td>
</tr>
<tr>
<td>4.</td>
<td>Kathal Junior School Nature Club</td>
<td>Kalirhat, Kanthal</td>
<td>29.01.02</td>
<td>58</td>
<td>School students</td>
</tr>
<tr>
<td>5.</td>
<td>Bailor Rahmania High School Nature Club</td>
<td>Bailor Rahmania High School, Bailor</td>
<td>10.02.02</td>
<td>96</td>
<td>School students</td>
</tr>
<tr>
<td>6.</td>
<td>Ichhamati Nature Club</td>
<td>Kalirhat Bazar, Kanthal</td>
<td>25.10.02</td>
<td>20</td>
<td>Local youth</td>
</tr>
<tr>
<td>7.</td>
<td>Shapla Nature Club</td>
<td>Mashok Tarun Sangha, Durgapur</td>
<td>02.03.03</td>
<td>20</td>
<td>Local youth</td>
</tr>
<tr>
<td>8.</td>
<td>Doel Nature Club</td>
<td>Mashok Gramunnayan Songstha, Durgapur</td>
<td>07.03.03</td>
<td>20</td>
<td>Local youth</td>
</tr>
<tr>
<td>9.</td>
<td>Nali Beel Nature Club</td>
<td>Suptaprotiva Kindergarten, Durgapur</td>
<td>02.04.03</td>
<td>20</td>
<td>School students</td>
</tr>
<tr>
<td>10.</td>
<td>Shitalakshya Nature Club</td>
<td>Fulbaria, Durgapur</td>
<td>20.04.03</td>
<td>20</td>
<td>Local youth</td>
</tr>
<tr>
<td>11.</td>
<td>Golap Nature Club</td>
<td>Kamra, Durgapur</td>
<td>24.05.03</td>
<td>23</td>
<td>Madrasah students</td>
</tr>
</tbody>
</table>

3.1.4. Environment related day observance

Various environment related days were observed regularly with spontaneous participation from the local people. The observed days were the World Wetlands Day (WWD, 2 February), the World Forestry Day (WFD, 21 March), the Earth Day (22 April) and the World Environment Day (WED, 5 June).

Most arrangements were done on the occasion of the World Wetlands Day and the World Environment Day. The aim of any environmental day observance was to make people
aware of the issues concerning that day through meetings, discussions and rallies. The rallies were organized with colorful festoons and banners depicting messages highlighting the relevant day’s significance. Caps and T-shirts with environmental messages on them were also distributed among the participants. Extensive use of PA (public address) system was also done. Leaflets were also distributed from the rallies to the onlookers.

In the Manikganj site, 12 such days were observed till 2004 (5 WED, 3 WWD, 3 WFD and 1 Earth Day). In total, 22 rallies were organized in different places of this project area with active participation from more than four thousand people. On the other hand, in the Trishal-Kapasia project site, three environmental days were observed on eight occasions (3 WWD, 3 WED and 2 WFD). In this site, a total of 22 rallies were also organized in different places with participation from five to six thousand people.

People from all walks of life participated in those rallies spontaneously, and chanted various slogans that made people aware of their environment. At both sites, the participants included local school and madrasah students, teachers, FRMC members, village environment committee members, nature club members, community groups, local elites, UP chairman and members and other organization members. Students and nature club members of the Manikganj site also took part in other activities like debates, cultural programs, essay competitions and quiz competitions which were arranged on those days.
The main topics of the discussion meetings were occasion specific, although general environmental issues and concerns appeared in those talks. For example, in 2003, two discussion meetings were held in Kanchanpur Junior High School and Arua Union Parishad Complex in Manikganj on 7 February as a part of the World Wetlands Day celebration. The aims of these meetings and other programs were to enhance awareness among the grassroots people, students, teachers, local elites, leaders and government officials about the importance of wetlands, conservation of the natural resources of wetlands, and the need for a movement against the existing destruction of the wetlands. The programs intended to develop interest in the community for conservation activities, to involve the local government institutions and local community in conservation and management activities, and consequently, facilitate sustainable development in the project area.

Many cultural programs such as folk dramas, songs, dress as you like, jokes, dance etc. were also organized at the project field office premises for environment related day observance. School teachers, students and general people were the participants and the audience of those shows.

Two schools, namely Nali High School and Maluchi High School, Manikganj, took part in a debate to mark the World Wetlands Day 2002. The topic of the debate was "Unplanned fishery harvesting is the main cause of depletion of fisheries resources". Nali High School was in favor of the topic and won the prize.
In total, seven debates were organized in the Trishal-Kapasia site in 2002 and 2003. The participants were students from primary (Boilor Govt. P. School and Bialiarpur Govt. P. School) and high schools (Boilor Rahmania High School, Halima Girls High School), members of nature clubs (Bialiarpur Nature Club, Ichhamati Nature Club and Kathal Junior School Nature Club), and also a village committee (Hodderbhiita VEC). Among the topics were, 'Deforestation is the main cause of environmental degradation', 'Harmful gear is the main cause of degradation of fisheries resources', 'Wetlands are not wastelands' and 'More plantation can save the environment'.

In the Padma-Jamuna site, several essay competitions were also organized to observe the environment related day. Some topics were 'The role of local people in conservation of wetland resources', 'Importance of afforestation and wetland in environmental conservation', etc. High school students were the main participants of these competitions. In total, 18 students from three schools participated in these competitions. The male and female participants were equal in proportion.

Eighteen students (10 boys and 8 girls) from six primary schools participated in quiz competitions organized at the project field office premises to celebrate environment related days. School teachers, local elites and project officials were the judges in all these competitions.
3.1.5. Awareness material development

1. Leaflet production and distribution

Under the awareness initiatives, seven different types of leaflets were prepared concerning environmental awareness. Some titles were ‘What should the flood-affected fish-cultivators do?’ ‘Works need to be done for the domestic animals in the flood-affected areas’ and ‘Important advice for the people affected by arsenic pollution’. Leaflets on the importance of planting trees, and with mixed messages on pesticides, integrated pest management, pollution, health issues, conservation of biodiversity and so on were also produced. These leaflets were distributed among the community people and school students. Different environmental groups and local volunteers helped to distribute these leaflets to the people of the Padma-Jamuna and Brahmapurta-Shitalakshya project sites.

Some leaflets published and distributed under the SEMP Floodplain component
2. Billboards and signboards

In total, 90 billboards and 263 signboards were prepared and erected in common public places like the crossroads, *haats*, *bazaars*, bus stands, launch terminals, ferry terminals, by wetlands and conservation areas, in/by schools and religious institutions like mosques, temples, etc. in the project sites of the Padma-Jamuna and Brahmaputra-Shitalakshya Floodplains. Out of these, 42 billboards and 168 signboards were erected in the first floodplain site, and 48 billboards and 95 signboards were set up in the second site. The billboards and signboards were sufficiently large and were made of steel frames for better longevity. These boards were well-made, and multi-colored to attract the common people. The language used was mainly Bangla, so that the messages could be easily read by the people and they become aware of the issues.

The main issues illustrated on these boards were fish conservation, wetland conservation, plant conservation, banning fish fry and brood fish catching, against using fine-mesh nets, dolphin conservation, banning polythene, using IPM, promotion of energy efficient options like improved ovens, solar cookers and biogas plants, and compost fertilizer.
3. Calendar

A four-color, six-page calendar was published in Bangla for the year 2003. Collages of birds, butterflies, medicinal plants, environmental degradation (e.g. siltation, snail collection, large-scale timbering, air pollution, waste dumping and migratory bird hunting), social movement in favor of environmental conservation (through folklore drama, rally, community meetings, etc.) and wildlife (snakes, turtle, frogs and lizards) made the calendar attractive to the people of different backgrounds. The response of the people who received the calendar was very positive.

4. Features in a national newspaper

In the national newspaper The Daily Star, two features were published on 24 August and 7 September 2003 in the Holiday section. These illustrated the experience of a few journalists in the SEMP project site and adjacent areas in Manikganj, and were written from an ecotourism perspective. They appreciated the fish conservation initiative and also the hatchery for breeding of turtles established under the SEMP. The latter was more highlighted as the turtles were released in ponds and other water bodies of the area as a measure of conservation. The plantation program and the medicinal nursery were also discussed in the first article. The second feature emphasized on the bird conservation in the project site. It positively described the authors’ experience in the Bahadurpur Bird Conservation Area where people were motivated to get involved in protecting birds. Besides these, conservation of other wildlife (e.g. monitor lizard) was also featured.

5. Posters

Two posters were published and disseminated on the occasion of the World Wetlands Day 2003 and 2004. ‘No Wetlands! No Water!’ and ‘From the Mountain to the sea- Wetlands at Work for Us’ were the slogans of the 2003 and 2004 posters, respectively. The 2003 poster illustrated the resources of wetlands and their present degraded conditions.

3.1.6. Demonstration activities

1. Medicinal plant plots

Two demonstration medicinal plots were established in two sites in Arua, namely, Maluchi High School (in 2000) and the project office in Bawlikanda (2001). In the first plot, 125 species were cultivated with 1,466 individuals. In the Bawlikanda nursery, 164 medicinal plant species were cultivated with 4,690 saplings. These numbers represent the stocks recorded in December 2004.
Similarly, in the Brahmaputra-Shitalakshya Floodplain, two demonstration plots were established: one in Bashkuri village, Bailor in 2001 and the second one in Mashok village, Kapasia in 2003. In Bailor, the plot covered 60 decimal area harboring 112 species of medicinal plants. The total number of saplings raised so far is 67,392 and in December 2004 the stock contained 33,096 saplings. On the other hand, in Mashok, 42 plant species were cultivated and 6,350 saplings were raised since 2003 with a stock of 4,475 in December 2004.

Local people including traditional healers, visited those nurseries to collect medicinal plant seedlings to establish their own homestead gardens. They also collected plant parts to prepare herbal medicines for their own use.

2. Compost pits

A total of 121 compost pits were established in the Manikganj project site. Union-wise, the pit numbers are 39 in Arua, 54 in Gopinathpur and 28 in Kanchanpur. Out of these, 38 were demonstration pits while the rest were for promotion of this environment-friendly agriculture option.

In the Trishal-Kapasia site, 112 compost pits were established. Out of these, 12 were established (in 2001 to 2003) and used as demonstration pits: two in Kanthal, seven in Bailor and three in Durgapur Unions. The support from the project included bamboo and waterproof sheets.

