Awareness Raising in Sustainable Haor Resource Management

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IUCN - The World Conservation Union
Bangladesh Country Office
2005
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This book is published with the financial support received from Sustainable Environment Management Programme (SEMP), Ministry of Environment and Forest, Government of Bangladesh and UNDP.

Published by: IUCN Bangladesh Country Office

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ISBN: 984-8574-09-3

Photographs: IUCN Bangladesh and CNRS

Design and Layout: Sheikh Asaduzzaman

Printing: Progressive Printers Pvt. Ltd.

Available at: IUCN-The World Conservation Union
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Foreword

Bangladesh is a country of wetlands. But unfortunately, these ecosystems are degrading rapidly due to unsustainable resource utilization systems, organized ill-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 program is, therefore, a crucially useful activity 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 taken under the Community Based Haor Resource Management project, a component of the Sustainable Environment Management Programme. It details out the justification of such interventions, approaches considered and the chosen activities to enhance people’s awareness level at the project areas
in the haor basin. 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 would help other agencies and individuals interested in undertaking community based awareness programs, especially in developing countries.

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November 2005
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In the Community Based Haor 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. Center for Natural Resource Studies (CNRS) has been associated with IUCN Bangladesh in implementing this project in some selected haors in the northeast of Bangladesh.

This report is an output of the awareness raising initiatives taken under the SEMP over its first six years. The preparation of 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 Pagnar, Sanuar-Dakuar and Hakaluki Haor areas. We duly appreciate their efforts.

We also express our gratitude to Golam Kibria, Anil Purakayastha, Alamgir Rahman, Yahya Sazzad, Molay Sarker and Md. Helauddin for implementing the awareness raising activities in the field. We gratefully appreciate the cooperation extended by Eric Lundborg during
the preparation of the final manuscript. We would like to thank Nuzhat Jabin and Sheikh Asaduzzaman for their special efforts in getting the book printed on time.

IUCN Bangladesh gratefully acknowledges the financial support received from the Ministry of Environment and Forests, Government of the People’s Republic of Bangladesh and the United Nations Development Programme (UNDP) for the Community Based Haor and Floodplain Resource Management Projects (SEMP Components 2.2.1/A & B) and the publication of this report.

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# Table of Contents

1. **INTRODUCTION**
   - 1.1. Background 01
   - 1.2. Project sites 02
   - 1.3. Need for awareness programs 05
   - 1.4. Scope of the report 06

2. **APPROACH** 07
   - 2.1. Identifying the issues 07
   - 2.2. Knowing the target groups and stakeholders 08
   - 2.3. Setting up targets 09
   - 2.4. Developing awareness tools 09
   - 2.5. Planning and execution 11
   - 2.6. Monitoring and evaluation 12
   - 2.7. Assessing the impacts 12

3. **ENVIRONMENTAL AWARENESS INITIATIVES** 13
   - 3.1. Campaigns among the grassroots 14
   - 3.2. Programs at the school level 16
3.3. Environmental knowledge sharing workshops 18
3.4. Environment related day observance 19
3.5. Awareness material development 20
3.6. Demonstration of swamp forest regeneration 22
3.7. Demonstration activities 23
3.8. Folk drama performance 26
3.9. Cowboy meetings 27
3.10. Establishment of nature clubs and libraries 28
3.11. Participation in exhibitions 28
3.12. Video documentary 29

4. IMPACTS 31
4.1. Folk drama 32
4.2. Wildlife protection 32
4.3. Fisheries 33
4.4. Swamp forest regeneration 34
4.5. Medicinal plants 35
4.6. Floating nurseries 36
4.7. Renewable energy options 36
4.8. Gender issues 38
4.9. Village Committees (VCs) 39

5. CONCLUSION AND RECOMMENDATIONS 41
REFERENCES 44
Abbreviations, Acronyms and Local Terms

*Bathan* A practice where people use lands/kandas around perennial beels in haors for cattle/buffaloes grazing or duck rearing in dry season (December – April)

*Bazar* A permanent market

*Beel* A saucer-shaped depression, which generally retains water throughout the year

*CNRS* Center for Natural Resource Studies

*Ejmauli land* Common land resources

*GoB* Government of the People's Republic of Bangladesh

*Haor* A back swamp or bowl-shaped depression located between the natural levees of rivers and may consist of a number of beels

*IUCN* The World Conservation Union

*Jal* Net

*Kabiraj* Herbal healer (Vedic school)

*Kanda* Ridges that are higher than the haor basin but lower than homestead land

*Khas land* Government-owned land

*MoEF* Ministry of Environment and Forests

*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
knowledge, perceptions of the problems and solutions, and behavior and attitude towards certain environmental issues. Furthermore, measures should be taken to ensure adequate participation of women at all levels of awareness campaigns for satisfactorily attaining the objectives.

The SEMP, a true outcome of the NEMAP, was initiated in the late 1998 which included, among other components, the Community Based Haor Resource Management. This project is being implemented by IUCN Bangladesh, in association with CNRS, initially in some selected parts of Pagnar and Sanuar-Dakuar Haors of Sunamganj District, and later on the same has been extended to Hakaluki Haor located in Moulvibazar and Sylhet Districts. Activities undertaken by the project would contribute to the attainment of the overall objective of the SEMP, that is, furthering the process of identification and field validation of the key environmental issues, addressing environmental degradation through conservation of resources, promoting sustainable development and generally raising the quality of human life as an integral part of the overall strategy of development and environment regeneration. The project specifically envisages stopping and reversing the current trends of wetland degradation, ensuring sustainable use of wetland resources, ensuring people’s participation in formulation and implementation of management plans, improving the quality of life with special focus on women, developing local wetland centers for ecosystem management and ensuring capacity building of the community for the management of natural resources and sustainable uses. One of the major ground works in doing so was educating the people about environmental issues and concerns. Thus, the awareness campaign was of great importance in this community based natural resource management initiative.

