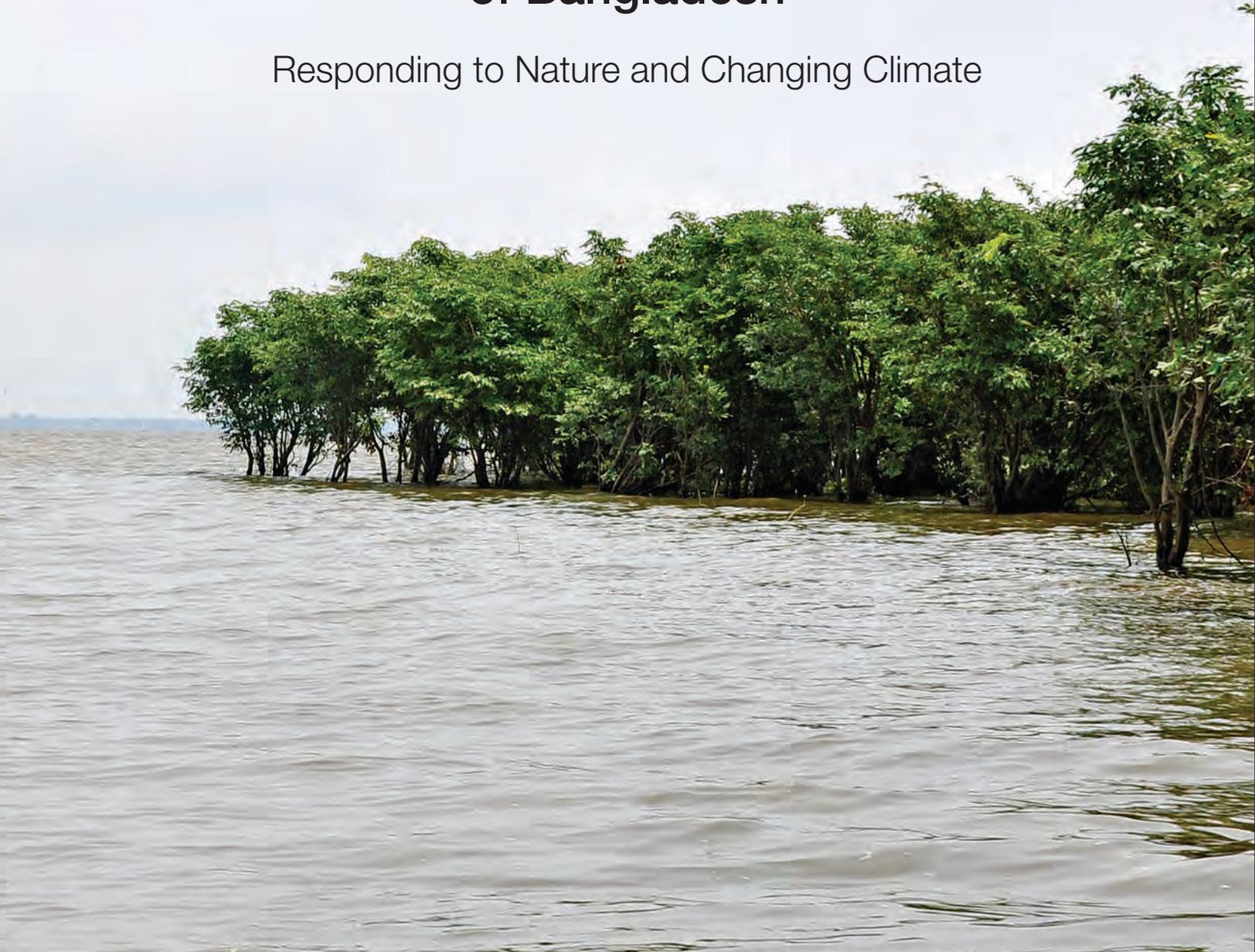




Community Based Ecosystem Conservation and Adaptation in Ecologically Critical Areas of Bangladesh

Responding to Nature and Changing Climate



Department of Environment

Community Based Ecosystem Conservation and Adaptation in Ecologically Critical Areas of Bangladesh

Responding to Nature and Changing Climate



Department of Environment
Dhaka, Bangladesh
June 2015

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A flock of birds in Hakaluki Haor
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Preface

Bangladesh is a land of diverse ecosystems, rich in biodiversity with a range of flora, fauna and their habitats. The ecosystems and all the living beings are currently threatened because of multiple anthropogenic causes like pollution, alteration of natural systems, over-exploitation, rapid urbanization and climate change. Anomaly in seasonal pattern, changes in rainfall pattern and water regime, and frequency and intensity of disasters have already started to affect agricultural production. In the coastal zone, increasing salinity levels in the water and soil has led to reduced availability of fresh water for drinking and irrigation that worsens poverty and complicates the lives of people living in and around the coastal Ecologically Critical Areas (ECA).

The Bangladesh Environment Conservation Act, 1995 authorizes the Ministry of Environment and Forests on behalf of the Government of Bangladesh to declare a site as an ECA. Till 2015, the Government has declared 13 sites as ECAs, for improving and conserving the health of the ecosystems. The Coastal and Wetland Biodiversity Management Project (CWBMP) that focused on ECA management and local communities' engagement was implemented by the Department of Environment during 2002–2011. For retaining and enhancing the activities accomplished during the CWBMP period in ECA management, “Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project (CBA-ECA Project)” was implemented during 2011–2015 by the Department of Environment in Hakaluki Haor, Cox's Bazar-Teknaf Peninsula and Sonadia Island ECAs. The project continued to nurture communities for sustainable management of the ECAs by enhancing awareness, revitalizing community groups established under the CWBMP phase, enhancing capacity of the communities, especially women, on alternative income generating activities. The CBA-ECA focused to enhance resilience of the ECA people through organizing, and engaging them in biodiversity conservation and habitat restoration. The project has successfully engaged communities in establishing a good number of wetland sanctuaries in Hakaluki Haor.

The CBA-ECA project further worked on building resilient communities and established several soft and hard conservation and adaptation measures that directly addressed the subsistence needs of the people in the ECAs. To familiarize use of renewable energy as a mitigation measure, the project installed solar irrigation pumps in the haor and coastal areas. It also placed solar desalination plants to supply safe, saline-free drinking water to the coastal communities. Improved Cooking Stove and Solar Home System have been provided at household levels to reduce carbon emissions, dependency on wood and other sources for fuel, and curb indoor air pollution for improving health, especially women and children who spend most of their time indoors. Creation of green belts and afforestation in the swamps of the haor and plantation in coastal mangroves and dunes have been carried out with indigenous species, to conserve resources and protect the local people from surges and erosion. Globally significant species of sea turtles and birds have also been conserved through this project. Village Conservation Centre (buildings) have been constructed so that the beneficiary communities can hold their Village Conservation Group meetings, community gatherings can take place for exchange of ideas for conservation and local women can get together at least once every week to discuss their issues. Watchtowers, popularly known as Paribesh Tower—Environment Tower, have been constructed on the coast as well as the haor to enhance vigilance of resources and to facilitate ecotourism.

The production and publication of this book is intended to capture the successes and lessons learnt from the CBA-ECA project and to document the impacts of the ECA management initiatives, key lessons and impacts, challenges faced and future direction for wise-use management of the ECAs in Bangladesh. I believe this document will be useful to policy makers, practitioners, academicians and researchers interested in this field.