3. Environment-friendly agriculture practices

In the Manikganj project site, 38 agriculture plots were established to demonstrate environment-friendly, organic agriculture practices. Among these, 13 plots were in Arua, 16 in Gopinathpur, and nine in Kanchanpur. The total area used was 678 decimals. A good number of local jute, rice and vegetable varieties were cultivated in these plots. Vegetables namely, amaranth, Indian spinach, brinjal, chili (Bogracity variety), mustard, radish (red and white varieties), onion (Taherpuri variety), pumpkin and papaya (honey
dew variety) have been cultivated in 32 plots. Rice (varieties BR-29, *Molla Digha (amon)* and *Bawali (amon)*, etc.) and jute (*Tosha*) were also cultivated in four and two plots respectively. By using compost, avoiding chemical fertilizers and pesticides, and employing IPM, these plots encouraged local people to take eco-friendly measures in agriculture. Required seeds, compost and IPM apparatuses were supplied under the project.

IPM was also encouraged through various initiatives to reduce the effects of extensive pesticide use in Arua and Gopinathpur areas. IPM training activities were carried out to inform the farmers about the detrimental effects of pesticide use, to encourage the local people and develop their skills in using IPM. In total, seven training programs were arranged where around 160 farmers participated. At first, the adverse effects of pesticide use on the environment and human health were discussed in detail. Later on, the ways to avoid the adverse effects of pesticides by using IPM was discussed. The various components and techniques of the IPM were described. The topics mainly focused on the use of biological agents, manual sweeping, light and limited use of pesticides, and changes in cropping pattern and explained how the various techniques could be synchronized. A field demonstration also accompanied these trainings to show how to use various techniques of IPM. These included manual sweeping and fixing of light (*hajak lamp* - a pump lamp runs on kerosene) in the field.
A total of 43 agriculture demonstration plots were established in the Trishal-Kapasia project sites. The total area covered by these plots was 350 decimals. The union-wise distribution of these plots was Kanthal 19 plots, Bailor 17 plots and Durgapur seven plots. Among these four were for jute (Deshi pat) and 18 were for rice (varieties like Rupa aus, Boro, Rupa boro, Pajam, Amon balam, Karba balam, Kiron mala, etc.). Cultivation of vegetables namely, potato, onion, cauliflower, tomato, radish, chili, bottle gourd, cowpea and lady’s finger were demonstrated in 21 plots. The purpose of this initiative and the inputs provided are similar to the Manikganj site.

4. Wildlife conservation areas

In total, eight wildlife and/or bird conservation areas were established in the Manikganj project sites: four in Arua, two in Gopinathpur and two in Kanchanpur Unions. These were managed by respective village environment committees.

In the Trishal-Kapasia site, eight biodiversity conservation sites were established. Of these three were in Kanthal, two in Bailor and three in Durgapur Unions. Respective village environment committees were managing these sites (only Ichhamati Nature Club managed Uttar Singrail Biodiversity Conservation Area) with initial assistance from the project. In both sites, the activities involved implementation of the Wildlife Conservation Act, improving the habitat for wildlife in general and banning of hunting, egg-collection and disturbing birds and other animals. These sites are well-marked with signboards and people are aware of their existence and purpose through community meetings and discussions.

5. Fish conservation areas

In the Padma-Jamuna Floodplain project site, five fish conservation areas were established with a total surface area of 700 decimals. These are the Ichhamati River at Bawlikanda village (a secondary river), an area of the Padma at Bahadurpur village, Gopinathpur Beel (200 decimals area), Bawlikanda (a floodplain area) and Boiddakandi-Mohammadpur (a beel area). In the first two, bamboo and branches of trees were used
to establish *kathha*. In the latter three, lease money was also required to establish the conservation sites. Respective VEC(s) or FRMC(s) are managing these areas which are used as demonstration areas for fish conservation.

Sluice gate fish conservation area was established in a canal in the Singrail-Baliarpur villages of Kanthal Union in Trishal. The objective was to implement the Fish Conservation Act, to improve the habitats, and to implement banning of fish fry/mother fish catch. This site is managed by the Boka Beel FRMC.

### 6. Turtle hatchery

In the Padma-Jamuna Floodplain area, a turtle breeding hatchery was created in an artificial pond to demonstrate the feasibility of turtle rearing and reintroducing them in nature. This hatchery was established at Bawlikanda village of Arua Union under Shibalaya Upazila at the end of 1999. Initially some turtles and some eggs were collected from the University of Dhaka. Later on more turtles were also collected from the project area (Table 4). In 2001 and 2002, 175 turtles hatched in the SEMP turtle breeding hatchery. In total, about 250 individuals of turtle were released in the floodplains in 2002 and 2003.

<table>
<thead>
<tr>
<th>No.</th>
<th>Local name</th>
<th>English name</th>
<th>Scientific name</th>
<th>Present stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Daira kasim</td>
<td>Indian peacock soft shell turtle</td>
<td><em>Aspidorhynchus hurum</em></td>
<td>4</td>
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<tr>
<td>2</td>
<td>Holud kaitta</td>
<td>Yellow turtle</td>
<td><em>Morenia petersi</em></td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Kori kaitta</td>
<td>Common roofed turtle</td>
<td><em>Kachuga tecta</em></td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>Sada kaitta</td>
<td>Roofed turtle</td>
<td><em>Kachuga tentoria</em></td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Shundhi kasim</td>
<td>Spotted flap shell turtle</td>
<td><em>Lissemys punctata</em></td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Vaittal / Smithi kaitta</td>
<td>Brown roofed turtle</td>
<td><em>Kachuga smithi</em></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td>52</td>
</tr>
</tbody>
</table>
People were made interested about this hatchery through signboards, community meetings, school level programs and folklore performances.

7. Renewable energy options

In total, 12 bio-gas plants were established under the project in the Manikganj project site. Of these, three were to demonstrate this renewable energy option to the local people. Each of these demonstration plots was established in Bawlikanda village of Arua in 2002 and in Uttarpara and Mazampara villages of Gopinathpur Union in 2003. In Trishal, out of 12 bio-gas plants, two were established for demonstration purpose. These were in Bashkuri village of Bailor Union and Kablapara village of Rampur Union in 2002. The total expense was equally borne by BCSIR (project implemented by Local Government and Engineering Department, LGED) and the SEMP. All these have been functioning well.

3.1.7. Folk drama performance

Folk drama is a good medium for raising awareness among people about their surrounding environments. A total of 97 folk dramas were performed in different public places in the Padma-Jamuna Floodplain site for the local people. In addition to common people, local elites, FRMC members, village committee members, Member of Parliament, UP Chairmen and members, and government officials were among the 120 to 170 thousand people who enjoyed those performances. Various local schools were the venues for these dramas.

Initially, at the Manikganj site, Save Environment and People's Development Association (SEPDA) staged 10 shows of 'Paribesh Rakkha Kori, Shukey Shantitey Bash Kori' (Living in peace by conserving the environment) covering a range of environmental issues. Later on, in March 2001, a folk drama group of 26 performers (18 males and 8 females) from the villages of the project area was formed. Initially the name of this group was 'NACOM Folklore Group' which is currently known as 'NACOM Lokosangskrithi Samobay Somity Limited'. All of them had interest in
different cultural activities. The group members were trained by a lecturer of the Department of Dramatics, Jahangirnagar University, Dhaka, through a locally arranged workshop. The group was also guided from time to time by the project personnel. The acting ability of the group members was very good after the training. They were provided with musical instruments and other logistics from the project. A fixed fund was also given to the group to generate alternative income to sustain it in the long run.

In the Bramhputra-Shitalakshya Floodplain project site, 45 folk drama performances were staged till December 2004. A total of forty to sixty thousand people enjoyed those shows.

Similar to the Manikganj site, a folk group named 'Dak Diye Jai Nattaya Dal' was formed in January 2002 in Trishal with 25 performers. They were trained by the professional music director and play director of Kolodhoni Nattaya Club, Mymensingh to improve the performance.

The objective of these dramas was to make people aware of the degradation of their environment and resources, consequences of such degradation and possible remedies for their sustainable livelihoods. The titles of these plays were Sundar Prithibi Chai ('Need a beautiful world'), Dak ('The call'), Andhare Alo ('Light in the darkness') and 'Dak Diye Jai' ('Calling on', only in Trishal-Kapasia site). These dramas, except the last one, were written by the then UP Secretary of Arua Union, who was
also the president of the cultural group in Manikganj site. The script of *Dak Diye Jai* was written by the Director of Dak Diye Jai Nattaya Dal.

These popular theaters were created to present the realities of today's environmental status in an easily understandable way by using local dialects. The spirit of the play, for example in *Dak*, was further amplified by the inclusion of three folksongs calling for the conservation of nature. Some of the important topics addressed in these popular dramas were wetland resource management in general, natural resource degradation, environment pollution and its causes, fisheries and wildlife conservation, importance of plant resources, medicinal plants and their importance, plantation, organic fertilizer, IPM and improved oven. All these performances were highly accepted and appreciated by the local people.

### 3.1.8. Exhibitions

The project team in the Manikganj site participated in two exhibitions, namely *Brikkha Mela* (Tree Fair) and Agriculture Technology Transfer Fair. They also organized *Barsha Mela* (Rain Fair) with spontaneous participation from the local people. The *Brikkha Mela* was organized by the Department of Agricultural Extension, Harirampur in July 2003. There were many stalls from different relevant organizations. The main focus of the fair was planting more trees for improving country's forest cover. People from all walks of life visited this fair which successfully informed people about their degraded environment. There were stalls from the
project showing an ideal model for wetland management as well as demonstrating tree-plantation activities.

The Agriculture Technology Transfer Fair was the second fair also organized by the Department of Agricultural Extension, Harirampur, Manikganj. Different new agriculture technologies were shown in this fair and people showed their keen interest to learn about these new technologies. The project stall showed different techniques like, IPM, composting, demonstration plot of rice and so on. The project stalls won the first prizes in both the fairs.

In 2003, a Barsha Mela was arranged at the project site under the SEMP project and people were delighted to participate in as they could learn many things, especially on wetland resources. The stalls in the Barsha Mela were of nursery, pottery, food processing, indigenous seed collection techniques of the farmers, cottage item, boat-making, etc.

In the Bramhaputra-Shitalakshya Floodplain project site, the SEMP project team participated in the Agriculture Technology Transfer Fair in 2002 and 2003, and the Tree Fair in 2003 organized by the Agricultural Extension Department, Trishal, Mymensingh. In these fairs, the SEMP project team held rallies, distributed leaflets publicizing the use of good seeds, IPM and tree plantation, with special emphasis on medicinal plants. The team was awarded with the first prize for excellent demonstration of agricultural technology, nice nurseries containing medicinal plants and best role in environmental campaigning on all three occasions.
3.2. Madhumati Floodplain

A large number of environmental awareness programs were conducted in the Madhumati Floodplain project area over the reporting period. The major portion of these programs was awareness workshops primarily targeting grassroots people of various occupations. In addition, programs at the school level, environmental knowledge sharing meetings, demonstration plots, observance of environment related days, environmental awareness materials development and publication, issue based folk/popular drama performance and establishment of nature clubs were also done. The program contents covered general environmental issues and specific issues associated with the project site, like dewatering of beels, road killing of wild animals, snail exploitation and turtle conservation.