1.2. Project sites

Three major haor sites were selected under the IUCN Bangladesh -SEMP component (2.2.1/A). Pagnar Haor of Fenarbak Union and Sanuar-Dakuar Haor of Sachna Bazar Union in Jamalganj Upazila of Sunamganj District are two sites where the project first started (Map 1). The first haor consists of 22 villages with around 12,000 people and the second consists of 20 villages with about 16,000 people. Both sites have diverse wetland features, like small and medium-size beels and canals, secondary rivers and huge seasonally inundated lands where people do fishing in the wet season and cultivate rice in the dry season. In addition, there are patches of degraded swamp forests in the khas lands and on kandas. Pagnar Haor site is a deeper flooded area as compared with Sanua-Dakuar Haor. Most villages of the first haor are exposed to the wave action in the monsoon causing drastic homestead erosion.
Map 1. Pagnar and Sanuar-Dakuar Haors – the project sites of the Community Based Haor Resource Management Project in Jamalganj Upazila, Sunamganj District. (Source: CNRS, GIS Unit)
Map 2. Hakaluki Haor – the project site of the Community Based Haor Resource Management Project in Sylhet and Maulvibazar Districts. (Source: CNRS, GIS Unit)
Some parts of Hakaluki Haor were included in the SEMP in July 2001 (Map 2). This haor is a complex system of more than 80 inter-connecting freshwater beels in a shallow basin. It is one of the largest haors of Bangladesh with great economic and ecological significance. It is a valuable source of freshwater fish which is vital for the livelihood of the local people. In terms of ecology, the haor is a major resting place for thousands of migratory birds in winter. The important beels here are Chatala, Pinglarkona, Haorkhal Footi and Paula. For project implementation, relatively smaller, manageable and representative segments of the haor ecosystem were selected. The project mostly concentrated in the highly degraded parts of Hakaluki Haor: Ghilachara Union of Fenchuganj Upazila, Bhatera and Bhakshimali Unions of Kulaura Upazila, Jafarnagar, Paschim Juri and Sujanagar Unions of recently formed Juri Upazila, and Talimpur Union of Baralekha Upazila. The total number of villages in the project area is more than 30 with a population around 35,000.

1.3. Need for awareness programs

It is very difficult, and virtually impractical, for the sustainable management of natural resources without the involvement of the people within the ecosystem. It is important that those people get engaged in every step of sustainable development, from problem identification up to the implementation of project interventions. Similarly, in the haor areas, community people are the key players in the management of the haor resources. However, their role in relation to their problems had not much been identified before the inception of the SEMP. For proper maintenance and use of the resources, they should be made conscious and capable of playing their proper role. It is also important to bring changes in the policy and execution levels to keep the ecosystem in order. So, it was envisaged that the environmental awareness and education for the user community and other stakeholders is an effective means to check the manmade depletion upon nature. Accordingly, awareness becomes one of the major activities under the present SEMP component.

The awareness activities are aimed at making sustainable management of wetland ecosystems and biodiversity efficient for improved livelihood security of rural community. 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. In the process of environmental education, individuals not only gain awareness of their environment but also acquire and exchange the 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 and awareness campaigns, community people are basically prepared for the major project interventions. In many cases awareness related activities cannot be
separated from other project interventions. For example, the awareness campaigns against dewatering of beels and not catching brood fish would in turn facilitate in establishing fish conservation areas, a separate intervention under the project.

1.4. Scope of the report

This report is a part of a series of reports documenting the major activities being carried out under the SEMP component 2.2.1/A. Awareness activities occupied a very significant proportion of the project interventions. In the following chapter, the approach considered in the environmental communication and education activities of this SEMP component are described. The major awareness measures taken under this project from October 1998 to March 2005 are included, which are followed by their impacts on the local communities and their surrounding environments. Finally, some recommendations have been suggested for future consideration.
CHAPTER 2

APPROACH

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

A number of steps need to be considered while undertaking an awareness program. These more or less could be identified as 1) issue identification, 2) target group and stakeholder identification, 3) setting up targets, 4) awareness tools development, 5) planning and execution of planned activities, 6) monitoring and evaluation, and finally 7) impact assessment. For the present project, all the above steps have been considered since the project inception, but had not been formally documented earlier. Field experience and consultation of awareness related accounts (e.g. IUCN-CEC, 2003) were useful in describing the approach taken under the SEMP awareness program 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 include 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 Pallas’s Fish Eagle and the need for their conservation in haors. Similarly, through campaigns, people and traditional fishermen could be taught about fish conservation and fisheries laws, and encouraged to stop from fishing during the breeding season.

However, in a community based project most of the environmental problems belong to the second category. For example, the enhancement of people’s awareness of swamp forest degradation should be accompanied by an increase of swamp forest coverage through community plantation initiative. Again, alternative or environment-friendly livelihood options require demonstration plots and funding options for the interested individuals or 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 issues and concerns. We need to know their knowledge level, 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. Other stakeholders (e.g. NGOs and government officials) are also to be identified in relation to the project and the above-mentioned issues should be identified for them as well.

Similar stocktaking was done for the SEMP 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 considered important for the awareness raising activities for their relevance and direct impact on the wetland and management. These groups are farmers, natural resource harvesters (e.g. fishermen, wood collectors, etc.), groups with special concerns (e.g. poor and vulnerable women groups, cowboys, etc.), students, groups of
young people, elites and wealthy people, teachers, religious leaders, local social and political leaders, local NGOs, local government representatives (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, a project implementation team would be able to identify local resource persons for awareness campaigns, like local knowledgeable persons, local political and religious leaders, members of local government bodies, invited scholars from public institutes, and school and college teachers. The teachers get involved in many awareness initiatives because they are honorable persons in the rural communities, and their opinions and views were mostly 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 identified that, they could be the motivators, trainers and could also 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-bound. 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

The constant communication with other people is a part of human existence. The important thing is what are being communicated and how it is done. So, the messages that are being conveyed and the tools that are being used to communicate them should be well-thought. The disseminated awareness messages can be divided into three broad styles, namely 1) information, 2) emotional and 3) behavior approaches. These could be explained by taking billboard as an awareness tool. The first approach focuses on giving 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. Examples may include 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 like, “If we cut one tree, we must 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, one has 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, cowboys, 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 to disseminate awareness issues among the visitors. Tree fairs and agriculture fairs organized by the government at district and upazila levels are two good examples in this respect.

Special attention should be given to the young people (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, herbaria and zoological museums. Some group-specific activities could also be organized, like art, quiz and essay-writing competitions for the school and college students on environment days. Nature walks and camping are two other activities that could be popular among school children. All these could create enthusiasm among younger generations, and thus have a long lasting impact on the society.

A number of media outlets like newspapers, press releases, magazines, newsletters, manuals, brochures, booklets, flyers, letters, radio, tapes, television, video, posters, stickers, banners, signboards and billboards could be used to spread information to the 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.

There are several other awareness tools and concepts that were considered under the present project. Erecting billboards/signboards at strategic points by market places, upazila complex, highway junctions, religious institutions, etc. with appropriate drawings 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 Pallas’s Fish Eagles 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).

Celebrating various international, national and local days or occasions is useful for creating
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 respect. Such activities can attract a large number of people without
much effort. These options should be explored as much as 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, cultural shows (e.g. folk dramas), video documentaries and
information dissemination (e.g. billboards and leaflets) were recognized as the major methods
for 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 under
the current project.

- Yearly work-plan was followed by quarterly and/or monthly work-plans specifying
  resources needed and distribution of responsibility.
- Participation of target groups, with significant proportion of women, was ensured.
- Resource persons, materials, equipments, etc. were identified and arranged well in
  advance.
- Realistic financial provision was kept for personnel, material preparation, material
  dissemination, media and venue.