Md Raisul Alam Mondal

Director General, Department of Environment and

Project Director

Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and
Social Protection Project (CBA-ECA Project)

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Abbreviations, Acronyms and Local Terms

BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BCCTF	Bangladesh Climate Change Trust Fund
Beel	A saucer-shaped depression, the deepest part of a haor that retains water all year round
CBA	Community Based Adaptation
CBA-ECA	Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project of the Department of Environment
CBD	Convention on Biological Diversity
CBFM	Community-Based Fisheries Management Project of the Department of Fisheries
CNRS	Center for Natural Resource Studies
CREL	Climate Resilient Ecosystems and Livelihoods Project
CWBMP	Coastal and Wetland Biodiversity Management Project of the Department of Environment
DoE	Department of Environment
ECA	Ecologically Critical Area, declared by the Government of Bangladesh under Bangladesh Environment Conservation Act, 1995
ECFC	Empowerment of Coastal Finishing Communities for Livelihood Security Project of the Department of Fisheries
EKN	Embassy of the Kingdom of Netherlands
FAO	Food and Agriculture Organization of the United Nations
Haor	A back-swamp or bowl-shaped depression between the natural levees of rivers and may consist of a number of beels
IPAC	Integrated Protected Area Co-management Project of the Bangladesh Forest Department, Department of Environment and Department of Fisheries
IPCC	Inter-governmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
Kanda	Ridges higher than the haor basin but lower than homestead land
LIP	Livelihood Implementation Plan
MACH	Management of Aquatic Ecosystem through Community Husbandry Project of the Department of Fisheries
MCG	Micro Capital Grant
MDG	Millennium Development Goal
NACOM	Nature Conservation Management
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-government Organization
SCM	Social Capital Management
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goal
SEMP	Sustainable Environment Management Programme
UCO	Upazila Cooperative Officer
UDMC	Upazila Disaster Management Committee
UNDP	United Nations Development Programme
UNESCO	United Nations Organization for Education, Science and Culture
Union	The lowest local government unit, governed by Union Council or Union Parishad
UNO	Upazila Nirbahi Officer
Upazila	Sub-district, lowest administrative unit
USAID	United States Agency for International Development
VCC	Village Conservation Centre, a one-storied multi-purpose building, established under the CBA-ECA Project
VCG	Village Conservation Group formed under the CWBMP and the CBA-ECA Project

Chapter 1

Ecologically Critical Areas (ECA) in Bangladesh and Their Management

This chapter illustrates the concepts of ecosystem conservation, evolution of ECA in Bangladesh, legal instruments and institutional framework supporting ECA management, past initiatives to manage ECAs by the Government, communities and NGOs including the Coastal and Wetland Biodiversity Management Project (CWBMP), and challenges posed by climate change which created a basis for the Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project (CBA-ECA Project).

Conserving and sustaining biological diversity and its environment is a major challenge for a highly populous country like Bangladesh, heading towards rapid economic growth. It further makes the conservation discourse difficult since significant part of the population is poor and heavily dependent on natural resources for their lives and livelihoods. As a result, all the ecosystems – large and small, aquatic and terrestrial, natural and semi-natural or man-made – face degradation at various levels. Wetland ecosystems of Bangladesh, for example, are facing a number of anthropogenic challenges in recent decades. Major issues include, losing connectivity between rivers and floodplains, decline in aquatic-terrestrial transitional zone, changes in land use, over-harvesting of natural resources, salinity intrusion due to reduction in upstream flow and sea level rise, intensive fish culture, intensive crop cultivation, development of residential and commercial areas, invasion of alien species, intensive use of pesticides, hunting of wildlife, and impacts of climate change and water management projects, transport and service corridors¹. Mangrove ecosystem, on the other hand, is under threat of deterioration due to over-exploitation, extensive shrimp farming, pollution, high dependency of locals on mangrove resources, poor knowledge on ecosystem, and sea level rise². Similar challenges can be seen in other ecosystems. Nevertheless, absence of effective governance system in natural resource management remains an overarching concern for conservation of biological diversity in Bangladesh.

Improving Ecosystem Conservation

Despite the challenges and threats posed by diverse anthropogenic and natural drivers and pressures, Bangladesh has several conservation efforts in place. These efforts follow both *in situ* (conserving species within their habitats) and *ex situ* (conservation of species outside their habitats) conservation measures. The *in situ* categories of conservation areas mainly include declaration and management of national parks, wildlife sanctuaries and game reserves, Ecologically Critical Areas (ECA). *Ex situ* efforts, on the other hand, include establishing botanical gardens, preservation plots, gene banks and arboretums.



Flock of migratory birds

© Sayam U. Chowdhury

1 Alam, M.Z. 2014. Status of biodiversity at wetland ecosystem of Mohangonj Upazila in Netrakona District. *Advances in Ecology*, article ID 642450, 8 pp.<<http://dx.doi.org/10.1155/2014/642450>>

2 Rahman, M.M., Rahman, M.M. and Islam, K.S. 2010. The causes of deterioration of Sundarban mangrove forest ecosystem of Bangladesh: Conservation and sustainable management issues. *AACL Bioflux* 3(2): 77–90.



Arrow Head (*Sagittaria sagittifolia*)
© IUCN/ A.B.M. Sarwar Alam

For safeguarding and conserving dolphins, sea turtles, whales, sharks and other marine resources, the Government of Bangladesh has created marine protected area. In addition, vulture safe zone has been declared by the Government for conserving this critically threatened species. The Government has also banned hilsha fishing in the breeding period and has started compensation programme for poor fishers for conserving this flagship species and the national fish of Bangladesh. The Government has further established sanctuaries for conservation of hilsha, other native fishes and other aquatic resources.

Under the Wildlife (*Preservation and Security*) Act 2012 (originally enacted in 1974, amended in 1994), the Government of Bangladesh has declared 38 protected areas. These include, 17 national parks, 20 wildlife sanctuaries (including 3 dolphin sanctuaries), and 1 marine protected area (Swatch of No Ground). These protected areas now cover 10.72% of total forest area of Bangladesh, while the most recent marine protected area is 1.63% of the total marine area of the country³. Twenty of these protected areas were declared between 2010 and 2014, indicating government's tremendous commitment towards achieving the targets proposed under the Convention of Biological Diversity (CBD). The five sanctuaries for hilsha cover a total riverine and marine (coastal) area of 350 square kilometer. For conservation of native species and aquatic biodiversity, government has established 550 sanctuaries in the last five years⁴. Besides, Bangladesh has ten botanical gardens and eco-parks situated at different parts of the country as a means of *ex situ* conservation. Sundarban and Tanguar Haor were declared as Ramsar sites in 1992 and 2000, respectively. In 1997, UNESCO declared three sanctuaries of Bangladesh Sundarban as World Heritage Site.

3 Department of Environment 2015. Fifth National Report to Convention on Biological Diversity. Ministry of Environment and Forests, Government of Bangladesh, Dhaka.

4 Department of Fisheries 2014. Annual Report 2014. Department of Fisheries, Dhaka.



Community engagement in mangrove plantation at coastal mudflat
© Department of Environment

Besides these, the *Bangladesh Environment Conservation Act, 1995* (revised 2010) has provision for Ecologically Critical Area (ECA) declarations by the Government of Bangladesh in certain cases where the Government is convinced that the ecosystem is degraded to a critical stage or considered to be threatened. Under the act, the Government of Bangladesh also declared 10 km periphery from the Sundarban boundary as ECA in 1999. These declarations have further enhanced the conservation efforts in these globally unique ecosystems.

Ecologically Critical Areas of Bangladesh

The Ecologically Critical Areas (ECA) are ecologically defined areas or ecosystems affected adversely by the changes brought through human activities. To improve the condition of ecosystems, the Government declared seven ECAs in 1999 with varied levels of degradation, comprising coastal areas, islands, and wetlands in different parts of the country (Table 1.1). During 2001–2009, five other ECAs were declared. These includes four rivers around Dhaka city emphasizing the impacts of rapid urbanization and industrialization around the capital. The latest ECA is a river including its shores in the north-eastern part of the country declared in early 2015.

Initiatives for Ecologically Critical Area Management

The overall management of ECA is vested with the Department of Environment. For most of the ECAs, no organized governance structure exists, except Cox's Bazar, Hakaluki Haor, Sonadia Island and St. Martin's Island. In each of these ECAs, there are community organizations called Village Conservation Groups (VCG) and ECA Management Coordination Committees at the union (the lowest local government unit),



upazila (sub-district, the lowest administrative unit), district and national levels to govern the ecosystem management and biodiversity conservation. These committees were formed in above mentioned ECAs under the Coastal and Wetland Biodiversity Management Project (CWBMP), which was notified through gazette. The community organizations are registered as cooperative society, thus under supervision of Department of Cooperatives of the Ministry of Local Government, Rural Development and Cooperatives. The ECA management structure has been incorporated in the draft *Ecological Critical Area Rules (2015, drafted)*, which is now awaiting government approval.