The interpersonal awareness programs like workshops were facilitated by the school teachers, other professionals, local NGO staff, local knowledgeable persons, local government officials as well as the project staff. The resource persons delivered speech on environmental conservation, protection and management issues and the role of the community in nature conservation issues. These were often followed by open or group discussions, video shows, etc. Awareness programs conducted in this project area are summarized in the Table 5.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of awareness campaigns conducted</td>
<td>Numbers</td>
</tr>
<tr>
<td>Awareness workshops</td>
<td>182</td>
</tr>
<tr>
<td>Environmental knowledge sharing meetings</td>
<td>49</td>
</tr>
<tr>
<td>Environment related day observance programs</td>
<td>26</td>
</tr>
<tr>
<td>Billboards and signboards</td>
<td>350</td>
</tr>
<tr>
<td>Environmental folk drama performances</td>
<td>21</td>
</tr>
<tr>
<td>Awareness programs on local occasions</td>
<td>5</td>
</tr>
</tbody>
</table>

3.2.1. Awareness workshops

A total of 182 awareness workshops were organized in Chanda and Kadambari-Chowaribari Beels. The subject of the workshop was selected based on the demand that came out during the baseline survey. Although most of these programs were participated in by people from various occupations, sometimes these were aimed at a specific group. The target groups for such workshops were selected on the basis of
the problems and relevant stakeholders. In addition to some general concepts like wetland biodiversity, wildlife conservation (including migratory birds), and wetland natural resource management, some specific issues were also considered, like conservation of snails, dolphins and turtles; *kua* conservation for fisheries; sustainable management of reeds, canes and bamboo; development of conservation sites and habitat restoration for fish and wildlife. Furthermore, talks on different conservation issues like Islam and Environment, Hinduism and conservation, etc. were presented in these workshops. In total, about 9,850 people (male about 6,630 and female about 3,220) attended these workshops over the reporting period.

Discussions in these programs were facilitated by local professionals, resources users, local government officials, UP chairmen and members, school teachers, local knowledgeable persons, local leaders, other NGO staff and SEMP project staff. In addition to speeches by the invited people and subsequent discussions, media such as video documentary shows, audio systems, posters, banners and leaflets were also used in these programs. Flip-charts, boards and other writing materials were also used to facilitate the presentations and discussions.

### 3.2.2. Environmental education initiatives

Environmental education programs for awareness building mainly focused on school and college students of the project area. The students were organized into environmental clubs. Through these clubs they were assisted in publishing newsletters, wall-magazines, issue-specific bulletins and organizing various other programs. Environmental libraries (and a mobile library) were also established targeting mostly students. Support was also given to school/college herbarium, zoological museum and establishing medicinal plant gardens. Other activities started for students were camping and study trips to nearby interesting areas.

#### 1. Environmental clubs

In total, 10 environmental/biodiversity clubs were established. These clubs were composed of interested students of the educational institutes, at primary, secondary
and college levels. The students were motivated through regular meetings. A desktop brochure, titled *Raktodron*, was published to describe the objective of the clubs in detail and to help them to understand the initiative. When the pupils were motivated to have an environment club then the school authorities were informed. Twenty to thirty-five students from different classes made up the groups. Regular meetings were held with the club members. In a typical meeting a topic from environment, biodiversity or wetlands was discussed. SEMP project staff facilitated such discussions. Sometimes handouts were prepared for the meeting to aid in the discussion. The name and status of the environmental clubs are presented in Table 6.

### Table 6. Environmental clubs in the Madhumati Floodplain established under the SEMP.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of environmental club</th>
<th>Institution</th>
<th>Established</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>1.</td>
<td>Shapla Env. Club</td>
<td>Narayanpur Primary School</td>
<td>6 Sep. 1999</td>
<td>12</td>
</tr>
<tr>
<td>2.</td>
<td>Amra Susuker Bandhu</td>
<td>Jalirpar Primary School</td>
<td>4 Jan. 2001</td>
<td>12</td>
</tr>
<tr>
<td>3.</td>
<td>Doel Env. Club</td>
<td>Kadambari High School</td>
<td>8 Feb. 2001</td>
<td>12</td>
</tr>
<tr>
<td>5.</td>
<td>Balaka Env. Club</td>
<td>Betgram High School</td>
<td>7 Apr. 2001</td>
<td>12</td>
</tr>
<tr>
<td>7.</td>
<td>Shapla Env. Club</td>
<td>Satpar Nazrul College</td>
<td>4 May 2001</td>
<td>16</td>
</tr>
</tbody>
</table>

The members of the clubs took part in some regular activities, like rallies on different environment related days or issues (plantation, snail conservation, fish conservation, etc.), collecting information on local biodiversity, establishing conservation sites (e.g. for snails), developing swamp tree nurseries and medicinal plant gardens and organizing issue-based seminars/workshops. Some special activities, like organizing mass signature and oath programs by Amra Susuker Bandhu; presenting a stall in the wetland fair in 2003 in Jalirpar Bronj market field by Gangshalik Environmental Club; and organizing art competitions in 2003 (Golap Environmental Club and Surjamukhi Environmental Club) and in 2004 (Shapla Environmental Club, Narayanpur).
Four environmental book-reading competitions were organized by Gangshalik (2000), Shapla (2001), Doyel (2001) and Balaka (2003) Environmental Clubs where 71 members participated. Book prizes were given to the first three winners to encourage them. In May 2001 and April 2004 two essay-writing competitions were organized to celebrate the World Wetlands Day with participation from about 100 college students of Kaligram and Kadambari. The topics were 'Wetland Natural Resources' and 'Environment and Life'. The winners were presented with environment related books and dictionaries.

Two environmental debating programs were organized by Shapla and Banolata Environmental Clubs with assistance from the SEMP project team on 'Special emphasis needed for snail conservation' and 'Wetlands biodiversity conservation: kua conservation or whole beel area conservation' in 2001 and 2003. In total, 28 students from Satpar Nazrul College and Bangaratna College participated in those programs (also see 'Fairs and exhibitions' section below). The winners were awarded with dictionaries.

The environmental clubs also assisted in establishing or providing support to the libraries (mobile library by Gangshalik Environmental Club) and museum/herbarium of their respective institutions.
A camping trip was conducted with the assistance from Gangshalik Environmental Club. Twenty male and 15 female students camped at Baghair Beel, and conducted flora and fauna survey during their stops.

The members of the clubs and different academic institutes were taken on different field trips arranged under the present project. Shapla Environmental Club participated in a field trip to the Chanda Beel area and Gangshalik Environmental Club to Mesobhita conservation site and Ranapasa canal conservation site. Chowaribari Surjamukhi Environmental Club visited Luxmipur biodiversity conservation site accompanied by teachers, who also helped them to conduct flora and fauna survey. Kadambari Doyel Environmental Club visited Chowaribari High School museum.

2. Environmental libraries

A library could be a good source for acquiring information on biodiversity, environment and nature. However, environment related books were found to be scarce in the libraries of local education institutes. Around 40 different kinds of environment related books were donated to eight libraries of educational institutions and clubs in the project area. The total number of books donated was more than 300. The institutions are, 1. Narayanpur Primary School, 2. Kadambari High School, 3. Ujani High School, 4. Betgram High School, 5. Nanikhir High School, 6. Satpar Nazrul College, 7. Gangshalik Environmental Club at Baniarchar, Boubazar and 8. Chowaribari High School. All these libraries are known as Paribesh Pathhagar or Environmental Library except that of Gangshalik Environmental Club, which is known as Mobile Library. The books are on general knowledge, wildlife (elephant, birds, etc.), insects, plants of Bangladesh, rivers of Bangladesh, organic farming, children’s story and poetry, travel, and environmental pollution. Bookshelves were also provided to keep these books. In this way, a small section of environmental books has been developed in those
institutions. The club members and the students of the respective schools are the users of these libraries. The maintenance of the membership is as per the library management rules of the school. This initiative has opened up a new avenue for the students to learn about their surrounding environment in addition to their school curricula.

The mobile library is basically a box full of environmental books. For this library, one president and one secretary are responsible for lending books and keeping records of the members. A member can take a maximum of two books for two weeks. The library is open once a week in the evening. The staff are selected or elected bi-annually from local school students. On an average 50 users use the library per year.

3. Local herbarium

Bangaratna College, Kaligram has a herbarium of local wetland species. It has been managed by the collage authority. The students of the collage collect the plant specimens and enrich the herbarium, thus giving a good picture of the local aquatic vegetation. At present, it contains around 150 specimens. Any one can use the herbarium with proper permission. Shelves and other logistic support were provided for the herbarium under the present project.

Students of Bangaratna College (about 100 students) got help in their practical examination by becoming familiar with the specimens before hand. Students from Nanikhir High School and Satpar College also visited this herbarium as a part of their excursion. Students collected floral species with guidance from their botany teachers, and this enriched their knowledge of the wetlands floral species. The college authority is very eager to maintain the herbarium after the end of the project.

4. Local museums

Two local museums, mainly zoological, have been established in Chowaribari High School, Chowaribari and Satpar Nazrul College, Satpar. There are good collections of local fish and reptile specimens. To enrich these museums the students follow 'no animal should be killed for preservation' rule. They collect normally or accidentally dead animals. Formalin solution, pots and other logistics were provided for the museum under the project. The school and college management committees allocated rooms for these museums in their respective institutions.
The museum in Chowarihari High School has a number of fish species (sarpunti (olive barb, Puntius sarana), bailla (Glossogobius giurus), meni (mud pearch, Nandus nandus), shol (banded snakehead, Channa striatus), nama chanda (elongate glass-perchlet, Chanda nama), tara baim (Macragnostus aral), jatpunti (spotfin swamp bard, Puntius sophore), taki (spotted snakehead, Channa punctatus), kaikla (freshwater garfish, Xenentodon cancila) and khaira (Indian glass-barb, Chela laubuca)), five species of snails, four species of snakes (gokhra (spectacled cobra, Naja naja), daras, (rat snake, Coluber mucosus), sutanali (common green whip snake, Ahaetulla nasutus) and dora shap (stripped keelback, Amphiesma stolata)) and insects which included grass hoppers, dragonflies and butterflies. Eight local varieties of amon rice were also kept in the museum. During the pond re-excavation in Betgram village, animal fossils, ancient pottery and handicrafts, peat and old branches of tree were unearthed and are preserved in the museum.

The students and teachers of Amgram High School and Satpar High School paid a visit to the Chowarihari museum. They were briefed by the teachers of Chowarihari High School and museum representatives about the museum activities and the role of club member in this program. They also shared their knowledge on wildlife with the visitors. The museum was also visited by the local Member of Parliament, wildlife biologists and local journalists.