These work-plans were followed while implementing various awareness interventions. The
experience gathered during execution was considered for improving subsequent work-plans
for better project performance.
2.6. Monitoring and evaluation

A Project Implementation Plan (PIP) for the Community Based Haor 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 precise, measurable and time-specific. These LFAs were used as the basis for monitoring and evaluation of all regular project activities including awareness activities. Initially, a two years’ planning was done. It was updated in a revised PIP later on and the LFAs for the extended haor sites in the Hakaluki Haor area were included.

People’s involvement either as contributors, participants or as audience is the main concern in any awareness program. Informative participants’ records have to be kept in the case of smaller groups like 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 depends on the methods used, which expected to be conceptually appropriate 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 ongoing activities like participatory observation, stakeholder consultation, process documentation, and occasional PRAs. These helped to make the programs more effective, especially, at the early stage of the project.
CHAPTER 3

ENVIRONMENTAL AWARENESS INITIATIVES

A significant number of environmental awareness programs were conducted in the project areas over the reporting period. Most of these programs targeted grassroots people of various occupations/background like fishermen, farmers, day laborers, fuel wood collectors, poor women and others. In addition to this, programs at the school level, environmental knowledge sharing workshops, observance of environment related days, development and publication of environmental awareness materials, demonstration of different alternative options, meeting with the cowboys, issue based folk/popular theatre performance and establishment of nature clubs were among the major interventions.

UNO, UP Chairman and government officials attending awareness session at Jamalganj

The program contents covered general environmental issues and specific issues associated with the haor basin, like degradation of swamp forest, dewatering of beels, etc.
The interpersonal awareness programs 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 speeches on environmental conservation, protection, management issues and on the role of the community in nature conservation issues. These were followed by open or group discussions, video show, etc. Awareness programs conducted in the project sites are summarized in Table 1.

<table>
<thead>
<tr>
<th>Awareness campaigns</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campaigns among the grassroots</td>
<td>150</td>
</tr>
<tr>
<td>Programs at the school level</td>
<td>24</td>
</tr>
<tr>
<td>Environmental knowledge sharing workshops</td>
<td>29</td>
</tr>
<tr>
<td>Environment related days observation</td>
<td>23</td>
</tr>
<tr>
<td>Folk drama performances</td>
<td>24</td>
</tr>
<tr>
<td>Cowboy meetings</td>
<td>20</td>
</tr>
<tr>
<td>Other workshops and meetings</td>
<td>5</td>
</tr>
</tbody>
</table>

3.1. Campaigns among the grassroots

A total of 150 awareness campaigns at the grassroots level were conducted in the project sites. In these programs general environmental issues as well as specific local issues were discussed. Some major issues were included in these programs, like the importance of natural/wetland resources (wildlife, fish and flora), threats to natural resources, causes of environmental degradation, options for protecting these assets, habitat destruction, wise-use of wetland resources, protection and development of agriculture, social responsibility to protect the environment, importance and strategy of participatory natural resource management, available renewable resources in haor basin, and present and past status of a haor (e.g. Hakaluki Haor).
Specific topics on fisheries resources, birds, swamp forests and others are listed below.

i) Fisheries resources - diversity, causes of fish decline, consequences of dewatering, impact of harmful fishing gears, options for improvement, importance of fish conservation area, fishing rules in Bangladesh and turtle conservation;

ii) Birds - bird hunting, importance of migratory birds and Pallas's Fish Eagle conservation;

iii) Swamp forest – importance, need for plantation, conservation area establishment and protection of natural regeneration;

iv) Erosion proofing - wave action, importance of proofing and role of swamp forest;

v) Institutionalization - village committees (importance, responsibilities in haor conservation), and Wetland Management and Training Center.

vi) Other topics included organic farming as an alternative agriculture practice and solar panel as a renewable energy option. Role of different groups like farmers, fishers in protecting the environment were also discussed when meetings were arranged with a particular group. Role of children in conservation was talked about especially when children were among the participants. Responsibilities of different government bodies, like Department of Fisheries, to increase fish production were also highlighted in several meetings.

In total about 25 thousand people participated in those meetings of which around 14 thousand were in Pagnar and Sanuar-Dakuar Haors and some 11 thousand in Hakaluki Haor. In most of the occasions participants comprised men, women and children. In these meetings women comprised 10-30% of the mass. However, meetings focusing on particular resource user groups (e.g. farmer and fishers) were exclusively participated by men.

Discussions in these programs were facilitated by local knowledgeable persons, professionals, government officials (UNO, UAO, UEO, ULO, UPO and RDO), UP chairmen and members, school teachers, local leaders, resources users, journalists, other NGO staff and SEMP project staff. Through this process, the government officials got a chance to exchange their views with the local people on various problems and issues of the area. On the other hand, the community people got the opportunity to express their specific problems to the
concerned government officers. In addition to speeches by the invited people and subsequent discussions, media such as video documentary shows, audio, posters, banners and leaflets were also used in these programs. Flipcharts, boards and other writing materials were used to facilitate the presentations and discussions.

3.2. Programs at the school level

Special attention was given to the schools because students are the future leaders and are also able to positively influence their parents by encouraging use of environment-friendly items and services. Four primary schools (Jamalganj Kindergarten, Noagaon Primary School, Bade Deuly Government Primary School and Judistipur Government Primary School), one girls’ high school (Jamalganj Girls’ High School) and one boys high school (Nabin Chandra High School) in different villages of Jamalganj and Kulaura Upazilas were selected for conducting awareness programs with school students.

Most of the general topics mentioned in the previous section have also been discussed in the school level awareness meetings. Besides these, the students discussed issues like, role of students in environment protection, importance of environmental education, effects of pesticides, destruction of bird eggs and nests, and conservation area for birds and fish.

Eight school level awareness programs were organized in Jamalganj and 16 in Hakaluki Haor sites. A total of around 5,200 people, almost all students, participated in those campaign programs organized in the local schools. Concerned teachers also participated and were 5-7% of the audience.
These programs were facilitated by government officials (UNO, UEO, UAO, UFO and RDO), UP chairmen and members, headmasters, school managing committee members, school teachers, college principals of the locality, local leaders, local knowledgeable persons, journalists and SEMP project staff. In addition to the talks by the invited people, additional media used included video documentary shows, audio, posters, banners and leaflets. Flipcharts, boards and other materials were also used to facilitate the presentations and discussions.

An art competition was organized for the students of Jamalganj Kindergarten, Jamalganj as a part of the World Environment Day observance on 5th June 2003. The topic of the competition was 'Nature and its Conservation.' The school authority selected the participants. The drawings were evaluated by the UNO of Jamalganj, school authority and representatives from SEMP staff. Best three contestants were awarded for their performance.