Table 1.1. Ecologically Critical Areas (ECA) of Bangladesh

No.	Name of the ECA	Type of Ecosystem	Location	Areas (ha)	Year of Declaration
1.	Cox's Bazar-Teknaf Peninsula	Coastal-Marine	Cox's Bazar	20,373	1999
2.	Sundarbans (10 km landward periphery)	Coastal-Marine	Bagerhat, Khulna Barguna, Pirojpur and Satkhira	292,926	1999
3.	St. Martin's Island	Marine Island with coral reefs	Teknaf upazila, Cox's Bazar	1,214	1999
4.	Hakaluki Haor	Inland Freshwater Wetland	Sylhet and Moulvibazar	40,466	1999
5.	Sonadia Island	Marine Island	Moheshkhali, Cox's Bazar	10,298	1999
6.	Tanguar Haor	Inland Freshwater Wetland	Tahirpur, Sunamganj	9,727	1999
7.	Marjat Baor	Oxbow Lake	Kaliganj upazila of Jhenaidah and Chaugacha upazila of Jessore	325	1999
8.	Gulshan-Baridhara Lake	Urban Wetland	Dhaka city	101	2001
9.	Buriganga	River	Around Dhaka	1336	2009
10.	Turag	River	Around Dhaka	1184	2009
11.	Sitalakhya	River	Around Dhaka	3771	2009
12.	Balu including Tongi canal	River	Around Dhaka	1315	2009
13.	Jaflong-Dawki	River	Jaflong, Sylhet	1493	2015

Source: Department of Environment (2015)

Since the late 1990s, several projects have been undertaken by different government agencies and NGOs in some selected ECAs in relation to aquatic and terrestrial ecosystems conservation engaging the local communities⁵. In some cases, these initiatives were not undertaken targeting ECAs, as they are, but some ECAs came under the management of these projects. For example, the Management of Aquatic Ecosystem through

⁵ DoE, 2013. *Bangladesh Environment and Climate Change Outlook (ECCO) 2012*. Department of Environment, Government of Bangladesh, Dhaka, 138 pp.



Fringed Spider (*Cleome hassleriana*) flower

© Department of Environment

Community Husbandry (MACH) project was initiated in 1998 by the Department of Fisheries in association with the USAID. Through this project, part of the Turag River was taken under community based management. The project demonstrated restoration of productivity and functioning of large wetland ecosystem and to enhance biodiversity and livelihood of the local poor.

Hakaluki Haor, declared as an ecologically critical area by the Government of Bangladesh in 1999, was included in 2000 as a project site of the Community Based Haor and Floodplain Resource Management Project of IUCN Bangladesh under Sustainable Environment Management Programme (SEMP), which was supported by the UNDP and implemented by the Ministry of Environment and Forests during 1998-2005⁶. The project aimed at contributing to the improvement of the wellbeing of the people, coupled with attaining sustainable development, poverty alleviation and capacity building of local communities for effective wetland resource management. Between 2001 and 2005, communities were engaged through motivation, awareness raising, establishment of community based organisations, capacity building, providing alternative income generation and other support to enhance awareness and capacity for wise use of wetland resources. The project also took conservation measures, like swamp protection and plantation, re-excavation of wetlands, establishment of fish conservation area, species conservation (eg dolphin, snail, Pallas's Fish Eagle and turtle). To retain and enhance the capacity of ecosystem management, many village groups formed in

6 IUCN Bangladesh, 2005. Major Interventions for Sustainable Wetland Resource Management. IUCN Bangladesh Country Office, Dhaka, x+134 pp.

Hakaluki Haor under SEMP were institutionalised and nurtured as Village (Ecosystem) Conservation Groups by other projects, namely the CWBMP and the CBA-ECA Project.

The Empowerment of Coastal Fishing Communities for Livelihood Security Project (ECFC Project) was implemented by the Department of Fisheries between 2000 and 2006 in Cox's Bazar-Teknaf Peninsula and St. Martin's Island ECAs. This UNDP and FAO supported initiative aimed at bringing about positive qualitative and quantitative changes in the lives of poor coastal fishing communities left outside formal institutions. The project organised these fishing communities into about 250 village organisations (VO) in 117 villages. It succeeded in empowering them with self recognition, strength of collective organisation and the knowledge to manage their livelihoods and managing depleted fishery resources in the coastal areas. One of the most tangible impacts of this project was the generation of savings and the utilisation of Micro Capital Grants (MCG) by the groups. A total of Taka 7 million has been saved by the VOs over the project period. The lessons of generating and utilising Micro Capital Grant (MCG) for uplifting livelihoods have been opted in the CWBMP and the CBA-ECA Project.

Under the Community Based Fisheries Management (CBFM-II) Project (2001–2007)⁷, a total of 130 community based organizations were established to manage 116 water bodies in 22 districts. Part of Hakaluki Haor (Barlekha upazila) was included in this country wide venture supported by the USAID. Community based management approach was introduced in the project sites, where different skill development initiatives, like water body management, good governance, leadership and account keeping were exercised to build the capacity of the fishermen's organisations for wetland management. At the same time, alternative income generating options such as duck rearing, vegetable production, livestock rearing, aquaculture and cage culture were introduced to reduce people's dependency on natural resources. The project established sanctuaries for managing and enhancing biodiversity of the wetlands. The initiative showed improvement in wetland management and in fish biodiversity by the communities. Trends of fish production increased in 50 (77%) of the 64 project water bodies. Increasing trends in biodiversity was also found in more than two thirds of the monitored water bodies. Organisation management at the community level and ensuring environmental governance, however, remained a challenge. In the CBFM-II, the contribution of social capital

⁷ Pemsil, D.E., Seidel-Lass, L., White, J.L., Ahmed, M.M. 2008. Community-Based Fisheries Management Project in Bangladesh, pp. 73-82. In: Impact assessment of policy-oriented research in the CGIAR: evidence and insights from case studies. Consultative Group on International Agricultural Research Science Council, Rome, Italy.



Mangrove ecosystem of Cox's Bazar
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Community led plantation in Hakaluki Haor

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(micro credit) was found to be effective in diversifying and increasing household income of poor fishers. The concept was also effectively practised in the CWBMP and the CBA-ECA Project through formation and utilisation of Micro Capital Grants (MCG).

The Nishargo Support Project (2003–2008) was initiated by the Bangladesh Forest Department with USAID's support and introduced the co-management approach in protected areas for wise use of natural resources. In continuation of this initiative, USAID supported implementation of Integrated Protected Area Co-management (IPAC) Project (2009–2012)⁸ in association with the Bangladesh Forest Department and the Department of Fisheries to promote and institutionalise an integrated protected area co-management system for sustainable natural resources management and biodiversity conservation. A couple of ECAs, namely Hakaluki Haor and Teknaf Peninsula were included in this project, where activities to reduce dependency of the local communities over natural resources and improvement of biodiversity through conservation were implemented. The project revealed that by understanding the local context, a mix of strategies needed to be considered for better management of wetlands and forests.

The three phased (2006-2015) Community Based Sustainable Management of Tanguar Haor Project (Tanguar Haor Project) aimed at establishing an effective co-management process for sustainable management of haor resources to create an opportunity for development of life and livelihoods of the people living in this Ramsar Site. This Swiss Agency for Development and Cooperation (SDC) supported project

⁸ DoE 2013. Bangladesh Environment and Climate Change Outlook (ECCO) 2012. Department of Environment, Government of Bangladesh, Dhaka, 138 pp.

formed 73 Village Community based Committees (VCC) covering 77 out of 88 villages and brought 4,774 households out of 10,205 households to the co-management of this ECA. For betterment of community's livelihood and management capacity of the organisations, different types of capacity and skill management training, such as leadership development, organisational and financial management, and community led monitoring trainings were provided. A sustainable fish harvesting system and resource sharing mechanism was developed involving community and local administration. The co-management model worked with project support as institutions from village to district levels took and implemented decisions on resource management. Alternative income generating activities were supported by the Social Capital Management (SCM, fund made up of savings and grants) and the Livelihoods Implementation Plan (LIP). Participation of women in income generating activities was encouraging. A total of about 5,000 community members were trained on 65 trades of alternative income generation activities (eg small business, livestock rearing, vegetable cultivation, ecotourism, and poultry rearing) with 45% female participation. All of them have effectively used the SCM fund to increase their household income. Until mid 2015, the communities have accumulated Taka 26 million as SCM. About 50% households of Tanguar Haor participated in the community organisations, and about 7,100 people received membership with 25% women members. Awareness building and conservation effort taken by the project through sanctuary declaration and plantation are expected to significantly contribute to biodiversity conservation.