3.2.3. Knowledge sharing meetings

Under the awareness raising component, knowledge sharing meetings were conducted at different intervention areas with the village committee members, professionals (e.g. farmer, fishermen, businessmen, etc.), members of vulnerable groups, NGO and social workers, government officers and UP representatives.
Subjects of these meetings were wetland natural resource management in the project site, nursery and plantation, biodiversity/wildlife conservation, snail conservation, fish conservation, *kua* conservation in Chanda *Beel* for brood fish conservation and production increase, birds including migratory birds, etc. A total of 49 knowledge sharing meetings were conducted at different places in the project site with participation from more than 1,700 people of which 34% were women. Local knowledgeable persons, people from different professions like farmers, fishermen, teachers, social-workers, experienced NGO persons, indigenous practitioners like *kabiraj*, government officials (UNO, UAO, UFO, etc.) and project staff facilitated these workshops.

**3.2.4. Environment related day observance**

A number of environment related national and international days were observed with different activities and events. Four celebrated international days were the World Wetlands Day (2 February), the World Heritage Day (18 April), the Earth Day (22 April) and the World Environment Day (5 June). In 1999-2004, programs were organized on nine occasions in 26 villages, and the venues included educational...
institutions, the project field office, WMTCs (Wetland Management Training Centres) and other common places. Discussions on the importance of the occasion, rallies, staging environmental folk dramas, handing out leaflets and distribution of seedlings were among the regular events in those programs. A total of about 3,500 people participated in those events (40% were women). In most of the cases these programs attracted general people, but sometimes targeted specific groups. The environmental clubs established under the SEMP also assisted in conducting some of these programs. Wetland Fair and photo exhibitions were two more programs organized to celebrate environment related days, and are described in detail under the Section ‘Fairs and Exhibitions’.

3.2.5. Awareness material development

1. Signboards / Billboards

More than 350 signboards/billboards were set up at different strategic locations in the project intervention area mostly by important roads and highways: Teherhat to Gaindasur (Dhaka-Gopalganj national highway), Babuitala to Teherhat (national highway), Teherhat to Rajoir (Dhaka-Barisal national highway), Rajoir to Ramnagar (Kotalipara-Gopalganj road), Teherhat to Kadambari, Bhennabari to Kadambari and Ujani to Muksudpur (LGED road). These were designed to provide information/messages, and mostly were pictorial. The drawing and painting were locally conducted.
This intervention was physically very prominent. The boards contained information on the importance and protection of different plant and animal species (trees, medicinal plants, canes, reeds, snails, owls, frogs, foxes, turtles, dolphins, birds, monitor lizards, mongoose, earthworms, etc.), importance of plantation (local species and fruiting species), vegetable gardens, fish conservation (against dewatering, killing of fries and egg-bearing fish), use of improved oven, messages from religious books and poems, laws on migratory bird protection, use of biodegradable products, against chemical fertilizers and pesticides, etc. Some boards were placed to target at specific resource user groups. For example, small signboards on fisheries resources were established beside the fishermen’s villages. By the conservation sites, khas or wildlife conservation site, signboards were placed to describe the purpose of the sites.

Billboards and signboards in the Madhumati Floodplain project site

2. Wall-magazines

Jalabhum Barta is a printed wall-magazine (four-colored, size 36" X 23") aimed to be published quarterly. Most of the articles, features, news items, poems, general knowledge items and stories were written by the local people like school and college teachers, UP chairmen, NGO workers and professional journalists, along with the project staff. So far, seven issues have been published, one in 1999 and 2002, three in 2003, and two in 2004. There was an editorial board to maintain the quality of the write up.

Members of different environmental clubs frequently prepare their wall-magazines in Bangla. These are published whenever possible, but often event specific. So far 12
issues have been published. Some titles are the World Environment Day, the World Wetlands Day, Fish Resources, Wetland Natural Resources, Dolphin and Snail. Regular topics included the editorial, main feature, environment related poetry and a general or specific write-up from local contributors.

3. Posters

A poster (four-color, 36" X23") on floating gardening or baira was published in 2002. The poster highlighted a sustainable use of water hyacinth to make floating garden platforms that could be used as an alternative livelihood option for the local people.

Two posters were published and disseminated on the occasion of the World Wetlands Day 2003 and 2004. These are described in the Section 3.1.5.

4. Leaflets

In total, six leaflets were published as desktop publications, namely, those on i) shial (jackal, Canis aureus) and ii) khek shial (Bengal fox, Vulpes bengalensis) by Pankouri Environmental Club in Monimohan High School, iii) topshye machh (paradise threadfin, Polynemus paradiseus) by Balaka Environmental Club, and iv) nim (Melia semprevirens), v) tulshi (Ocimum sanctum) (in 2002) and vi) dolphin (Platanista gangetica) leaflets (in 2001) by the SEMP project team. All these were designed to help the local community understand the importance of these species and other related issues and to contribute to the conservation of local animals and plants.

5. Booklets in Bangla

a) Numerous migratory birds of many varieties visit the project area, and make the beel their temporary habitat. To help the youth and children know about the importance of these migratory birds, a booklet titled Otithi Pakhi ('Visitor Birds'), was published in 2000. Drawings and basic descriptions of major migratory birds were presented in this booklet, which were distributed among the club members.
b) *Machh* ('Fish') is the largest booklet produced and distributed so far. It contains primary information on fish resources in the project area, including drawings to assist the club members identify different species. The booklet, published in 1999, contains a sample test at the end, meant to stir more questions in the readers. Breeding, feeding and habitat information on different fish types are also illustrated. The booklet also identifies major gears and traps used to catch fish.

![Bengal Fox](image)

**Bengal Fox** *Vulpes bengalensis*

*খেক্সীয়াল* Bengali Fox is regarded as a chicken thief. The leaflet card tells that the mouth is so small it cannot even hold a chick!

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![Insectivorous Insects](image)

**Insectivorous Insects**

*জে শব্দ পকা পকা খাই* is a pocket booklet presenting brief descriptions and drawings of some of the major insects that eat other insects harmful to us. There are 31 insects featured in this booklet published in 2000.

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![Bird Nests](image)

**Bird Nests**

*পাখির বাস* *Pakhir Basha*, published in 2000, presents pictures and illustrations of nests and habitats of some of the popular birds in the project area. The aim is to inform the club members and other young people about these birds so that they can take precaution to leave the nests undisturbed.

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6. **Students' newsletter**

*'Basanta bauri'* (Bangla name of blue-throated barbet, *Megalaima asiatica*) is an environment related bimonthly newsletter published by the students of Bangaratna College. It is a 3-fold desktop preparation, printed on both sides of an A4 paper. Regular contents included the editorial, poetry, students initiatives, notes on wetland/natural resources, and so on. In total, three issues were published with 900 distributed.
Besides the above-mentioned publications, there are a number of issue-specific bulletins published so far by the environmental clubs. The members wrote and edited all the issues. The issues included different environmental concerns, biodiversity or importance of an environment related day.

3.2.6. Demonstration activities

To display some project activities demonstration plots were developed. The demonstration plots give practical knowledge of certain issues or topics to the participants. Moreover, these plot themselves are good communication tools.

1. Demonstration breeding ground

In the WRTC’s of Bhennabari, Satpar and Gopalganj in Chanda Beel, demonstration plots as breeding grounds for common birds were established. At least 42 pots and 11 bamboo baskets and 20 bamboo pieces were set to facilitate nesting and breeding. These nesting sites were visited by the local people, workshop and training participants, local students and other visitors to the centers. The most commonly observed species were, bhat shalik (common myna, Acidotheres tristis), jhuti shalik (jungle myna, A. fuscus), gu shalik (pied myna, Sturnus contra), kaua (house crow, Corvus splendens), bulbuli (red-vanted bulbul, Pycnonotus cafer), doel (magpie-robin, Copsychus saularis), tila ghughu (spotted dove, Streptopelia chinensis), dhabal ghughu (Indian ring dove, Streptopelia decaocto), nishi bak (night heron, Nycticorax nycticorax), chorui (house sparrow, Passer domesticus) and tila munia (spotted munia, Lonchura punctulata).

2. Demonstration ponds

Eight demonstration ponds were established in the WRTC in Chanda Beel to show standard practices of fish fry and fish production. Local people, participants of workshops and trainings, students, government officials and NGO members visited these ponds year round. In 2001, these ponds won the first prize for the best motivator and quality fingerling production at the district level in Gopalganj.

Besides these demonstrations, other environment-friendly activities, like horticulture by organic manure, biodiversity conservation in the boundary of the ponds, native species plantation program, etc. were also conducted in the WRTC campus.

3. Turtle pond

In May 2002, a turtle pond was established at Goalgram Asram in Goalgram village, Nanikhir with active help from the Asram committee. This was initiated to demonstrate turtle breeding in the project area. The area of the pond is 10 decimal
with a maximum depth of 15 ft. It was fenced along the bank made of bamboo and steel net. A total of 118 small turtles were released in that pond. But during the flood of 2004, many individuals were lost. At present the Asram committee is managing the pond (Table 7).

Table 7. Turtle hatchery in Nanikhir, Gopalganj.

<table>
<thead>
<tr>
<th>Local name</th>
<th>English name</th>
<th>Scientific name</th>
<th>Initial stock</th>
<th>Present (early 2005) stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kali kaitta</td>
<td>Brahminy river turtle</td>
<td>Haremella thurjii</td>
<td>50</td>
<td>26</td>
</tr>
<tr>
<td>Hulud kaitta</td>
<td>Yellow turtle</td>
<td>Morenia petersi</td>
<td>46</td>
<td>16</td>
</tr>
<tr>
<td>Kori kaitta</td>
<td>Common roofed turtle</td>
<td>Kachuga tecta</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Shundhi kasim</td>
<td>Spotted flap shell turtle</td>
<td>Lissemys punctata</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>118</td>
<td>54</td>
</tr>
</tbody>
</table>

4. Conservation areas

Several conservation areas have been established all over the project area to demonstrate the conservation practices. These include conservation sites for fish, dolphin or biodiversity in general. The sites were, 1) Dodhara native fish conservation site, 2) Mesobhita biodiversity conservation site, 3) Ranapasa canal conservation area, 4) Luxmipur biodiversity conservation site, 5) MBRC (Madaripur Beel Route Canal) dolphin conservation site, 6) Betgram snail conservation site, 7) Kadambari Ganesh Pagal Asram conservation area, 8) Khetbila fish conservation area, and 9) Nayakandi fish conservation area. These areas were well marked with signboards and billboards. Local people were made aware of these sites through awareness campaigns. Students and interested people were taken to these areas, and were also encouraged to visit those places for educational purposes.
5. Medicinal plant gardens

A medicinal plant plot was established under SEMP in the WRTC premises in Bhennabari village of Satpar Union in 1999. The garden is 15m long and 10m wide with an area of 2.25 decimals. So far 185 medicinal species have been cultivated in this garden. At present there are 94 species. The purpose of this central nursery was to increase the availability of medicinal plants in the locality, help community and traditional healers with plants and plant parts, and also to help in setting up a collection of rare and locally threatened medicinal plants. These consequently promoted herbal treatments for the local community. Later on 52 medicinal plant plots were raised at the community level as well as in the premises of government offices. Some medicinal plant gardens at community level include those in Nanikhir High School (by Golap Environmental Club in 2002), Baptist Church, Satpar Nazrul College and Goalgram Asram premises. The average number of species per plot was 62.