A quiz competition was arranged in Jamalganj Girls’ High School on 7 February 2005 to observe the World Wetlands Day 2005. Students from Jamalganj Girls’ High School and Jamalganj High School participated in that competition. Questions on wetlands in general, its biodiversity and geology were asked. The group from the girls’ high school won the first prize.

On 10 February 2005, an essay competition was organized in Chakapan High School and
College in Kulaura to mark the World Wetlands Day 2005. The topic of the essay was ‘Aamar Dekha Hakaluki Haor’ (Hakaluki Haor as I have seen). A total of 32 students, divided into two groups (Class VI-VIII and Class IX-XII), participated in that competition. A teacher and SEMP staff joint committee evaluated the papers and ranked top three from each of the two groups.

3.3. Environmental knowledge sharing workshops

In the environmental knowledge sharing workshops the major emphasis was given on the school teachers specially the primary school teachers. Teachers were involved because they play a vital role in building the intellectual foundation among the children and are respectable in the society. Other community groups were fishermen, farmers, landless people, day laborers and housewives. Local elites, journalists, government officials, UP chairmen and members of the project areas also participated in some workshops to share their understandings.

Out of 31 workshops 25 were organized in the Jamalganj area and six in the Hakaluki Haor site (Kulaura). A total of around 600 people participated in those workshops organized at local regional training centers, upazila auditoriums, UP offices and in public meeting places in different villages.

Rally marking the World Wetlands Day 2003

The participants were informed about the environmental issues in general, often in the form of a keynote speech by the resource person. The participants were then divided into small groups which worked on local environmental problems and were facilitated to work out possible solutions and to suggest possible interventions. In case of the teachers, they further worked out the role of teachers, other agencies and the local community in implementing the
interventions they suggested. Handouts and posters on wetlands and biodiversity conservation and other environmental issues were distributed among the teachers so that they could use these materials to enhance the knowledge of the students.

An indigenous knowledge documentation workshop on *haor* was organized in Jamalganj Upazila to collect the native knowledge from the community. The participants were community people from different background. The workshop produced many interesting facts such as preservation of dry fish with *bishkatali* plant (*Polygonum* sp.) instead of DDT and other pesticides, Pallas's Fish Eagles arrive at *haor* on 12 *Bhadra* (the fifth month of the Bangla year, the date corresponds to 27 August) and *karoch* (*Pongamia pinnata*) trees could be useful in fish conservation in *beels*.

3.4. Environment related day observance

Various environment related days, namely the World Wetlands Day (WWD, 2 February), the International Day for Biological Diversity (IDBD, 22 May), the World Environment Day (WED, 5 June) and *Matsho Pakkha* (fisheries fortnight, FF, observed nationally) were observed in different ways around the year. Over the reporting period, 10 (6 WED and 4 WWD) environment related day observance programs were held in Pagnar and Sanuar-Dakuar *Haors* and 13 (1 WWD, 7 WED, 1 IDBD and 4 FF) were held in the Hakaluki *Haor* site.

On those occasions, awareness programs were conducted with the students of different schools and were also attended by respective UNO, UP chairmen and members, village committee members, local professionals and school teachers. The programs included rallies, discussion meetings, stall display, poster-leaflet distribution, video shows and use of PA systems. Some of the programs are described in the Section 3.2.
3.5. Awareness material development

A number of awareness materials were developed on different issues and topics on wetland resources conservation, and were distributed among the workshop participants (school programs, grassroots awareness programs, environmental knowledge sharing workshops and environment related day observance programs). These included charts, leaflets, flayers, banners, posters, etc. These materials included messages and information to show the importance of different natural resources and actions to be taken to conserve them. Messages in some items read "Plant trees, save the environment", "Don’t catch brood fish, don’t harm the country" and "Establish fish sanctuaries, save the fish". The messages were written in easily understandable Bangla, often rhymed, and accompanied by colorful drawings designed for the common resource users.

Three multicolored posters were published, illustrating 41 threatened birds of Bangladesh (Critically Endangered (19), Endangered (18) and Vulnerable (4)). Some of these were confined to the north-east of the country where present project sites are located, e.g. Pallas's Fish Eagle (Haliaeetus leucoryphus), swamp francolin (Francolinus gularis), lesser adjutant (Leptoptilos javanicus) and black-breasted parrotbill (Paradoxornis flavirostris). 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 posters of 2003 and 2004, respectively. On the 2003 poster the resources of wetlands and their present degraded conditions were also illustrated.
To disseminate information and messages on environmental issues to a large number of people and to develop awareness, billboards and signboards are a useful means. Hence, a good number of billboards of different sizes and laminated posters have been prepared and erected in different public places at the project sites in the haor basins. In total, 49 billboards were erected in Pagnar and Sanuar-Dakuar Haors and 76 in the Hakaluki Haor site. Each billboard contained two separate messages on two sides. In Pagnar and Sanuar-Dakuar Haors the messages covered issues like the fish conservation area, vulture and Pallas’s Fish Eagle conservation, negative impact of dewatering of the beels, against the hunting of migratory birds, dolphin protection and importance of hijal (Barringtonia acutangula) and karoch (Pongamia pinnata) swamp forests.

On the other hand, in the Hakaluki Haor site information included laws on protection of migratory birds, fish conservation (e.g. by not using fine mesh nets, not to catch fish smaller than 9 inches, not to catch fish in breeding season, and messages against beel dewatering) importance of medicinal plants, on the role of mollusks, the use of renewable energy options, saving hijal-karoch forests, and also general messages depicting importance of natural environment and its useful resources.
3.6. Demonstration of swamp forest regeneration

In the past, most of the kandas were covered with swamp trees (hijal and korach) and numerous species of grasses and reeds. However, over-harvesting of resources, clearing of swamp forests for other purposes, water control dykes and increased agriculture practices degraded this characteristic feature of the haor ecosystem.