Coastal and Wetland Biodiversity Management Project

The Coastal and Wetland Biodiversity Management Project (CWBMP), implemented by the Department of Environment from 2003 to 2011 was the first comprehensive initiative to focus only on management of selected ECAs, namely, Cox's Bazar, Hakaluki Haor, Sonadia Island and St. Martin's Island. The project considered the major threats faced by these ECAs: i) excess and unsustainable exploitation of biodiversity resources; ii) clearing of forests, including watershed; iii) conversion and fragmentation of wetland and forest ecosystems; iv) movement of large number of tourists and transportation; iv) hunting and poaching of birds



Community led sand dune conservation
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and other wildlife; v) indiscriminate collection of shell, coral and shrimp fry; vi) pollution of habitats; vii) dry season water lifting from rivers in neighbouring country India; and viii) climate change impacts. The initiative sensitised and raised awareness of local communities and secondary stakeholders in the light of these threats and harnessed the opportunities to overcome the challenges.

Governance has always been a major challenge in natural resource management in Bangladesh. Keeping that in mind, the CWBMP formed village conservation groups (VCG) and ECA Management Committees and linked them for effective monitoring and support on the ground. The project brought together relevant stakeholders from union to national levels in the ECA Management Committees to take pragmatic, context specific actions for respective ECA management, including enforcement. This was further supported by establishing Endowment Fund at the Upazila (sub-district) level, facilitating conservation efforts within the committees' jurisdiction.

Seventy two VCGs were formed in the four ECAs to lead the ECA conservation activities. Capacity building of these groups and local communities on natural resource conservation, organisational management and livelihood enhancement was provided to engage them in conservation. The project further provided Taka 9.6 million as Micro Capital Grants (MCG) to all VCGs. These groups started to use that following guidelines and disbursed funds to its members to undertake alternative income generation activities. With the fund, individuals got involved in on farm (eg practicing improved agricultural and horticultural methods, homestead gardening and plant nursery, cow fattening, goat rearing and duck rearing); off farm (eg fish drying and processing); and non farm activities (eg small business and tailoring). Such livelihoods support helped the communities initiate gradual reduction of their dependency on ECA resources. Linkages were created between the VCGs and the local government institutions to reduce unlawful activities, like illegal fishing and poaching. A total of 184 community members received training on alternative income generation activities with material support. The project provided Endowment Fund to the Upazila ECA Committee with the objectives of facilitating the engagement of secondary stakeholders in ecosystem conservation and extended support to the communities.

Protection of swamp forests and mangroves was one of the key activities under the CWBMP. This was accompanied by plantation raising to restore degraded habitats both in freshwater wetland and on the coast. Such habitat improvement consequently improved the richness of aquatic and terrestrial species.

The project also experienced challenges, like multiple ownership of land, revenue oriented management of wetlands, undue interest of certain groups of stakeholders, limited engagement from law enforcing agencies due to insufficient funds and lack of quick transportation facilities, unskilled manpower and increasing population pressure.

Climate Change and Ecologically Critical Areas

In addition to numerous human induced threats to ECA management, climate change has imposed a new challenge in recent years. Changes in climatic parameters like temperature and rainfall have potential impact on survival, breeding and life cycle of aquatic and terrestrial life forms. Further, changes in temperature and rainfall patterns can cause problems to terrestrial and aquatic plants, due to their complete dependency on temperature for flowering, pollination, seed formation, seed germination and growth. ECAs consist of terrestrial and aquatic ecosystems and would from changed timing, frequency and amount of rainfall in the changing hydrological regime.

In addition to these, sea level rise is expected to shift Bangladesh's coastline from south to the north, permanently flooding a good portion of the country, which includes several ECAs in the coastal zone. Effects of such inundation on coastal vegetation and wildlife have been much talked about, but without systematic investigation. Sea level rise may also contribute to the expansion of salinity; that is likely to affect country's coastal habitats and biodiversity. Higher water temperatures, loss of brackish waters and reduced flows from upstream could harm coastal fisheries, which supports coastal communities, such as those living in Cox's Bazar. Climate change stresses, like ocean acidification, sedimentation, high sea temperature and beach erosion, increased vulnerability of corals could lead to substantial coral mortality in short span. Rise in sea levels could cause erosion of turtle nesting grounds and higher sand temperature may lead to changes in sex ratio or disturbed hatching process. Depletion in the ozone layer will allow higher amount of ultra-violet rays to penetrate, which is expected to harm seaweeds by hindering the photosynthesis process.

Climate change is also expected to bring more intense and frequent extreme weather events, like floods, cyclones, tidal surges, erratic rain, flash-flood, drought, making most ECAs of Bangladesh vulnerable. Super Cyclone Sidr of November 2007 devastated about one fifth of the Sundarban and part of the coast. Saline water intrusion after storm surges has changed coastal ecosystems drastically through changing the land use patterns in recent years. Agro-biodiversity has decreased due to increase in shrimp farming. Small freshwater ecosystems converted into saline water systems has largely damaged aquatic biodiversity of the locality.

Specific, potential impacts of climate change and variability on the ECAs have not been much investigated. Recently, the Department of Environment assessed the vulnerability and consequences of climatic and non climatic changes on key habitats and community of Hakaluki Haor⁹ (Box 1.1).

9 DoE 2013. *Bangladesh Environment and Climate Change Outlook (ECCO) 2012*. Department of Environment, Government of Bangladesh, Dhaka, 138 pp.

Box 1.1: Vulnerability of Hakaluki Haor and its Community under Changing Climate

A recent vulnerability assessment of Hakaluki Haor showed on-going and potential, multiple impacts of changing climate on the habitats of this ecosystem like beels, canals, rivers, agricultural lands, kanda (raised land) and waterfowl habitats. Vulnerability of ecosystems consequently makes the dependent people vulnerable.

These vulnerabilities are essentially result of dual impacts of both climatic and human induced drivers. These drivers are diverse ranging from change in rainfall and temperature patterns (climatic) to use of illegal fishing gears or excessive use of chemicals in the agricultural fields (non climatic). These drivers create pressure on the haor habitats, thus directly affecting ecosystems goods and services.

Changing ecosystem services and functions include disturbed spawning cycle, destruction of fish habitats from siltation, less fish production, reduction of aquatic species both in richness and diversity, reduction in soil fertility, reduced crop production, reduction in wildlife on raised land due to habitat destruction, increase in pest infestation in absence of waterfowls, and loss of overall aesthetic quality of Hakaluki Haor, the largest haor of Bangladesh.

To address observed and predicted impacts and trends of changing climate, some initiatives have been undertaken in the ECAs. Climate Resilient Ecosystems and Livelihoods Project (CREL) started its operation in 2013 in different important ecosystems of Bangladesh, including Hakaluki Haor, Sundarban, Cox's Bazar-Teknaf Peninsula, and Sonadia Island ECAs. CREL has been built on the experiences and achievements of three USAID supported initiatives, namely the MACH, the Nishorgo Support Project, and the IPAC. It aims at building resilience of the people vulnerable to climate risks, with enhanced adaptation to climate change impacts through natural resource management. This initiative focuses on improving governance of biodiversity and natural resources, on enhancing capacity and knowledge of key stakeholders, on planning

and implementation of climate resilient natural resource management and on improving and diversifying environmentally sustainable livelihoods that are resilient to climate change¹⁰. For supplementing the CBA-ECA Project, CREL has started its interventions involving five village conservation groups at the Hakaluki Haor. In Hakaluki, the main focus is on awareness raising, swamp plantation, biodiversity conservation and sanctuary management. In Cox's Bazar, the focus is mainly on mangrove conservation.

Capturing the Experiences of Community Based Ecosystem Conservation and Adaptation in Ecologically Critical Areas

To retain and strengthen CWBMP's conservation efforts in ECAs and to build resilience of respective communities under changing climate, the Department of Environment has implemented the "Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project (CBA-ECA Project)" between 2010 and 2015. The CBA-ECA project has motivated communities and enhanced their awareness, capacity and organizations (Village Conservation Groups, VCGs) for ECA management and biodiversity conservation. Like its predecessor, the CWBMP, it has further supported the community organisations with grants to facilitate alternative income generation activities. The project has strengthened linkages among the VCGs and the ECA Management Committees, from union to national levels, for effective ECA management.