6. Baira

Floating gardening or baira cultivation is an age-old practice in the Madhumati Floodplain project area. In this technique, floating platforms are made from water hyacinth and other aquatic plants, and seedlings are raised and vegetables are grown in these plots in rainy season when land for agriculture is scarce. However, the extent of
baira does not reflect the true potential of this environmentally friendly alternative income generation option. A total of 500 baira demonstration plots were established under the project over the reporting period to promote baira in the project area. In addition, a good number of winter vegetable plots made from baira residue were facilitated under the SEMP project (IUCN Bangladesh 2005).

3.2.7. Environmental drama performance

Folk drama could be a very important means for conveying environmental messages to the common people. This medium was widely used in the...
Awareness program of SEMP in the Madhumati Floodplain. Primarily, Save Environment and People's Development Association (SEPDA) was engaged to perform dramas (seven shows of 'Prakritik Shampad Rakkha Kori, Shukey Shantitey Bash Kori', 'Living in peace by conserving natural resources') based on a wide range of environmental issues. The community members who were inspired enough to form their own groups and to stage plays were supported under the SEMP project to conduct dramas on environmental topics. They were given ideas on environmental issues. The scripts of the drama were reviewed for the accuracy of environmental information. Sometimes the stories were selected from the popular folklore or sometimes were written by the local stakeholders and project staff.

In total, nine folk dramas were staged by the local groups in the project area (Table 8). These dramas covered issues like sustainable wetland resource utilization, bird hunting, baira cultivation, fish conservation, nursery, plantation and related issues, wildlife, NGO responsibility, micro-credit and use of pesticides and chemical fertilizers.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the drama</th>
<th>Drama Group/Performer</th>
<th>No. of show</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>‘Chanda Beeler Kanna’ ('Cry of Chanda Beel')</td>
<td>Voice of Listeners Club, Jalirpar</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>‘Bhuler Mashu’ ('Paying for the Mistakes')</td>
<td>Chanda Beel Paribeshbadi Nattya Gosthhi, Jalirpar</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>‘Amader Paribesh’ ('Our Environment')</td>
<td>Jalirpar Shishu Kishor Nattya Gosthhi</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>‘Chena Theke Ochena’ ('From known to unknown')</td>
<td>Gangshalik Environmental Club</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>‘Bashanter Ful’ ('Spring Flowers')</td>
<td>BASSA (Bangladesh Auxiliary Services for Social Advancement)</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>‘Paribesh Bachao’ ('Save the Environment')</td>
<td>Gano Bikash Nattya Gosthhi</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>‘Kumro Ful’ ('Gourd Flowers')</td>
<td>Balaka Environmental Club</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>‘Boat brikkho’ ('Banyan Tree')</td>
<td>Gangshalik Environmental Club</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>‘Bipanna Paribesh’ ('Threatened Environment')</td>
<td>Jalirpar Paribeshbadi Nattya Gosthhi</td>
<td>3</td>
</tr>
</tbody>
</table>

The folk dramas were performed in the school compounds, church precinct, open fields, Kadambari Asram, SEMP field office and market places. Project personnel and community members helped to organize these shows. Public announcement (PA) systems were adequately used in an area to invite people to the programs. In the reporting period, a total of 21 stage shows were conducted in different villages of the project sites. A total of
26 thousand people enjoyed those shows of which 44% were women.

3.2.8. **Baul song programs**

_Bauls_ are indigenous folk singers of rural Bangladesh. Country people like their songs very much because of the spiritual and also down to earth meanings. Under the SEMP initiative, _bauls_ of the project area in the Madhumati Floodplain were encouraged to write and perform songs with environment related issues. During the reporting period, a number of _baul_ song programs were organized in the WRTC of Bhennabari, Baniarchar Boubazar, Jalirpar bus stand in the project site, Tekerhat market place, Gano Unnayan Prachesta compound and Satpar Bazar outside the project area. These programs attracted a total of one thousand people. The participating _baul_ groups were Sadan group (Baikanthapur village, six members), Ashutosh group (Jalirpar village, five members), Jagadish Biswas group (Patkelbari village, four members) and Bipul group (Singa village, three members). Their songs presented the old resourceful Chanda _Beel_, its degradation in a very romantic and emotional way.

3.2.9. **Video shows**

Video shows were conducted at common places (market place, club house, school compounds, etc.) in the project site and also on the occasion of _Asram Mela_ on 13 _Jaistha_ (or 27 May) at the Kadambri Asram premises.

The video documentaries included 'Life of Birds', 'Dinosaurs', videos on snakes, _Machhe Bhate Bangali_ ('Fish and rice make us Bangalee') - on local community
livelihood and fish resources), Praneet Rajja (wildlife, habitat and life history), and ‘Mina’ (healthcare, literacy and social rights). Two environmental dramas, namely Bhuler Masul and Chanda Beeler Kanna were video recorded and shown to the audience. A video on baira cultivation activities was also shown. In total, more than 14 thousand people enjoyed those video shows, where about 35% were women.

3.2.10. Fairs and exhibitions

1. Wetland Fair

On the occasion of the World Wetlands Day 2003, a three-day long Jalabhumi Mela (Wetland Fair) was organized at Jalirpar Bronj market field (7 to 9 February 2003). It was organized under the SEMP with assistance from local environmental clubs, NGOs, village resource management committees and vulnerable groups. It was participated by the NGOs, community based organizations (CBOs) and local stakeholders to make the local community aware of the importance of wetland resources and actions needed for their conservation, and also to enhance the involvement of local organizations in such actions. A total of 21 stalls were made and were booked by 15 NGOs, clubs and CBOs. The fair was well-organized and good discipline was maintained throughout. Participants displayed and sold/distributed books, leaflets, newsletters and posters, demonstrated some of their activities like natural/cage fish culture, baira cultivation, vegetable gardening, plantation, nursery,
distribution of saplings, sanitary latrines, etc. They also sold handicrafts made of shola (Aeschynomene aspera), jute, bamboo and wood, and local cloths and nakshi kantha (local stitched cloth). A three-member committee (Chairman Jalirpar Union, and two teachers from K.B.M Mallick High School and Kalog Mukharji Memorial Seminary) visited the stalls and selected three best stalls for awards.

There was a common stage, where discussion, folk songs, drama and video shows were arranged. A round table discussion (titled ‘Wetlands conservation, things to do’) was participated in by teachers, UP Chairman and local NGO representatives.

Twenty students from five primary and secondary schools participated in an art competition. General environmental issues were the topics of their drawings. The best three were awarded after being judged by the school teachers and project staff.

Bangaratna College and Satpar College students debated on ‘Wetlands biodiversity conservation: kua conservation or whole beel area conservation’.

Ashutosh group from Jalirpar and Sadan group from Kotalipara performed folk songs and staged cultural programs. Three environmental dramas were staged by Bangladesh Auxiliary Services for Social Advancement, Gangshalik Environmental Club and Gano Bikash Karjakram. Around a thousand people enjoyed these programs of which more than one third were women.

2. Tree Fair

The SEMP project team participated in a number of Tree Fairs in the upazilas of Rajoir (2002 - 1st prize, 2003 & 2004) and Muksudpur (2002 - 1st prize & 2003), and in Madaripur District (2003 - 3rd prize), and won prizes for their stalls. The team demonstrated native species of trees, fruit trees and medicinal saplings. Leaflets were distributed, banners with messages were displayed, and some saplings were distribution among the interested visitors. In total, 15 to 18 thousand people visited those fairs.
3. **Photo exhibition**

A photo exhibition was organized at the project field office in Baniarchar on the occasion of the World Environment Day 2002. It was visited by around 150 local people including students, village committee members and community group members. A total of 114 photos were displayed on the wall or on the boards by sticking on or hanging by threads. The photos exhibited climate change issues, the Chakoria Sundarban, air pollution by transportation, water pollution by industries, deforestation and others environmental concerns.
3.2.11. Awareness program on different local occasions

Local festivals, and religious and cultural events are suitable for mass awareness raising. Some major programs of this type were organized in Kadambari Asram Mela (in the Asram precinct), Jalirpar boat race (at Jalirpar kheyaghat), Khalkula Mela (in Khalkula, Ujani Union), Betgram Mela (in Betgram) and Jalirpar/Banogram Mela (in Jalirpar). Banners and posters with various environmental messages were erected, leaflets on environmental issues were distributed, and stalls were established. The banners contained messages encouraging plantation, conservation of fish resources, etc. The posters were on plants, birds, fish, wildlife and reptiles (published by IUCN Bangladesh). Leaflets produced under the project were also distributed. Environmental club members briefed the visitors about the project activities and the clubs' role in environmental activities. Video shows and performances of folk dramas were also arranged. Emphasis was given on the improvement of the local environment and people's participation in environment-friendly activities.
CHAPTER 4

IMPACTS

Awareness raising activities are recognized as very vital project interventions for helping the wetland resource users understand the need for prevention and reversion of wetland degradation. Through these interventions, people appreciate the necessity of sustainable use of wetland resources and become encouraged to improve the quality of their lifestyle; and thus promote sustainable development in the locality. Environmental awareness campaigns under the SEMP floodplain component have created some appreciable impressions on the people of the project areas. In terms of meeting the project targets, the present project achieved the intended level of performance like, the number of participants for a given awareness campaign, number of programs organized in a given time limit, number of billboard erected and so on.

An evaluation matrix with performance indicators is an effective way for assessing a project’s impact. But such a system could not be practiced frequently for interventions like awareness raising. In absence of such quantitative measures, qualitative assessment like talking with the participants for their responses, recording the changes in their behavior, actions and/or outlooks, noticing the positive changes in the environment and biodiversity, etc. could be done.

On returning from awareness raising campaigns, resource users, school students, leaders of UP, government officials and community people in general were found enthusiastic
about conservation and sustainable management of ecosystems. Community level awareness campaigns developed consciousness among the villagers about many important issues like harmful effects of the fishing gears and dewatering, roles of the migratory birds, plants and wildlife in maintaining ecological balance of the wetlands and importance of environment-friendly agriculture practices. Awareness workshops and knowledge sharing workshops enhanced wider dissemination of environmental concerns, causes and solutions among fishers, farmers, day-laborers, marginal groups, students, teachers and businessmen. This further facilitated the linkage between government officials, UP chairmen and members with local communities. Such awareness resulted into adoption of some improved practices by traditional user groups. After an awareness program, the participating people were found to discuss those issues among themselves. Specific responses toward some specific issues are highlighted below under project site headings.