With a goal of regenerating the swamp forests on fallow lands owned by the villages (ejmali) and the government (khas), afforestation was done in some selected areas to demonstrate the impact on the local community. Between 1999 and 2004, a total of 307,532 saplings of swamp trees (hijal and koroch) were planted in Matargaon, Khujargaon, Rajapur, Fenarbak, Udaypur, Lalpur, Kashipur, Gangadharpur, Chhoynara, Hotamara, Binajura, Bhatiaduptpur, Nazimnagar, Fekulmahmudpur, Polock, Kalibari and Radhanagar villages under Fenarbak, Beheli and Sachna Bazar Unions of Jamalganj Upazila. In addition, 4,300 timber trees, 3,500 fruit tree saplings/seedlings were planted on roadsides and homesteads. Under this project, the total area planted in Jamalganj as block plantation was 250.1 acres (khas/ejmali lands) and about 11 km of roadside plantation on both sides of the roads. Considerable number of seedlings were also planted in the project area of Hakaluki Haor (2001 – 2004). Saplings of swamp trees amounted to 140,547 covering 144 acre, 22,466 saplings along 13 km of road side, 26,940 saplings on a 10.5 km stretch along the rivers, 1,274 saplings for institution plantation in 1.5 acre and 63 saplings for wildlife habitat development in a half acre area were planted.
3.7. Demonstration activities

A number of demonstration plots were established in the project areas over the reporting period. The purposes of these plots were to inform people about the restoration of lost ecosystems, safeguarding indigenous knowledge or alternative livelihood options. Local and other interested people from different areas visited these sites. Such visits were often accompanied by explanatory speech from the project staff highlighting the significance of such initiatives. In some cases, these plots were further used to train community people, especially during sustainable income generation trainings.

1. Conservation of plant species

A 515-hectare area was demarcated and conserved for the natural growth of nol khagra (Phragmites karka), satomuli (Asparagus racemosus), ban tulshi (Ocimum americanum), hijal (Barringtonia acutangula), karoch (Pongamia pinnata), borun (Crataeva magna) and various other shrubs and herbs in 2002 in the Hakaluki Haor area. The purpose was to conserve and protect those local swamp species which were once abundant but now either rare or locally extinct. During the last few decades, these trees have been discriminately cut by the local people, which resulted in the transformation of forestland into barren grazing lands. The establishment of conservation plots turned out to be successful in creating an area which also encouraged natural regeneration. The UP Chairmen of Bhatera and Bhukshimail Unions have effectively protected those natural plants of the conservation area. They publicized the message of conservation through drum beating in the markets, visiting houses to alert villagers that they should not encroach or damage the natural plant growth and they should not take cattle for grazing. UP guards were also used to protect these areas. They also warned if anybody encroached, the police or their guard would apprehend them. Consequently, the villagers remained alert, and this area has become a natural forest with increased wildlife diversity. The number of snakes has also increased. Local people even complained that they were afraid of these snakes when they went to the field for their work.
2. Fish conservation area

A total of 14.63 acres of canals/rivers/beels were re-excavated in 2000, 2002 and 2003 in six sites of Pagnar and Sanuar-Dakuar Haors in Jamalganj as a part of wetland restoration. Out of the total re-excavated works, some portions were chosen by the respective village committees to establish fish conservation areas. Eight such conservation areas were established in Jamalganj with a total area of 7.23 acres. The habitats included rivers, canals and beels with surface area ranging from 0.50 to 1.02 acres.

3. Medicinal plant nursery

Even in the recent past, the traditional healers of our country used to depend on herbal plants growing naturally for making medicines for treating the majority population. This dependency has declined as many alternatives have evolved. Nonetheless, for the treatment of the poor patients of the villages, the kabiraj's have to depend on these medicinal herbs. Now-a-days, this herbal treatment has again been recognized as a good means of treatment.

Keeping this in mind, a medicinal plant nursery was established in September 2003 in the project field office premises in Jamalganj. The objectives were to help in restoring these valuable resources from the clutch of destruction and decline, facilitate a way to produce cheap and safe medicines, help traditional healers of the project area to provide treatment to the poor patients thus providing poor people with health service. The nursery contained 93 plant species with medicinal properties, collected from different places and sources. Herbal healers and local people were encouraged to visit that garden and collect plant parts to cure different diseases. This is being managed directly by the project staff.

4. Compost production

In 2000, one demonstration compost pit was established in each of three villages, namely Matargaon, Ujjalpur and Golimipur. This was an effective initiative for educating interested farmers and visitors about a sustainable and environment-friendly agriculture practice. Compost was produced from water hyacinth, cow-dung and other waste products from the cowshed. Compost made in those pits was distributed among the local farmers. However, the pit of Matargaon was severely damaged during the flood of 2004.

5. Floating nursery

Raising seedlings or cultivating vegetables on floating platforms made up of aquatic plants is a traditional practice in some areas of southern Bangladesh. This form of soil-less culture is locally termed as baira or dhop. On a trial basis, two baira platforms were established in September 2003, one in Binajura village, Fenerbak Union by Pagnar Haor and the other in the ditch within the
boundary of project office compound in Jamalganj. The village committee of Binajura and the project field station managed these. Seedlings of pumpkin (Cucurbita maxima) and wax gourd (Benincasa hispida) were raised on those platforms. Each freshly made plot was 30 ft long, 9 ft wide and 6-7 ft high. About 1,000 seed germinating pods, made up of futki bon (Hygroryza aristata), were placed on each baira. Each of these pods bore 5-6 vegetable seeds. The seedlings grown were distributed among 153 families in exchange for token money. Out of this sale, Tk 600 was saved and was deposited in the village committee’s account.

6. Turtle pond

A turtle conservation pond was established in Ujjalpur village of Jamalganj to create awareness among the local community for the conservation and restoration of freshwater turtle. It is now rearing five Indian Flapshell Turtles (Lissemys punctata) (nationally ‘Vulnerable’) and an Indian Roofed Turtle (Kachuga tecta). The pond was clearly signed, and visitors, especially young people, were encouraged to visit it.

7. Solar energy panel

A photovoltaic (PV) system was installed in Binajura village in Pagnar Haor in January 2003. A private energy company, was contracted for the installation. The Binajura Village Committee raised more than Tk 41 thousand to meet the partial establishment cost (around Tk 1.43 million). The total system supported 262 light bulbs and 10 televisions of 154 households of the entire village.
Local people as well as other visitors of the project sites visited the village to get familiar with this novel energy option. The village committee, established under this project, was in overall charge of this solar panel management. A good management system was in place where items like entry fees for a bulb (Tk 50) and a television (Tk 300), monthly bills for a bulb (Tk 20) and a television (Tk 30) were collected. So a total of more than Tk 211 thousand could be generated per year from this initiative. Eighty percent of the amount would be used for conservation, poverty reduction, education and health activities for the village, whereas 20% to be spent for management of the solar panel. A list of 20 poorest people of the village was also selected, and a provision of 50% reduction of the bills for them was kept, if they join the initiative.

8. Biogas plant

Four biogas plants were established as a demonstration in Gilachara Union of the Hakaluki Haor area in January 2002. The size of the plant was either 100 or 130 cubic ft. The SEMP provided 50% of the establishment cost and the rest was provided by Local Government and Engineering Department (LGED) of the Government of Bangladesh. The Bangladesh Council of Scientific and Industrial Research (BCSIR) and LGED have extended technological supports for construction and maintenance purposes. The project staffs had provided them with initial knowledge on operating and maintaining biogas plants.