The CBA-ECA Project under took many conservation initiatives at the ecosystem and the species levels, ranging from mangrove restoration and sea turtle conservation on the coast to swamp protection and aquatic sanctuaries in the haor. The Endowment Fund established under the CWBMP further facilitated conservation and ECA management efforts in all ECA upazilas under the CBA-ECA Project. To build community resilience through adaptation and mitigation, special initiatives were undertaken by providing a wide range of technological support to the communities, like improved cooking stoves, solar home systems, solar irrigation and desalinisation plants, and submersible green belts.

At the end of the CBA-ECA Project, an initiative was taken to capture and document the approaches followed, achievements made, impacts created, lessons learned, gaps identified and future needs for taking this experience forward. This book is an initiative for managing knowledge that could be used in the future for taking ecosystem and community based conservation and adaptation efforts in the ECAs.

This book compiles overall experience of the CBA-ECA Project. Chapter 2 captures the development, philosophy and evolution of the CBA-ECA Project. Chapter 3 highlights community engagement, awareness, community organisations, and impact on peoples' understanding on ECA management and biodiversity conservation. Conservation strategies, actions and their impacts are enumerated in Chapter 4. People's livelihood is an important element of CBA-ECA Project, so is the financial arrangement to support livelihoods and conservation efforts; Chapter 5 covers all these aspects of the project. Chapter 6 focuses on institution and governance issues along with financial element in it. Building community resilience was one of the most important aspects of the CBA-ECA Project. Chapter 7 highlights interventions undertaken, and experience and lessons learnt from them. All these experiences and lessons are brought together in Chapter 8 to suggest on sustainability of the achievements of the CBA-ECA Project. The final Chapter 9 proposes some general and specific recommendations to take the achievements and lessons of the CBA-ECA Project forward.

¹⁰ Climate Resilient Ecosystems and Livelihoods (CREL): <http://www.federalgrants.com/Climate-Resilient-Ecosystems-and-Livelihoods-CREL-35006.html>

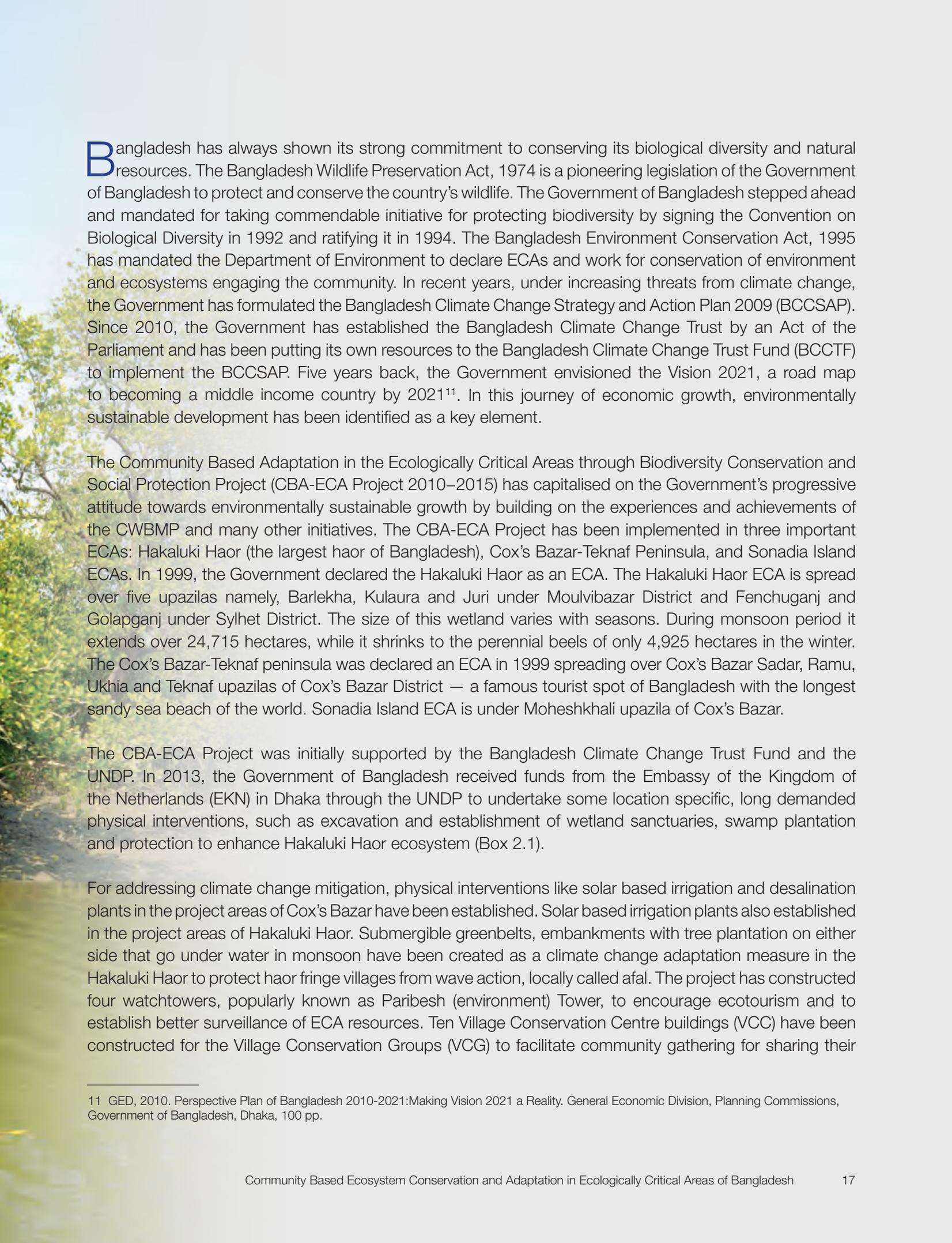
Chapter 2

CBA-ECA Model: A Balanced Initiative

This chapter highlights the necessity of the CBA-ECA Project, expectation from this initiative, philosophy behind putting different adaptation and conservation elements together, and how CBA-ECA is balancing our needs, experiences, resources and capacities.



Coastal mangrove
© Department of Environment



Bangladesh has always shown its strong commitment to conserving its biological diversity and natural resources. The Bangladesh Wildlife Preservation Act, 1974 is a pioneering legislation of the Government of Bangladesh to protect and conserve the country's wildlife. The Government of Bangladesh stepped ahead and mandated for taking commendable initiative for protecting biodiversity by signing the Convention on Biological Diversity in 1992 and ratifying it in 1994. The Bangladesh Environment Conservation Act, 1995 has mandated the Department of Environment to declare ECAs and work for conservation of environment and ecosystems engaging the community. In recent years, under increasing threats from climate change, the Government has formulated the Bangladesh Climate Change Strategy and Action Plan 2009 (BCCSAP). Since 2010, the Government has established the Bangladesh Climate Change Trust by an Act of the Parliament and has been putting its own resources to the Bangladesh Climate Change Trust Fund (BCCTF) to implement the BCCSAP. Five years back, the Government envisioned the Vision 2021, a road map to becoming a middle income country by 2021¹¹. In this journey of economic growth, environmentally sustainable development has been identified as a key element.

The Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project (CBA-ECA Project 2010–2015) has capitalised on the Government's progressive attitude towards environmentally sustainable growth by building on the experiences and achievements of the CWBMP and many other initiatives. The CBA-ECA Project has been implemented in three important ECAs: Hakaluki Haor (the largest haor of Bangladesh), Cox's Bazar-Teknaf Peninsula, and Sonadia Island ECAs. In 1999, the Government declared the Hakaluki Haor as an ECA. The Hakaluki Haor ECA is spread over five upazilas namely, Barlekha, Kulaura and Juri under Moulvibazar District and Fenchuganj and Golapganj under Sylhet District. The size of this wetland varies with seasons. During monsoon period it extends over 24,715 hectares, while it shrinks to the perennial beels of only 4,925 hectares in the winter. The Cox's Bazar-Teknaf peninsula was declared an ECA in 1999 spreading over Cox's Bazar Sadar, Ramu, Ukhia and Teknaf upazilas of Cox's Bazar District — a famous tourist spot of Bangladesh with the longest sandy sea beach of the world. Sonadia Island ECA is under Moheshkhali upazila of Cox's Bazar.