4.1. Padma-Jamuna and Brahmaputra-Shitalakshya Floodplains

The people of these project sites in general, are now more knowledgeable and motivated as a result of massive awareness activities conducted over the last few years. They are now interested in practicing different eco-friendly activities. Local people are now planting seedlings of various species, including medicinal plants, around their homesteads in an increasing rate as they now understand the benefits of plantation. More seedlings are being distributed from the project nurseries. Many nurseries have been established in the locality with the help from the SEMP, and seedling growers are now enjoying substantial additional income. The use of IPM and organic fertilizers has increased in the area as farmers are aware of the advantages of these. Hunting of birds and other wildlife have decreased much after the community awareness programs. The increase in number of wild birds in the project area is noticeable. Catching fish through dewatering and spreading poison in water have also decreased. Some specific impacts on individuals (e.g. fisherman, students and elites), and impacts of awareness activities on the people and the environment have been discussed below.

4.1.1. Impacts on individuals

1. Fish conservation

Mohammed Kohinur Islam (age 38) is a farmer of Noyakandi, Manikganj. Earlier, he used to be busy only with agriculture. After participating in SEMP awareness programs, he is now playing an important role in conserving the fishery resources. Now, as a club member, he sometimes meets with the local club members and the local youth to discuss the possible activities for fishery resources conservation. He
is very much aware of the depleting trend of fish fries, and advised the local fishermen to refrain from catching fish fries; otherwise they would be punished by the law. After this warning he monitored the local markets to determine whether the fishermen catch the fish fry or not. One day Mr. Islam found many fish fry sellers in the local market. He, along with his club members captured the stock, and released all the fries in the river. After this action, fish fry catching has stopped.

Mohammad Motalib (age 43) of Fulbaria, Kapasia was a local fisherman and used to catch fish from adjacent Nali Beel. One day he was invited to the community awareness meeting by the SEMP team and in that meeting, the importance of conservation of fisheries resources was discussed. At the end of the meeting, he was asked to say something. He said, "I alone cannot do anything to conserve the fisheries resources," he and his relatives were engaged in fishing in the surrounding beels. He attended several awareness meetings afterwards and realized the adverse effects of current jal (a fine-mesh fishing net) and not conserving the fisheries resources. He then went to the Nali Beel, took out all current jal from the beel, and burned them. He managed to declare the use of current jal banned in that beel. After a while, he along with president of the FRMC announced catching the fries of threatened fish and use of current jal were prohibited in the beel. Mr. Motalib also donated a piece of land (0.1 acre) for establishing fish sanctuary in the beel to the FRMC. Now, he is actively taking care of the fish sanctuary for conservation of fisheries resources.

2. Wildlife care

Paran Halder (age 12) is a student of Maluchi Government Primary School, Arua, Manikganj. He participated in many awareness programs such as rallies, discussion meetings and nature walks. He also watched several folk dramas organized by the SEMP to increase the environmental awareness among the local people. After attending these programs he became aware of the environmental issues. Paran used to rear a parrot at his residence. He released the bird after his involvement with the project awareness activities. Once he found a bird in the lawn of his residence injured in storm. He tried to treat the bird, but could not provide good treatment. Then he brought the bird to the SEMP project office where the staff treated the bird successfully. After a couple of days' treatment, the bird recovered. It was released to its own habitat when it was fit to fly.
3. **Bird hunting**

Shuvash Chandra Das (age 42) of Kamra, Kapasia, used to hunt birds with his air-gun. Once he was invited to attend a SEMP community awareness meeting. In the meeting, the effects of hunting of birds on environment was discussed and it was also discussed how the animals, plants and human beings are interrelated in the ecosystems. The awareness meeting influenced Mr. Das very much, and he realized the negative effects of his hunting activity. He attended the next awareness meeting and he was asked to say something regarding environmental conservation. He mentioned about the bad effects of hunting and swore in that meeting not to hunt any more. He also urged all not to hunt birds or other animals and to work for a better environment. He is now playing a valuable role in the nature conservation of this area.

4. **Nursery establishment**

Nur Mohammad (age 45) is the Headmaster of Fulbaria KG and High School, Kapasia. Observing the environmental awareness activities of the SEMP in the area, he expressed his interest to be involved with the activities. He was invited to an awareness meeting where the scope and importance of nursery and plantation establishment were discussed. He, therefore, realized the worth of nurseries and plantation, and declared that he would donate 0.3 acre land for nursery development. A nursery was established on the donated land in Kapasia. He assured that "..... the project can raise seedlings in this nursery and after the completion of the project, I will continue the seedling raising. I will distribute seedlings to the local people that will enhance plantation activities."

5. **Plantation**

Mohammad Faruque Hasan (age 38) is an influential person of Gopinathpur Charpara, Manikganj. Once a roadside plantation program was arranged under the SEMP with the participation of local elites, including the local UP Chairman. The road was from Charpara Ichhamati River to Gopinathpur Maddapara. There were some crop fields of
Mr. Hasan by the road and he did not allow the SEMP team to carry out plantation there. He also warned them if seedlings were planted, those would be cut down. Therefore, the chairman and the project staff returned from the site without completing the plantation. Later on, an awareness program was arranged in that village and Mr. Hasan was invited to that program. Mr. Hasan did not attend the program, but sent one of his representatives. In that awareness program, advantages of plantation programs were discussed by the facilitator. Being informed from his representative about the advantages of plantation, Mr. Hasan became motivated and came to the project field office and apologized for his earlier behavior. He then expressed interest to carry out plantation along the previously selected road. Observing his motivation, a date for plantation was fixed, and Mr. Hasan himself helped in planting seedlings in that site.

6. Medicinal plants, nursery and treatment

Nihar Ranjan Sarkar (45) of Palashpur, Kapasia is a village kabiraj. He used to treat the villagers with herbal medicines extracted from locally available medicinal plants. Gradually, the medicinal plants had been depleted in the locality and there was a lack of herbal medicines. As a result, he was about to change his profession. According to him, "...there are no medicinal plants in the locality, how I can help people with treatment". Once he attended a community awareness meeting conducted under the SEMP, and also enjoyed several environmental folk dramas. From the discussion and the dramas, he came to know that the threatened medicinal plants of the locality were being supplied under the SEMP project. He came to the project field office and collected some medicinal plants. He established a garden of medicinal plants around his homestead. Gradually the seedlings grew up in that garden, and Mr. Sarkar continued his treatment with herbal medicines. He said, "I have received many medicinal plants through this project, and now I can help the people through herbal treatment."
4.1.2. Environmental folk dramas

Folk drama was expected to be one of the most effective tools for awareness raising, and it was proven true. There was tremendous feedback on folk theater performances in the project areas in the Padma-Jamuna and Brahmaputra-Shitalakshya Floodplains. In both the floodplain sites, people enjoyed the shows and seemed to realize the need for a change in their life-style towards a sustainable direction. Local people were found enthusiastic about managing their own environment in quest of a healthy and sustainable living standard. A few results of the dramas include reduced bird hunting, increased use of cow-dung in agriculture, becoming aware of the depleting trend of fishery resources in wetlands, becoming educated about the advantage of medicinal plants and about the role of wildlife in maintaining ecological balance, more motivation in setting fish sanctuaries, in plantation, and in use of biogas and IPM technology. People are now very enthusiastic about staging more new folk dramas on environmental issues. The demand is gradually increasing even beyond the project site.

A few folk dramas concerning environmental awareness were organized in the Balla Union, Manikganj. This union was outside the project area, so no other awareness interventions were carried out there. After those programs, it was noticed that local people stopped trapping or hunting birds, use of organic fertilizers increased and hunting of lizards and mongoose stopped. Now-a-days, people are planting more medicinal plants around their homesteads. The use of medicinal plants is also increasing. People from Bhadiakhula, Manikganj were also influenced very much watching the folk dramas, and requested the SEMP project office in Arua several times to arrange such dramas in their village.

4.1.3. Programs in schools

A major success of the environmental awareness programs arranged in local primary and high schools was stopping bird hunting in the locality. The students also stopped harming lizards and mongooses.
The students now collect different seedlings from the project nursery, and plant them around their homesteads, which was very rare before. They are now much more aware of the advantages of planting medicinal plants. There is an enormous participation of school students in plantation activities along the roadside and around schools.

The students now keep their house neat and clean for a better and healthier environment. They have been motivated and encouraged to use sanitary latrines in their houses. They also spontaneously participate in various environmental programs on behalf of their schools.

4.1.4. Environment day observance

People of the locality are now aware of and know more about environment related days through discussions and rallies. In addition, quiz and essay competitions, and debates arranged in the locality were also informative. People spontaneously participated in the rallies and chanted different slogans to increase environmental awareness. Even the people who did not participate in the rallies were able to know about the environmental days by watching the rallies and hearing the slogans.

4.1.5. Awareness materials

The billboards and signboards with different information and messages on environmental issues have caused great impression on the local people. Leaflets also created positive impacts on them. People have become educated about environmental matters important to them. People

![Art competition on environmental issues](image)

![Environmental awareness for students](image)
now have stopped catching fish from fish sanctuaries. People from outside the project area are also encouraged by the signboards and billboards, and now know many facts regarding the project. Some of them also requested the local SEMP project office to include their villages under the project, especially for biogas interventions and group activities. The fishermen have reduced catching fish with fine-mesh nets, and catching fish fries and brood fish after learning about the legal fate of doing so. People now frequently come to the project office to know details about the subjects they read on signboards or billboards or leaflets such as medicinal plants, improved oven, IPM, various fish and wildlife species with their scientific names and particulars, etc.

4.1.6. Exhibitions and demonstrations

The exhibitions and demonstration plots were found to be effective to motivate visitors to adopt environment-friendly agricultural techniques/practices in a sustainable manner. Local people are now planting more seedlings of fruit, timber and medicinal plants. Through the demonstrations of IPM, people are using these techniques more frequently. They are now much more aware of bio-gas and improved oven, and they frequently come to the project office to learn more about these techniques. The villagers have also requested that the project personnel organize more of these sorts of exhibition.

People also come to the central project nurseries to collect medicinal plants more often. In addition to that, the medicinal plant demonstration plots also encouraged the establishment of nurseries at community and private-levels in the project area. In Arua, seven private and two community level nurseries have been established, while in Kapasia-Trishal sites six private and two school-level gardens have been established.