9. Improved stove

To demonstrate another energy saving options, improved stoves were encouraged in the project areas in haor under the SEMP project. BCSIR invented different models of improved stoves which are energy efficient and can save 50-70% of the fuel cost. People of the project sites were first informed about these stoves through discussions in awareness meetings or workshops. In each site, 4-5 training programs were organized by the BCSIR and interested local people took part in those. After being trained, these participants made their own ovens for personal use. So far, a total of 102 stoves were installed in both project sites.

3.8. Folk drama performance

Folk drama or popular theater is one of the communication media that can be used very effectively. Folk drama groups perform folk dramas in different villages, cluster villages or bazaars under a temporary shed with a selected script. To use this popularity, a folk drama group, Save Environment and People’s Development Association (SEPDA), was engaged to perform dramas on environmental issues. Project personnel and community members helped to organize these shows. PA systems were adequately used in an area to invite people to the programs. In the reporting period, a total of 24 stage shows were conducted in different villages of the project sites (18 shows in the Jamalganj sites and six in the Kulaura site) in
presence of a total audience of over 9,200 (around 6,400 in the Jamalganj sites and around 2,800 in the Kulaura site).

At the beginning of the 50-minute-long play titled ‘Haorer Kanna’ (Crying Haors), the degrading trends of the natural resources of haors were featured by comparing the rich past and the poor present. It then highlighted environmental issues like importance of swamp tree plantation, establishing forest conservation areas for protecting households from wave action, and improving the environment as a whole, plantation and its maintenance, damaging effects of fine-mesh fishing gears, fish conservation areas, creating habitats for wildlife and its necessity for sustaining ecological balance, needs for re-excavation of water bodies and other related issues.

3.9. Cowboy meetings

A cowboy meeting is a way to disseminate awareness messages among these young people. A total of 20 meetings were conducted at Ashipur, Nazimnagar, Binajura, Bhatidaulatpur, Lalpur, Rasulpur, Chhoyhara, Gangadharpur, Sukdebpur, Fenerbak, Matargaon, Totamara, Rajapur and Bhadarpur villages of Jamalganj Upazila. Members of respective Village Committees also participated in these meetings. Total participants of 20 meetings were about 1,400. These special meetings were separated from grassroots campaigns because cowboys playfully destroy nests and eggs of birds. They are also the ones who spend their day with their cattle in the areas about swamp plantation sites. So, the cowboys were helped to understand issues like the role of birds in the environment, natural regeneration of swamp
trees, protection of swamp forest plantation from their cattle and other relevant issues. Government officials, UP chairmen and members, local elite and teachers were invited to those meetings for delivering speeches.

3.10. Establishment of nature clubs and libraries

Five nature clubs have been established with young boys and girls, including school students, to disseminate awareness messages through meetings, rallies and environment related day observance (Table 2). Among them, two were with school students in Nabin Chandra High School and Sachna Bazar High School, and the other three were with young boys and girls in three villages. Each club has an executive committee of six to nine members and a general committee composed of all members. There is an advisory committee of two/three teachers or Village Committee members for facilitating the club’s operation. Each club meets once a month. Each of them has a library containing some books and magazines related to environment, e.g. Poribesh Patra. They gather in the club office not only for the meetings, but also in their leisure time.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name</th>
<th>Established</th>
<th>Location</th>
<th>Member no.</th>
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<td>1.</td>
<td>Paribesh Shanrakkhan Jubo Shangha</td>
<td>27 Aug. 03</td>
<td>Binajura</td>
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<td>2.</td>
<td>Chhatro-bandhu Poribesh Shanrakkhan Shangha</td>
<td>13 Sep. 03</td>
<td>Nabin Chandra High School, Khujargaon</td>
<td>78</td>
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<tr>
<td>3.</td>
<td>Chhatro-moitry Poribesh Shanrakkhan Club</td>
<td>12 Nov. 03</td>
<td>Sachna Bazar High School</td>
<td>48</td>
</tr>
<tr>
<td>4.</td>
<td>Shapla Poribesh Shanrakkhan Jubo Shangha</td>
<td>22 Dec. 03</td>
<td>Matargaon</td>
<td>50</td>
</tr>
<tr>
<td>5.</td>
<td>Kokil Jubo Shangha</td>
<td>28 Dec. 03</td>
<td>Sukdevpur</td>
<td>18</td>
</tr>
</tbody>
</table>

3.11. Participation in exhibitions

The SEMP field team, since 2000, has been participating in the Brikkha Mela (Tree Fair) and Krishi Mela (Agriculture Fair) organized by the upazila and district administrations. Over the reporting period, the team participated in five fairs at the upazila level (Jamalganj Upazila) and once at the district level in

*Haor plant resources displayed in an agriculture fair*
Sunamganj District. Visitors to the stalls were presented with different issues and concerns about medicinal plants and swamp trees. The team once was awarded with the first prize at the upazila level fair in 2001. An award was also won by the team for participating in an upazila fair in 2004.

3.12. Video documentary
An initiative has been taken in early 2005 to produce a short documentary film under the SEMP-IUCN projects (components 2.2.1./A&B). The suggested film would depict the conservation issues of the wildlife, fish and flora of the wetlands in the project areas and also illustrate the alternative livelihood options of the local communities as promoted under the project.
CHAPTER 4

IMPACTS

Awareness raising activities were recognized as a very vital part of the project for helping the wetland resource users understand the prevention and reversion of wetland degradation, the sustainable use of the resources, promoting sustainable development and improving the quality of their lifestyle. Environmental awareness campaigns under the SEMP have created appreciable impression on the people of the project areas. In terms of meeting the project targets, the present project achieved the intended level of performance, for instance the number of participants for a given awareness campaign, the number of programs organized in a given time period and the number of billboard erected.

A evaluation matrix with performance indicators is an efficient way for assessing a project’s impact. But such 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 outlooks, noticing the positive changes in the environment and biodiversity, etc. could be done.

On returning from the 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, role of the migratory birds, plants and
wildlife in maintaining ecological balance of the wetlands, importance of environment-friendly
government practices. Awareness workshops or knowledge sharing workshops enhanced wider
dissemination of environmental concerns, causes and solution of those problems among
fishermen, farmers, day-laborers, marginal groups, students, teachers and businessmen. This
further facilitated the linkage of the government officials, UP chairmen and members with the
local communities. Such awareness resulted in the adoption of some improved practices by the
traditional user groups. After an awareness program, the participating people were willing to
discuss those issues among themselves. Specific responses toward some specific activities or
issues are highlighted below.

4.1. Folk drama
Arranging folk drama was ostensibly one of the most impressive awareness initiatives. The
audience reaction was over-whelming from the very first show. Audience attendance was also
very encouraging with a significant percentage of women. Even women wearing veil (parda)
came to the show and enjoyed it.