The CBA-ECA Project was initially supported by the Bangladesh Climate Change Trust Fund and the UNDP. In 2013, the Government of Bangladesh received funds from the Embassy of the Kingdom of the Netherlands (EKN) in Dhaka through the UNDP to undertake some location specific, long demanded physical interventions, such as excavation and establishment of wetland sanctuaries, swamp plantation and protection to enhance Hakaluki Haor ecosystem (Box 2.1).

For addressing climate change mitigation, physical interventions like solar based irrigation and desalination plants in the project areas of Cox's Bazar have been established. Solar based irrigation plants also established in the project areas of Hakaluki Haor. Submergible greenbelts, embankments with tree plantation on either side that go under water in monsoon have been created as a climate change adaptation measure in the Hakaluki Haor to protect haor fringe villages from wave action, locally called afal. The project has constructed four watchtowers, popularly known as Paribesh (environment) Tower, to encourage ecotourism and to establish better surveillance of ECA resources. Ten Village Conservation Centre buildings (VCC) have been constructed for the Village Conservation Groups (VCG) to facilitate community gathering for sharing their

11 GED, 2010. Perspective Plan of Bangladesh 2010-2021: Making Vision 2021 a Reality. General Economic Division, Planning Commissions, Government of Bangladesh, Dhaka, 100 pp.



Inauguration ceremony of solar desalination plant

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ideas with respect to conservation of resources and to enhance VCGs income by sustainable use of the establishments. For better management of natural resources, support has been provided to the community for initiating alternative livelihoods for income generation.

Expectations from the CBA-ECA Project

The CBA-ECA Project has worked towards strengthening a co-management model for the ECAs by incorporating climate change adaptation, mitigation and improved livelihood options for the ECA communities. To achieve that goal, the project has strengthened biodiversity conservation, alternative livelihoods options, climate change adaptation, mitigation and institutional mechanism in Hakaluki Haor, Cox's Bazar-Teknaf Peninsula, and Sonadia Island ECAs. Over the project period, the CBA-ECA Project was expected to slow down or reduce degradation of biodiversity and natural resource bases; to restore and rehabilitate degraded ecosystems and improve habitat quality; to reduce the dependency of local people on critical resources by providing alternate income generating options and resource substitutes; and to ensure effective engagement of the local people in the process of project implementation to develop a caring community for the local biodiversity and natural resources.

Table 2.1. Achievements of the CBA-ECA Project at a glance

No.	Achievement	No.	Achievement
Output 1: Conservation management plans reviewed, climate change considerations incorporated and priority interventions are identified			
1.1	Conducted community risk and vulnerability assessment	1.2	Documented local knowledge on disaster preparedness, protection and adaptation
1.3	Identified and prioritized interventions for enhancing community resilience	1.4	Updated Conservation Management Plans (CMP) developed under CWBMP
1.5	Developed ecosystem specific biodiversity conservation and climate change risk reduction action plans		
Output 2: Capacity of VCGs, UDMCs and ECACCs is enhanced to implement priority interventions; income sources of local communities diversified and pressure on biodiversity recourses reduced			
2.1	Facilitated formation and functioning of Village Conservation Groups (VCG)	2.2	Constructed 10 Village Conservation Center Buildings
2.3	Facilitated functioning of ECA Coordination Committees at Upazila and District levels	2.4.	Trained 324 VCG members on organizational management and leadership development
2.5	Organized 11 training sessions for VCG members, Union Disaster Management Committees (UDMCs), ECA Conservation Committee (ECACC) on natural resources management and climate change adaptation	2.6	Provided Micro Capital Grant (MCG) management and skill development training to 500 VCG members and material support to 226 VCG members for alternative income generation activities
Output 3: Priority interventions for climate change adaptation, mitigation and biodiversity conservation are demonstrated and implemented through community participation			
3.1	Developed 81 action plans through VCGs to implement priority activities	3.2	Established 10 wetland sanctuaries and conservation areas managed through excavation and protection
3.3	Demonstrated watershed management in 2 sites	3.4	Trained 1024 VCG members on adaptation option through agriculture, horticultural practice and IPM and demonstrated in 487 plots
3.5	Planted 17.29 hectares swamp, 361 hectares mangrove and 62 hectares sand dune, and protected 685 hectares swamp and 500 hectares mangroves	3.6	Protected 14 sites for birds, 864 hectares for wildlife in Hakaluki Haor; established 5 sea turtle hatcheries and 22 community conserved areas in Cox's Bazar
3.7	Provided 17 awards to individuals, groups, and institutions to encourage biodiversity conservation	3.8	Provided 1100 improved cooking stoves and 40 solar home systems to VCG members
3.9	Installed 5 solar irrigation plants and 2 solar desalination plants		
Output 4: Homesteads, community areas and habitats are protected through plantation, afforestation and other climate change adaptation measures			
4.1	Constructed 11 submersible embankment with green belt to protect settlements in Hakaluki Haor	4.2	Distributed 215,773 saplings of timber, fruit and medicinal plants to community to conserve habitat, protect settlement and enhance carbon sequestration

No.	Achievement	No.	Achievement
4.3	Undertaken a research on implementation of community based adaptation measures for homesteads and community areas	4.4	Carried out research on suitability of various tree species
4.5	Developed and demonstrated climate/disaster resilient housing for the poor		
Output 5: Ecological changes monitored and reported, and ECA rules and relevant legal provisions are enforced to protect biodiversity and other natural resources			
5.1	Conducted 57 law enforcement events	5.2	Engaged 63 community guards for protecting biodiversity and habitats
5.3	Awarded 17 community people for contribution to protecting biodiversity and habitats	5.4.	Constructed 4 watch-towers for better surveillance and enabling ecotourism facilities
5.5	Engaged 35 volunteers for conservation		
Output 6: Awareness raised, information communicated, project learning and recommendations disseminated, and institutional learning promoted targeting various audiences (including local communities, policy makers, practitioners and intermediaries)			
6.1	Organized 1182 meetings and 11 workshops to aware people and to link community with institutions	6.2	Prepared 5 types of posters, 5 types of fact sheets, 115 billboards/signboards and 12 publications for raising awareness among stakeholders
6.3	Carried out media initiatives to raise awareness	6.4	Conducted 28 folk shows, 3 experience sharing visits, 5 important day celebrations, and awareness programmes in 12 schools for mass awareness
6.5	Organized 3 local level workshops for experience sharing among stakeholders		

Elements of the CBA-ECA Project

The CBA-ECA Project, executed by the Department of Environment and its implementing partner NGOs, essentially has taken a community based approach to conserving biodiversity of three ECAs under the changing climate. The specific tasks of the project included preparation of action plans for biodiversity conservation and climate change risk reduction, capacity building and livelihood diversification of the community, implementation of priority actions on biodiversity conservation and climate change adaptation, adaptation measures for community protection against climate change, monitoring and enforcement awareness raising, and media campaign. All the activities of the CBA-ECA Project have, therefore, been context specific and community driven.

Awareness building of the communities has been an important part of the project. Wide range of activities have been undertaken courtyard meetings, plantation programme, folk dramas, rallies, school awareness programmes, and nationally and internationally important day observance, etc. Environment and natural resources conservation issues, challenges, opportunities and responsibilities have been the main topics in these events.

The project promoted an institutional arrangement for the management of ECAs. Lower tier of this framework is the grass roots level community organisations, the Village Conservation Groups (VCG) — central to the ECA and its biodiversity management. These VCGs are actively engaged in designing and implementing

conservation and climate change adaptation and mitigation interventions. In the haor and coastal ECAs, a total of 72 VCGs were formed and registered with the Department of Cooperatives under the CWBMP. The CBA-ECA Project has worked with 68 VCGs, almost all were formed under the former project. These groups have been facilitated to have fortnightly/monthly meetings to discuss group activities, biodiversity resource conservation and protection, deposit savings, fund management, and lending out money to their members to support income generating activities. The VCGs have received training on leadership, natural resource management and group and fund management. Selected VCG members have also received training for alternative income generating activities like sewing, tailoring, mat making, handicrafts making, poultry rearing, goat rearing, and fish culture. The members could explain how the resources degraded and what the consequences of such degradation are on their livelihoods and the environment.