People of the local area highly appreciated the turtle conservation program through the central hatchery in Arua. They are now aware of turtle conservation issues. This level of awareness encouraged the establishment of the two hatcheries at the community level in the natural environment.
environment, one in Bawlikanda (Arua) and the other in Uttarpara (Gopinathpur). Three turtle species with 150 individuals were recorded in these stocks in 2003. Moreover, turtle hunting has been completely banned in the project areas. If the hunter comes from another area, local people take necessary actions against hunting. No turtle is now found in the local market. The population of turtle has also increased in the Manikganj project area.

4.2. Madhumati Floodplain

4.2.1. Students and young people

In the awareness activities a good amount of resource and concentration was allocated for the students. Establishment of environmental clubs and libraries, and publishing of leaflets and booklets are a few outputs of such attention.

The booklets published under SEMP created enthusiasm among the young people about the environment around them. They showed more interest in identifying and listing plants, insects and wildlife. In response to the fish conservation awareness campaigns, the environmental club members were found to make regular rounds in the haats, bazars and fish collection centers to identify and assess types and volume of fish captured and sold. Visits to the museum and herbarium, and reading books borrowed from the school and club libraries also enhanced young people’s understanding about the environment and their duties to protect it.

1. Wildlife protection

There are many examples where young people showed increased interest in protecting wildlife especially birds. For example, one day some members of Surjamukhi Environmental Club, Chowaribari found that two children were carrying a couple of dove chicks in their hands. When asked, they informed the club members that they found them lying in a nearby bush and calling. The members rescued those birds and kept them in the corner of one of their class rooms in the school. They took good care of them over the next few days. After a period of nursing, when the chicks learned to fly, the students freed them. The students enjoyed the whole experience immensely.

On another occasion, a severe storm hit Rajoir in April 2003. Hundreds of birds like kani boga (pond heron, Ardeola grayii), dhushor bak (grey heron, Ardea cinerea), bhat shalik (common myna, Acridotheres tristis) and others entered into the premises of Bhennabari Primary School. Teachers told the students to keep those birds safe. The
students, therefore, guarded those birds the whole night. In the morning when the storm ended, the birds flew outside. The school children as well as the teachers were overwhelmed with the wonderful sight of the flying flocks.

2. Environmental knowledge

Student in the project site could not get general knowledge or environment related books easily before the project. Under the SEMP, a good number of books were donated to some local school and environmental club libraries. Students and young people of the project area and from the surroundings visited those libraries and borrowed books to read. This initiative also encouraged the local NGOs to distribute books to the local clubs for enriching their libraries. As a result of these, the knowledge base and interest developed among the young people was very encouraging.

3. Fossil fuel

The youth clubs also motivated their neighborhoods to reduce the use of fossil fuel like peat, traditionally used for cooking in the locality. Peat is present in a sizeable area in the project area. In places it is a couple of meters deep under one meter layer of soil and is extracted just by removing the topsoil. After learning how burning peat in the kitchen may cause respiratory problems for family members, the youth club members decided to visit each household in the neighborhood to discuss the potential health risk and hazard caused by burning peat. The members visited all households in
Kaligram, Goalgram, Beel Chanda and Sanpukuria villages. A majority of households reported that they were not aware of the lasting detrimental effect of the fume emitted through burning of peat. Several households also committed that they would not use peat in future and would discourage others from using it. They were also suggested that dead branches of trees, dhokalmi (Ipomea fistulosa), doincha (Sesbania bispinosa), shola (Aeschynomene aspera), straw and wetland grasses could be used as substitutes for the peat. Besides, unnato chulli or improved oven, invented by the BCSIR, was also considered to be used for efficient fuel consumption.

4.2.2. People's perception on biodiversity

The foremost desired impact of any awareness program is a positive change in the people's attitudes and perceptions. It was apparent that the SEMP activities have brought changes in people's mindset and oriented them to think in a biodiversity and environment-friendly way. A large number of direct stakeholders from different arenas of the society were participating in the project activities. In addition, many were receiving the publications and awareness materials though they were not directly involved with the project.

1. Hunting

According to the Wildlife (Preservation) (Amendment) Act 1974, hunting or damaging of most of the wildlife is prohibited in Bangladesh. Some people who have power and contact with the upper levels often hunt in the beels. Some of them, locally called babu, come by car and hunt the migratory birds. But the people of the project area, namely those of Dodhara, Chowaribari, Nanikhir, Sanpukuria and Satpar villages are now very much aware of it. They declared that "...if we see a hunter hunting birds, we protect them with others." Moreover, Satpar, Betgram, Ujani, Kadambari, and Chowaribari villages and WRTC compounds are now protected from bird hunting.

2. Snail conservation

Snails are one of the important natural resources in the beel area. Many people in Chanda Beel depend upon snails for their existence, and day-by-day the extraction rate is increasing rapidly. Women are also involved in harvesting snails. People, however, collect all sizes of snail. Sustainable use of snails has been the topic of many awareness meetings, rallies and billboards. Many snail harvesters are now aware that the very small size snails are their future assets. Under the SEMP, they are now trying to motivate people to a larger extent to establish snail conservation areas in Betgram beel area, Kadambari Asram kua and beel area, Sanpukuria Bowser canal and Ranapasa canal sites.
3. Conservation sites

By the plantation program of native species and vegetation fencing, a number of conservation sites were developed with the local stakeholder in Mesobhita, Ujani, Luxmipur, Dodara and in Ranapasa canal site, Senkhali canal site, Kadambari Asram places and Malikuri canal site in Chowaribari Beel complex. These were indicators of people’s enhanced awareness and understanding and a change in perception of biodiversity, conservation and natural resource management.

4. Impacts on individuals

Impacts on individuals were also observed in terms of wildlife conservation. Sohel Mollah of Ujani lived adjacent to the Ujani biodiversity conservation site. He used to make shoes and sandals with monitor lizard or kalo gui (Varanas salvator, locally called gharial) skin before the start of the SEMP project. He used these shoes himself, and also presented those to his friends living in Dhaka. Outsiders also used to kill this lizard for its valuable skin. The SEMP awareness programs and formation of village committees saved this nationally ‘Endangered’ animal from such illegal hunting. In these programs, the project staff briefed the participants about wildlife and their necessity in environmental balance. Mr. Mollah, a graduate person, accepted this cordially. He promised not to kill kalo gui in future and would help to find a way to save the species.

4.2.3. Fishery resources

As the primary use of beels is fishing and collection of other aquatic organisms, it is expected that the effect of the awareness raising activities will be observed on the fisheries management activities. Information and messages related to sustainable fisheries management, causes of decline in fishery resources, and ways and means to reduce fish decline have been widely disseminated through different kinds of communication media. The environment and biodiversity conservation clubs regularly visited markets, growth centers and fish collection centers to identify and assess types and volumes of fish captured as mentioned earlier.

Through awareness campaigns, the people were motivated to adopt some important sustainable practices. Efforts were made to motivate the people that the wetlands and the resources they harbor are people’s responsibility. If the community does not take care of fish resources of the wetlands they will automatically decline and would be extremely hard to retrieve. At the end of
workshops and training sessions, the participants set some fish fries free in the open beels. This activity created a lot of enthusiasm among the local people. So far, three landlords and kua owners have released a large number of fish fries in the open water bodies.

Kuas in the project area were netted thrice in a season if they were not dried out. This had a very adverse impact on the remaining fish populations. By stopping the third netting it was possible to conserve some fish fries and brood fish. The project tried to motivate people to give up this harmful practice. But, as people’s livelihood dependeds on this, it was difficult to motivate the people completely. However, some local elites like members and chairmen of UP have been motivated.

The impacts of kua related awareness campaigns on individuals were very encouraging. A few examples could highlight this. Asutosh Bala of Betgram village is a fisherman of Chanda Beel. He owned three kuas with a total area of 2.3 acres. In response to awareness campaigns, he harvested his kuas by netting only, but no dewatering in successive four years starting from 2001. Moreover, he released fingerlings in his kuas every year (8,000-10,000 fingerlings/year) to raise the production.

Santosh Kumar Baroi of Betgram and Akij Baidha of Beel Chanda villages had kuas of 2.7 acres and 11.7 acres, respectively. They participated in different awareness programs under the SEMP where fish conservation was highlighted. They were motivated by those campaigns, and started harvesting fish only once from the kuas instead of the more common three-time netting. They also left some brood fish in their kuas for natural fish reproduction. Similar one time netting and no dewatering was followed by YMCA, Kaligram (1.7 acres of kua) and Kadambari Ganesh Pagal Asram (3.3 acres of kua).

In Nayakandi village, Alomoti Bairaghi studied up to primary level. She used to work in the Chanda Beel area and used to catch small fish or fish fries. But after the SEMP awareness campaigns, she understood the effects of small fish harvest, and now she does not catch small fish/fish fries. Besides this, she prohibits others from catching small fish. These exemplify the impact of the fish conservation campaigns on the individual level, which consequently increased the fish production in the beels.
4.2.4. Plant resources and plantation

Even in the late 1990s, the local community preferred to plant only woody tree species for timber. But now they are aware of the importance of medicinal plants as demonstrated in different campaigns including the Tree Fairs. Government departments also realized the significance of plantation programs with medicinal plants. For example, Agriculture Extension Department and Forest Department also showed interest in the SEMP medicinal, native, fruits nursery program. They officially invited the SEMP team and gave all kinds of logistical support to participate in the Tree Fair. Many students, government officials, NGOs representatives, common people, kabirajs regularly visit the SEMP medicinal plots, take technical support and collect medicinal saplings. Gopalganj DC office complex, Muxsudpur upazila complex and Rajoir Hospital complex established medicinal gardens which were facilitated by the SEMP team in response to their official request.

In addition to the impact of SEMP demonstration of medicinal plants on larger bodies, individuals were also encouraged to establish these at a private level. Asalata Baroi of Beel Chanda collected medicinal species from the project medicinal plots and made a medicinal plant garden in her home. She provided treatment to local people from her medicinal garden and could earn from this as well. Similar plots could also be seen in Kadambari, Barampalta and Ujani were three poor women developed medicinal plant gardens in their homesteads after being trained under the SEMP.

4.2.5. Biodiversity conservation

With gradual realization of the importance of biodiversity in our existence the people of the project area are now motivated enough to conserve their biodiversity. They now actively take part in the biodiversity conservation activities. This can be illustrated by two examples showing the gradual shift in people’s outlook to conserve biodiversity.
Case 1

Before the VEC formation in Ujani village, project staff had a discussion with the local people. Along with that they also carried out a reconnaissance. People said that monitor lizard or kalo gui (Varanas salvator, locally called gharial), an 'Endangered' species in Bangladesh, was available there, but was harmful for them as it destroyed their domestic animals (like chickens, ducks and goats, and pond fish). So, they did not want to conserve this reptile. But the lizard was available only in that village of the project site and was declining very rapidly. So the project staff discussed with Fatik Mollah, an elite and also the land owner of the site. He said that in 2001 and 2002 he killed more than fifty kalo gui. But he did not kill just for his amusement, but whenever this lizard came out to catch fish from their ponds and to catch domestic animals, he had to kill them. This particular local problem demanded an effective local solution.