After the shows, the audience was requested to express their views on the performance. Local
people appreciated this novel awareness initiative very much. On the use of fine mesh gears,
one old man emotionally said that the government should prepare and enforce strong laws,
and put the users of such gears in jail. In some villages, for example in Khujargaon, some youth
were seen audio recording the play. In Sachna Bazar some scenes were even video recorded. In
many villages young people even sang the songs on their way back home.

Of course response to this awareness program was not the same in all cases. Being part of a
very religious Muslim society, the elderly people of Shukdevpur village initially disagreed on
musical instrument use. However, local people insisted on using music in the middle of the
play. But to ensure senior citizens’ participation, the drama ended without any musical
instruments. But it was encouraging that everybody was eager to enjoy that play, including
women observing pardas.

4.2. Wildlife protection
Wildlife, especially birds, is a vital component of haars. In every awareness program the
issue of bird protection was highlighted, and the messages were received positively by the
participants. The community people are now much more aware of the migratory birds than
they were before. Hunting of migratory birds by the local people has decreased
significantly over the last few years. No such birds were found in the Jamalganj markets for
selling in 2004.
An exceptional incident took place in Udoypur village located near Aila Beel. The beel is a large perennial water body where thousands of migratory birds used to come every winter. Visitors come to the beel for bird-watching. Some bird hunters of Derai Upazila used to cast ‘current jal’ (a fine mesh fishing gear) in the beel for hunting/capturing migratory birds. In 2002, the villagers of Udoypur prohibited them orally not to hunt birds in the beel. But they were reluctant and continued hunting. One night the villagers of Udoypur caught those bird hunters red handed with ‘current jal’, while they were casting nets. They promised not to hunt bird in future and the villagers released them.

As a result of the meetings with cowboys in different villages of the project area, this group is now more aware of birds in their natural habitats. Field assessment showed that cowboys are now conscious about wild birds and do not hunt them or destroy their eggs and nests.

Boys of nature clubs established under the project are now pro-active in preventing any destruction of habitats and killing of wildlife and birds in their locality. They were particularly taking care of the globally threatened Pallas’s Fish Eagle for conservation in Pagnar Haor. Overall response towards the protection of this species was encouraging.

4.3. Fisheries

The haors were rich in fish even in the recent past. But now this important resource has been decreasing both in diversity and quantity. This issue along with the causes and possible solutions were discussed in all forms of campaign in the project area. The number of people using small mesh nets (e.g. kona jal and current jal) has decreased significantly over the reporting period. Community people have also begun resisting the fishermen using small mesh gill nets in the beels. In recent months, a strong outlook has been developed against dewatering of beels to catch fish.

Establishing fish conservation areas is an effective intervention to raise awareness among the community people in the project area. Studies satisfactorily showed that the total fish catch in
a conservation area could be higher than in the non-conservation sites. For example, in one study the total fish weight was about three fold greater and the total fish number was about two times greater in the conservation area than in the non-conservation areas. It was also found that abundance of higher size classes (10–20 mm and 21–30 mm) was considerably more than that of lower size class (1–10 mm) and the highest size class (>30 mm). But, it may be due to gear sensitivity of fish size or fish dispersion toward deeper area of the monitoring habitat as this trend was found both in the conservation and non-conservation areas. Nonetheless, a good number of fish species was caught in the conservation sites which was rather uncommon for the area.

4.4. Swamp forest regeneration

One of the major achievements of the SEMP project interventions in haors was swamp forest regeneration in a significantly large area. This created a considerable enthusiasm among the local community, made them aware of the importance of swamp forests and consequently encouraged them to undertake several initiatives of conservation and sustainable management of haor resources.

Reforestation, conservation of swamp trees and ensuring its natural growth creates resources with immediate and future benefits. Environmental benefits that result from the swamp forest regeneration are multi-dimensional. These included increased habitats for rare or endangered species of plants and animals, more nesting and perching sites for birds and erosion stabilization. Under this habitat restoration initiative, reeds were regenerated after about 30 years of loss. Increased vegetation cover provided more shelter and ensured adequate supply of food to fish, a platform for shrimps, koi (Anabas testudineus), shing (Heteropeustes fossilis) and other species to lay eggs on in grasses, reeds and branches, and also protection of spawn.

The newly vegetated area improved the livelihood status of local communities in and around haor area. In addition to these ecological benefits, it also met fuel wood requirements of the locality and medicinal vegetation was regenerated providing herbal medicine to the community. This plantation program facilitated local community people like landless and other poor people including women of the areas in getting jobs as day laborers. A huge number of people, in fact, 31 thousand man-days were employed for planting, watering, fencing, guarding and transportation.

In response to the campaigns for sustainable use of resources, it has been agreed upon that the villagers would harvest the trees in a four-year rotation, viz. one-fifth portion of the forest would be trimmed in one year, next year another one-fifth portion and so on. On the issue of wildlife conservation, the community also decided not to harvest one-fifth portion of the new
swamp forests, which would be kept as natural forest and wildlife conservation area. This conservation area would also facilitate growing other aquatic and semi-aquatic plants like reeds and grasses, which would provide home for various other fauna. Cowboy meetings were also proven to be very useful for swamp forest regeneration. These boys were more aware of the importance of swamp trees and protecting young trees from their cattle.

From a legal point of view, such swamp forest regeneration protected illegal encroachment of common or government lands. Nonetheless, conflict arises out of plantation and conservation activities. In swamp block plantation, conflict prevails between village committee (VC) and illegal land owners, land encroachers, bathan owners, or UPs for various reasons. The reasons included, illegal possession of land, demarcation of land among different possessors, grazing area for cattle and practicing bathan. Moreover, in the roadside and riparian plantations, conflicts started over the possible crop damage from shading from the planted trees. However, all those conflicts were mitigated through discussions among multilateral stakeholders, such as farmers expected to face damage, local elites, UP representatives, village committees, SEMP team and local administration.

4.5. Medicinal plants

The establishment of the medicinal plant nursery gave momentum to herbal treatment in the project area in Jamalganj. It encouraged the local people to use medicinal plants to cure their diseases, and therefore helped in conserving indigenous knowledge of the area. The people
and the village doctors started collecting leaves, fruits and barks of the medicinal plants free of cost from this nursery. They said that they began using medicinal plants for curing/controlling some special diseases like heart disease and jaundice along with the common ones (e.g. cough and dysentery). Moreover, they now show interest to collect saplings for planting in their homesteads.

4.6. Floating nurseries

In 2003, the demonstration plots of floating nurseries (baira) presented local people with a useful, convenient and eco-friendly livelihood option. People expressed interest in adopting this cultivation technique, although it was quite new to them. They appreciated the income generation from selling winter vegetable seedlings and vegetables grown on bairas, and also meeting the family’s vegetable needs. They also realized the possibility for increased employment in the area because of baira cultivation, especially in the rainy season.