Knowledge sharing on conservation with community

© Department of Environment

Four committees have been incorporated in the institutional framework at local, district and national levels engaging community representatives, local government and government administration. Union ECA Management Committees and Upazila ECA Management Committees are the local level authorities with whom VCGs communicate regularly. The district level and national level ECA committees receive feedback from the bottom and provide necessary guidance for ECA management. For carrying out initiatives with

regard to conservation, the Upazila ECA Management Committees have been supported by providing endowment fund and operational guidelines. Upazila ECA committees have used the fund for conservation networking, protecting resources and taking initiatives for conservation of natural resources.

The uniqueness of the CBA-ECA Project is to facilitate innovative funding mechanisms. Here funds were given not only for the self employment of the community, but also for the conservation of nature. More importantly the funds lie with them and are operated by them. In case of the Micro Capital Grant (MCG), the fund was given to the community to enable them reduce dependency on natural resources, whereas the Endowment Fund was given to the Upazila ECA Management Committees, which is in-charge of monitoring and motivational activities for the conservation of respective ECAs. MCG received by all 68 VCGs, a financial support provision was introduced as the revolving fund used through social banking policy among the community members.

Under the CBA-ECA Project, 10 Village Conservation Centre (VCC) buildings have been constructed for VCGs. This is an innovative concept in Bangladesh. The VCCs are essentially, well designed, one storied multi purpose building having 900 square feet floor space. A VCC has been used as the office, and meeting and training place for a VCG. There is also a biodiversity museum within the building from where VCG can earn by keeping it open for the tourists. These VCCs also offer space for community gathering and celebration of festivals. One day every week, the VCCs are allocated only for the women of the community so that they can gather and exchange their thoughts. The VCGs also allow the members to take their handicraft items to the centre to sell to the tourists.