As a measure of solution, Ujani Biodiversity Conservation Committee was established, that included landowners, elite persons and others as its members. The committee concluded that if the lizard had plenty of food in its own habitat, it would not come out and attack human interests. So the committee decided to allocate six ponds for kalo gui. Till now the project staff have been assisting the committee for looking after the conservation sites. The committee has been motivated enough to continue to maintain the sites even after the completion of the project.

Case 2

Environmental club activities also helped people to change their attitudes and practices often through discussion and thought-provoking dialogues. Bird hunting was the favorite hobby of Sunit Golder of Baniarchar since his childhood. He could do it efficiently with various traps and tools, and by climbing trees. He earned money by selling birds, and sometimes enjoyed eating the prey with his family and friends. Some times he used to go 10 to 15 km, far from his house to hunt birds. Sunit also used to eat khatas (Bengal Fox). In 2001, an environmental club formed at Baniarchar (Gangshalik Environmental Club). The club members helped Sunit understand the negative aspects of bird hunting (birds eat insects, thus increase crop production, and contribute to land fertility from their droppings), killing and consumption of wildlife (khatas eats rats, and khatas meat is bad for health) and the importance of birds and wildlife in human society. He understood and took it positively, and became an environment-friendly man. He gave up his favorite hobby of killing birds and also does not eat khatas meat any more. He also participates in club programs when gets free time.
4.2.6. Environmental day observance

The environment related days were not often observed in the project area before the SEMP initiatives there. Local NGOs and other institutions are now much more active in this regard. Now they observe these days individually or jointly with other NGOs or government departments. Since 2002, organizations and institutions, namely Local NGOs (Gano Bikash Karjakram, Lotus, Pradip Shikha and Sadesh Unnayan Sangstha), educational institutes (Bhennabari High School, Chowaribari School, Jalirpar School, Kadambari High School, Kasalia High School and Singa High School), local social clubs (e.g. Campaign for Sustainable Development, Ekata Club and Nabarun Club) and others have been organizing discussion meetings and rallies on environment related days.

4.2.7. Awareness tools

Billboard and signboard establishment was a great success for the SEMP in terms of creating a concrete, vivid and bold impression on the local community and the visitors of the project site. It was further supported by the increasing interest of the local NGOs and government offices which became aware of the effectiveness of these graphic awareness tools. CARITAS, one of the largest NGOs in Bangladesh, understood the importance of billboards and began initiatives for establishing these in Baniarchar village. They requested the SEMP project team for providing them with ideas and environment related messages so that they could produce and erect billboards at selected points. In the local NGOs coordinated meetings at the upzila level in Gopalganj, Muksudpur and Rajorir to discuss billboard messages and everyone emphasized the importance for awareness raising in the community. The UNO of Muksudpur recently recommended that more billboards should be established on the Gopalganj-Bhanga Biswa Road.
Other awareness materials like leaflets, wall-magazines and newsletters also influenced other institutions to produce their own materials. Campaign for Sustainable Development (CSD) started publishing *Chanda Beel Barta* since 2002 which was conceptually similar to *Jalabhumi Barta* published under the SEMP. Educational institutions, like Chowaribari High School, Singa High School and Rahuthor High School produced hand written wall-magazines on different environmental occasions. Gano Bikash Kajrakram jointly organized an awareness raising workshop with Bangladesh Auxiliary Services for Social Advancement and CARITAS, and distributed leaflets for conservation of fish resources.

### 4.2.8. Environmental folk dramas

Introducing environmental issues through folk dramas/popular theaters was a new concept for the people of the Madhumati Floodplain. After attending the environmental drama organized under the SEMP, different organizations and individuals were encouraged to carry out such activity on their own. For example, in November 2004, Gano Unnayan Prachesta conducted an environmental drama at their own compound performed by their own staff. In 2003, teachers and students of Nanikhir High School performed an environmental drama on the school premises. Babu Sapan Biswas (Sanpukuria, Satpar) was so inspired by SEMP’s environmental dramas that he prepared a script and performed it with other local culture-minded people in Sanpukuria School field in December 2003. Different groups and organizations in the project area (e.g. Baniarchar Nabarun Club, Jalirpar Charpara Club, Kaligram Jubo Club, Patkelbari Jubo Sangha and Satpar VRMC members) requested the SEMP team to continue folk drama activity in the area, and also to provide them technical and financial support for building their own drama teams.

Most of the spectators learned from the environmental dramas that over-harvesting of wetlands' natural resources, hunting of
birds, harvesting of brood fish, deforestation, use of chemical fertilizers, killing of wildlife are unwise and harmful for the environment and human beings. Many of the community people informed the SEMP team that they started planting saplings of medicinal plants, and fruit and timber trees in their fallow lands and stopped killing wildlife for amusement.

4.2.9. Gender consideration

Women play a vital role in the wetlands as important resource users. So involving them in the project planning, implementation and monitoring process is crucial for the success of any community based project. Hence, a definite gender policy was adopted under the SEMP (Farzana et al., 2004).

Awareness raising was identified as one of the most important parts of the SEMP initiative. It was thus important to involve women, especially poor and marginal ones at every step of the awareness interventions. Women of the project area participated in the Participatory Action Plan Development (PAPD) workshops, and helped in developing proposals for conservation and sustainable use of wetland resources. Possible awareness interventions were also developed from those workshops. Subsequently, a large number of awareness programs were organized, and local women (including young girls/female students) took part in those meetings, workshops, environment related day observance, rallies, video programs, exhibitions, fairs and preparation of awareness tools, as participants, audience, and sometimes as organizers. The most popular awareness program, the folk drama, was performed by female actors and women comprised a significant portion of the audience.

A good example of the enhanced awareness among the poor women was seen when they were organized into vulnerable groups and were motivated to engage into a sustainable livelihood often through micro-credit initiative. The enthusiasm created among the women was further demonstrated by their spontaneous participation in various training programs on nursery, gardening, eco-friendly agriculture and alternative livelihood options like baiera. As a result, a number of female group members established nursery plots for demonstration, and some other poor women developed medicinal plots in their own homesteads. The rural women have been involved in managing small conservation areas established in the project site. Women’s indigenous knowledge of conservation and management of wetland resources has been emphasized in the conservation process, like in Khetbila, Nayakandi, Patkelbari, Betgram and Dudhara villages.
Young girls participated in awareness activities as members of environment clubs along with boys in schools and colleges. They also actively took part in environment related programs, like rallies, meetings, debates, drawing competitions, dramas, workshops, wall-magazine publication, plantation programs, nature walks and excursions.

The large scale women's participation could be explained primarily by religion. The Hindus comprised 76% of the total population of the project area. So the traditional *parda* practice, restricting women to go outdoors, was almost absent. Moreover, the literacy rate of women in the project site was moderate and women were aware of the necessity of education. The government initiatives (compulsory primary education, scholarship for female students at higher secondary level) and assistance of various NGOs in educating female children were contributing towards raising the literacy rate of women. Thus, environmental awareness among women in general has increased considerably in a relatively short period in the Madhumati Floodplain project area.
CONCLUSION AND RECOMMENDATIONS

Awareness and education programs for the community people are mandatory for any environment management project. These could be a part of a big project intervention or could be a separate major intervention themselves or a combination of both. In the SEMP project in the floodplains, the last approach was followed. The awareness programs conducted in the project areas have created some good impacts on the local community in general as well as the target groups. The awareness movement carried out under the SEMP through, for example the billboard establishment, stage performances of folk dramas, campaign among focus groups and knowledge sharing by different occupations was found to create enthusiasm in the community.

The choice of resource persons was thoughtful. The participation of local knowledgeable persons and leaders was appreciable and effective. The involvement of local government officials was important to create linkages between them and the local communities. Such participation also ensured the formers’ endorsement on project interventions. Creating awareness among the students through school level programs and establishing nature clubs was also a notable success of the project.

For the sustainability of the project success, the maintenance of the level of achieved awareness is very important. From the experience of the present awareness interventions, the following recommendations are suggested.
1. Use of media
   a) Ideas of awareness raising activities should come, at least partly, from the local people. They have to be facilitated properly to generate ideas.
   b) Innovative ideas should be used like folk dramas. It would be much appreciated to have drama groups formed with the local people, as done in the Manikganj and Trishal-Kapasia sites. Other initiatives may include photo exhibitions, big screen film shows on nature, slide shows on natural photography including project interventions and so on.
   c) It is better to have more than one folk drama highlighting different environmental issues from different perspectives, instead of accommodating all issues in a single show.
   d) Video documentaries are effective media, thus should be shown frequently. It would be very appealing to show project intervention videos to the local community where the local people are filmed. It would help them to feel acknowledged. Topics of the video should be simple and should be narrated in simple Bangla.

2. Demonstration plots
   a) These are effective means to raise awareness. Plots of breeding grounds for birds, display ponds for fisheries, beel conservation and similar interventions could be done extensively.
   b) Demonstration of alternative livelihood like baira is also effective in informing people about the income-generation possibilities and ways of overcoming their problems.

3. Target groups
   a) Campaigns with focus groups like school students, cowboys and fishermen should comprise major parts of the awareness activities as opposed to general campaigns.
   b) Special emphasis should be given on young people. Tools should be developed specifically ‘for them’ and preferably ‘by them’. Activities, like drawing competitions, debates, excursions and photo exhibitions should be organized frequently through the nature clubs. Their ideas should be used to produce awareness materials like billboards, posters, etc. Sustainability of these nature clubs is vital for continuous awareness activities among the youth. Therefore, these clubs should be fully functional before the termination of the project.
4. Resource persons

a) Involvement of local knowledgeable persons should be higher including local leaders, village committee (VC) members and religious leaders along with government officials.

b) Enlightened resource users should be encouraged to talk. 'Why not to catch brood fish' better be told by a fisherman who does not catch those anymore.

5. Evaluation

a) Participatory monitoring and evaluation system should be strengthened and properly used for awareness activities. Specific measurable indicators should be identified.

b) Impact assessment of the awareness interventions should be more quantitative. Baseline data will be useful in this regard. For example, at the beginning of the project if 10 gharials were killed over a specific period in a village, what is the statistic now, after a given period of the awareness campaign?

6. Sustainability

a) Plantation and its management system is an effective concept as it is associated with the income generation of the local people. It is also vital for the sustainability of the VCs. However, a project as vast as the SEMP should not rely only on one major intervention.

b) Sustainability of the VCs is vital for the project. Before the wrapping up of the project activity altogether, strength of those committees should be tested to ensure the expected level of awareness among these local leaders.

c) Awareness programs alone cannot be sufficient to halt any destructive activity. This could be effective in reducing damaging effects when combined with other measures.
REFERENCES