In 2004, there was an unprecedented flood in Sunamganj district. As a result the villagers could not dare initiate the floating nursery. But, due to the enthusiasm observed among the people, it is expected that in 2005 they will start practicing baira farming with assistance from the SEMP, provided no calamities like 2004 takes place.

4.7. Renewable energy options

1. Solar panel

Installation of solar panels was one of the important demonstrative interventions in the haor area showing clear impacts within a short period. This has shown how people are able to raise a good sum of their own money for environmentally sound options when they are motivated properly. The strong management system established with the

Electricity generated using solar panels promotes small industries
village committee was also a success. They generated sufficient money as payment not only for maintenance and operation of the solar panels, but also to undertake interventions for conserving the environment of the village, and improving the health, education and economic conditions of the villagers.

The solar panel demonstration significantly changed the living standard of the people of Binajura village and also influenced other villages to adopt similar system of energy supply. The literacy rate and the number of people engaged in school education have increased since students now feel more comfortable to study at night. The household fuel cost has been reduced considerably. People feel more secure as there is less crime in the area. They are now more aware of different national issues since they have access to a powerful medium like television. Workers involved in small cottage industries are now able to work at night.

This demonstration also motivated people of other villages, like Fenarbak, who have installed solar panel totally by themselves. Large NGOs like, CARE Bangladesh has shown keen interest in introducing the Solar Panel System under their Flood Proofing Project in some villages in the SEMP project site. They have identified the demonstration activity as a good example of enlightening the rural life. Local rich people also introduced photovoltaic (PV) system in their houses as they found the system useful.

2. Biogas plants

The wide use of biogas could save fossil fuel and conserve vegetation resources immensely in any given area. In addition to that, use of biogas instead of traditional stoves, run by fossil fuel, could also help the rural people of Bangladesh, especially the women, in many ways. For example, the health hazards and diseases (e.g. eye irritation, skin problems, headache and coughing) due to indoor air pollution will be decreased. The housewives and the family members, especially the children, will be less affected during cooking. Such system will save cooking time for women, which means more free time and less tiredness, both of which have a direct positive impact on the time available for childcare and for improving the kitchen environment quality. But, unfortunately, the selected owners of biogas plants at the Hakaluki Haor area were lacking sufficient maintenance capacity despite project support, and were not handling the new system properly. During charging the plant, materials like leaves, sawdust, straw, etc. entered into the well, due to lack of proper handling. So, none of the plants survived to provide the expected positive impacts.

3. Improved stoves

Like biogas plants, improved stove could also lessen the use of plants as energy sources. Till this end, it is understood that the stove was not widely accepted in the project area as first
envisaged. Such failure has also been seen in some other parts of the country. The apparent
reason was that the stove design did not complement the available fuel in use. The
depth of the improved stove is 15–20 cm and usually useful for 'hard fuel' like, wood, jute
stick, etc. On the other hand, the traditional stoves are usually 38–46 cm deep, where
all kinds of fuels are burnt, more often dry leaves, cow-dung and straw. Hence, although
more than a hundred stoves were initially established, the further adoption rate was quite slow.

4.8. Gender issues

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 whole SEMP
initiative. It was thus important to involve women, especially poor and marginal ones at every
step of awareness interventions. Women of the project areas in the haors participated in the
participatory action plan development 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 took part in those mostly as participants, but sometimes as
organizers. The percentage of women was always significant among the participants.

A good example of enhanced awareness among the poor women was seen when they were
organized into vulnerable groups and were motivated to engage in a sustainable livelihood
often through environment fund 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. As a result, a
number of group members established nursery plots and medicinal plant plots for
demonstration.
Young girls participated in awareness activities as members of environment clubs along with boys. They also actively took part in environment related programs like rallies, meetings, quiz competitions, essay-writing competitions, drawing competitions, dramas, workshops, plantation programs and nature walks. Thus, environmental awareness among women has greatly increased in the haor project areas.

4.9. Village Committees (VCs)

The VCs were prepared with proper trainings on their responsibility, management of resources under their area, and were also educated about their rights and the means to resolve conflicts over their resources. At the end of 2004, the UP administration suddenly leased out the water body used by the VC of Matargaon village for project activities to another group of people. The VC of Matargaon demonstrated very effective resistance and stood against this sudden leasing. They held rallies/demonstrations against such leasing before the local chairman, UNO and District Commissioner of Sunamganj District, and submitted letter to every stage. The local and the national newspapers also publicized their actions. As a result, the UNO called both sides and organized a reconciliation process, and ultimately the matter was settled in favor of the VC of Matargaon.
CONCLUSION AND RECOMMENDATIONS

Awareness and education programs for the community people are crucial to the success of any environment management project. These could be a part of a big project intervention, could be separate major interventions themselves, or a combination of both. In the SEMP project in 

*haors*, the last approach was followed. The awareness programs conducted in the project areas have created some positive impacts on the local community in general and the target groups in particular. The awareness movement carried out under the SEMP through the billboard establishment, stage performances of folk drama, campaign among focus groups and knowledge sharing by participants of different occupations created enthusiasm in the community.

The choice of resource persons was given a lot of thought. Participation of local knowledgeable persons and leaders was appreciable and effective. 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.

To sustain the success of the project, the maintenance of the awareness level achieved is very important. From the experience of the present awareness interventions, 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, like folk drama should be used. Other initiatives may include photo exhibitions, big screen film shows on nature, slideshows on natural photography including project interventions, etc.

c) It is better to have more than one folk drama highlighting different environmental issues from different perspectives, instead of accommodating all important issues in one drama.

d) Video documentaries are effective media, thus should be shown frequently. It would be appealing to show project intervention videos to the local communities, which are filmed on real-life scenarios. It would make them feeling 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 others could be done extensively.

3. **Target groups**
   
a) Campaigns with focus groups like school students, cowboys, fishermen, etc. 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 painting competitions, debates, excursions and photo exhibitions should be organized frequently through the established 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 as well as the local leaders, VC people, religious leaders, etc. should be higher compared with the government officials.

b) Enlightened resource users should be encouraged to talk. For example, ‘why brood fish should not be caught’ would be better if told by a fisherman who does not catch those.
5. Evaluation

a) Participatory monitoring and evaluation systems 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 villages had 15 nests of Pallas's Fish Eagle what is the distribution pattern (no. of villages and no. of nests) after a certain period of awareness campaign.

6. Sustainability

a) A swamp forest regeneration and 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 activities altogether, the strength of those committees should be tested to ensure the expected level of awareness among these local leaders.

c) An awareness program alone cannot be sufficient to put any destructive activity into halt. It could be effective in reducing damaging effects when combined with other measures.
REFERENCES