Village Conservation Center at Hakaluki Haor ECA
© DoE/ AKM Rafiqul Islam





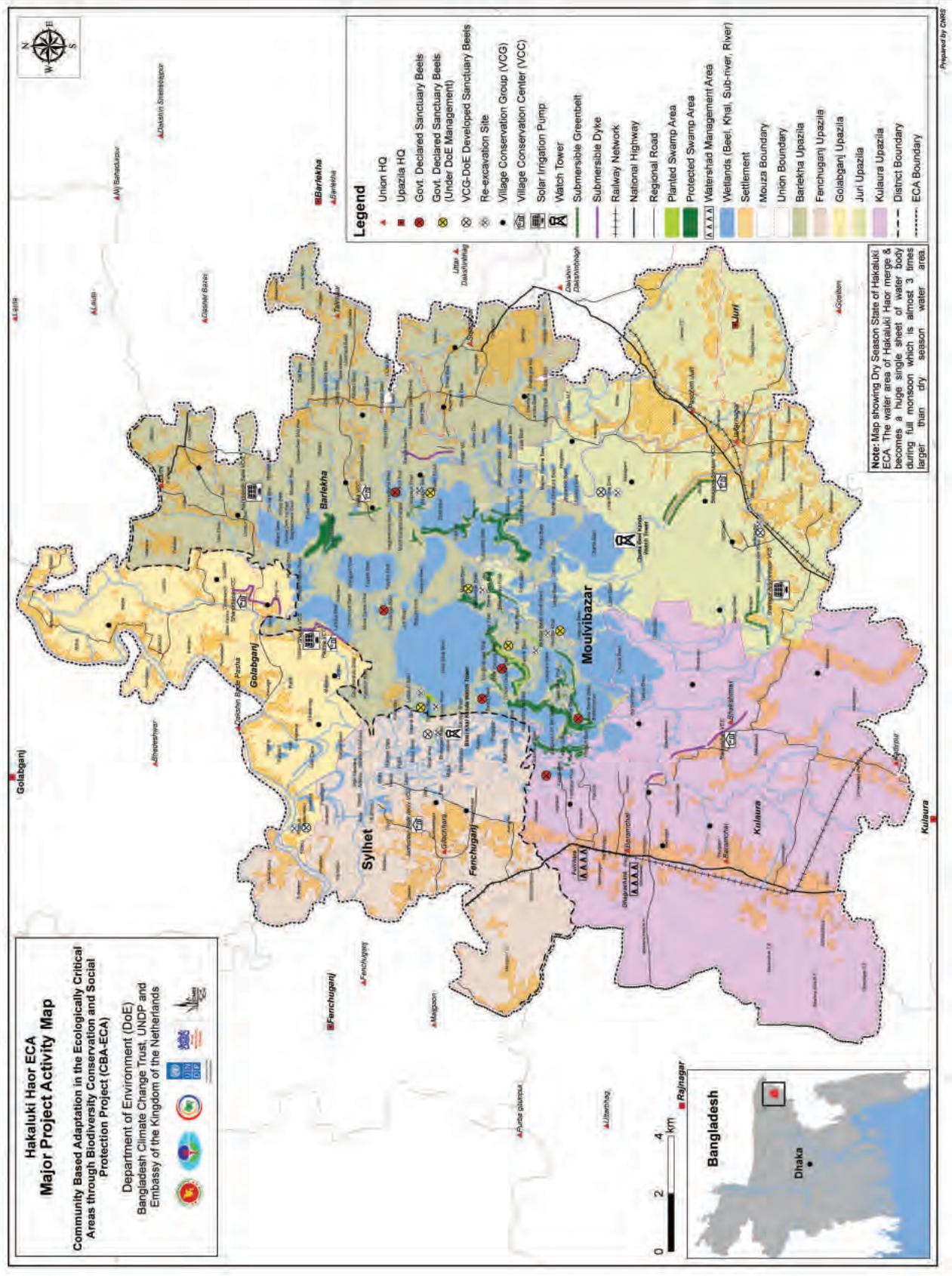
Women role in processing of pea nut

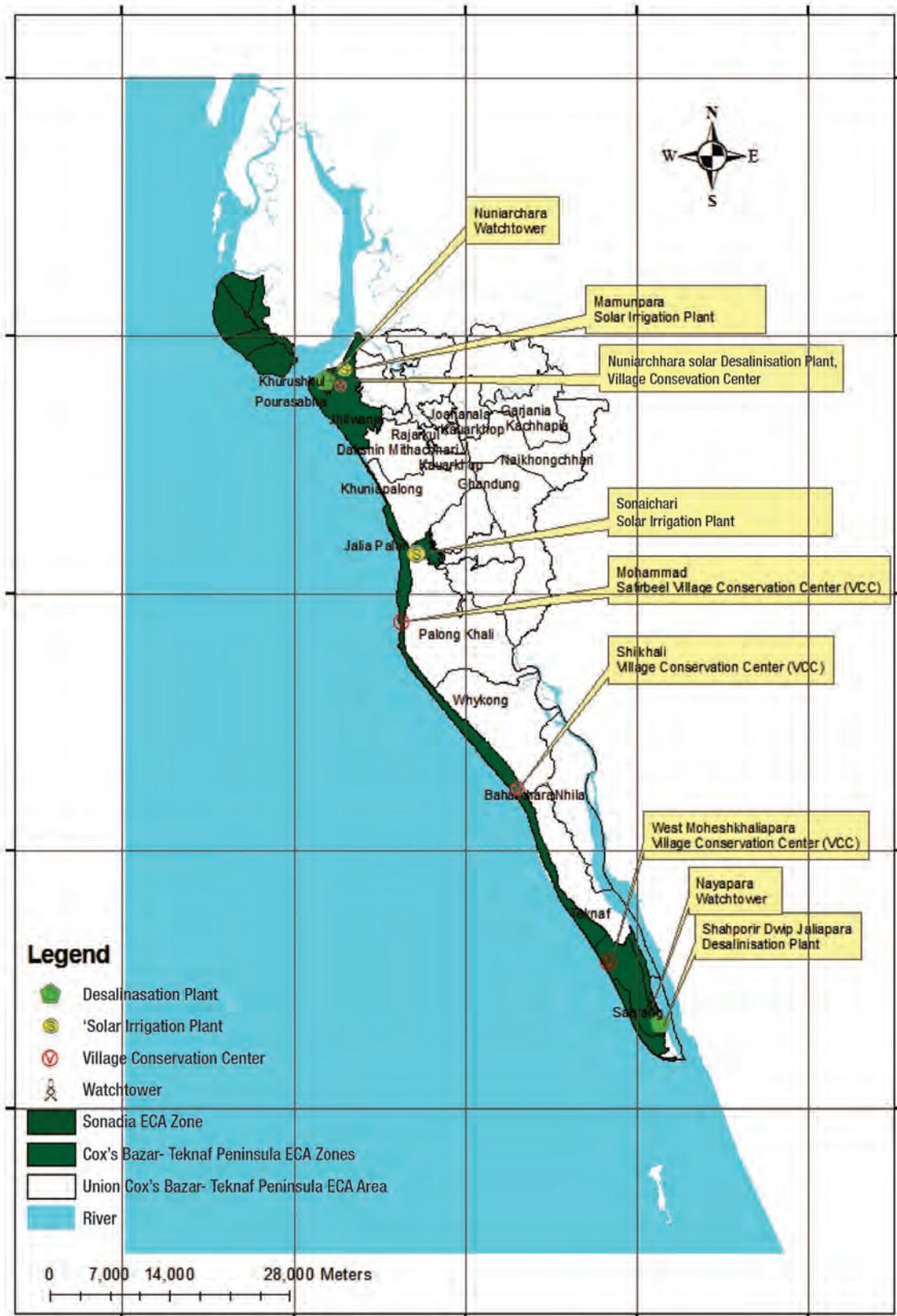
© IUCN/ Sakib Ahmed

Biodiversity conservation is the core of the CBA-ECA Project. Conservation measures included swamp forest protection and plantation, aquatic sanctuary establishment, mangrove protection and plantation, sand dune plantation, rocky inter-tidal zone and mudflats protection, bird conservation, turtle conservation, and extension of Integrated Pest Management (IPM) among the communities. Watchtowers constructed by the plantation sites or sanctuaries provided opportunities both for better surveillance and nature based tourism. As part of conservation measure, community guards have been deployed for patrolling. Local administrations with the Department of Environment and the VCGs have undertaken legal enforcement to stop illegal harvesting of ECA resources.

As demanded by the community to improve their basic services, selected households have received improved cooking stoves and solar home systems. At haor and coastal sites, five solar irrigation plants have been installed to promote agriculture in non arable land. In coastal area, two solar desalinisation plants, first time ever in Bangladesh, have been installed to provide drinking water to thousands of people living in the salinity affected areas. These activities have also built resilience of the communities under the changing climate. Activities like construction of green belt on submersible dykes and plantations in the haor also improved community's resilience in the ECAs.

Major project activity map of Hakaluki Haor ECA





CBA-ECA Project: A Balanced Initiative

Community based natural resources management started in Bangladesh in the 1990s. The CBA-ECA Project, therefore, had the opportunity to capitalise on the lessons in the project formulation and execution when it started in 2011. Looking back, the project has considered four issues.

Firstly, by putting people in the centre, the project has emphasised on people's expectations and needs while designing its activities. It has assessed the local context and attempted to address the problems in a pragmatic manner. Inclusion of interventions to build climate resilience in addition to biodiversity conservation supports that notion.

Secondly, the CBA-ECA Project has effectively explored and made best use of available resources. It started off with financial assistance from the Government of Bangladesh's Bangladesh Climate Change Trust Fund and UNDP. Later it has enhanced the project activities through the facilitation and contributions of development partners, like the Embassy of the Kingdom of the Netherlands (EKN) in Dhaka through UNDP.

Thirdly, the project has been built on the past experiences and knowledge bases gathered and created by previous projects, for example, MACH, SEMP, the ECFC, the CBFM-II, the CWBMP and IPAC (see Chapter 1). These are all community based initiatives, but had different philosophies, entry points and approaches. The CBA-ECA Project is premised on its predecessor the CWBMP, but took lessons from other projects.



People collecting fresh water from solar desalination plant
© Department of Environment



Integrated Pest Management practice by VCG member

© Department of Environment

In case of financial investments for example, on the one hand, the Micro Capital Grant (MCG) has been distributed to the VCGs to enhance economic condition of their members for reducing dependency over natural resources and enhancing resilience. On the other hand, the communities have learnt and experienced how to utilise small funds, and have been successfully managing the MCG in the mode of micro credit without a third party involvement. A total of Taka 9.6 and 6.8 million have been provided as MCG under the CWBMP and the CBA-ECA project, respectively. Taka 10 million has been provided as Endowment Fund to 10 upazilas namely, Kulaura, Juri and Barlekha of Moulvibazar; Fenchuganj and Golapganj of Sylhet; Cox's Bazar Sadar, Maheshkhali, Ramu, Ukhia and Teknaf of Cox's Bazar to support conservation, enforcement and management actions in the ECAs. Further, the CBA-ECA Project has taken

forward 68 VCGs out of 72 VCGs and all ECA Management Committees formed at the Hakaluki Haor and Cox's Bazar sites under the CWBMP. The CBA-ECA Project therefore has effectively capitalised on all investments made by the CWBMP.

Fourthly and finally, the CBA-ECA Project has efficiently harnessed the abilities and commitments from different actors in the arena of biodiversity conservation. The Department of Environment's revised organogram and manpower allocation, Government's administration and other institutions supporting ECA management, and the vast experience of partner NGOs, namely CNRS and NACOM, in natural resources and ECA management have come together to make the project implementation effective and successful.

The CBA-ECA Project is therefore an initiative that has successfully balanced the needs on the ground, the available resources, the past experiences and investments made, and the abilities and commitments of important actors engaged in ECA management. While doing so, it has further effectively converged these important elements towards the ECA management in Bangladesh.



Chapter 3

Inspiring and Engaging the People

This chapter captures the awareness, commitment, aspiration and motivation of the people involved in the CBA-ECA Project. It describes the formation and evolution of Village Conservation Groups (VCG) as community based institutions to organise and engage the communities, their capabilities in planning and managing resources and responsibilities.



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প্রকৃতি ও
পরিবেশের
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সমাজভিত্তিক জীববৈচিত্র্য সংরক্ষণ ও জলবায়ু পরিবর্তন অভিযান

বিশ্ব জলোচ্ছ্বাস দিবস

২রা ফেব্রুয়ারি - ২০১২ খ্রিঃ

“পরিবেশ বান্ধব উন্নয়নে আপনিও গর্বিত অংশীদার হউন

স্থান : ছিদ্রক আলী উচ্চ বিদ্যালয়, আজিমগঞ্জ

আয়োজনে : সিএনআরএস এমোসিমেশন

আর্থিক সহযোগিতায় : ক্লাইমেট চেঞ্জ ট্রাস্ট ফান্ড, পরিবেশ অধিদপ্তর



People living in and around the Ecologically Critical Areas (ECAs) are at the centre of the Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project's (CBA-ECA Project) approach and philosophy. These are the people who rely on the natural resources, especially on forest and aquatic resources, to sustain their lives and livelihoods. Moreover, they are the people living at the lowest economic stratum of the society in rural Bangladesh as the poor and the ultra poor. It is therefore important to consider their livelihoods ensure effective ECA management. It is also necessary to engage them effectively in all conservation efforts in ECAs.

Community engagement in natural resources management demands several successive, inter-dependent actions. People's dependency on natural resources of ECAs and its extent have to be identified along with their socio-economic status. They need to be aware of the declining situation of their common pool resources and the need to improve the situation. They have to be organised to undertake interventions to protect the ECA. Such organisation is also vital to improve their livelihoods, reduce their dependency on the depleting natural resources through alternative livelihoods options and to shape their lives and the future generation.



Fishing in Hakaluki Haor

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Organising the People

A total of 68 Village Conservation Groups (28 in Hakaluki Haor ECA and 40 in Cox's Bazar-Teknaf Peninsula and Sonadia Island ECAs) were nurtured under the CBA-ECA Project, with an aim to achieve better management of ECA resources and enhance resilience of community. These VCGs are spread over 19

unions, 10 upazilas in three districts. The membership of VCG ranged from 20 to 60 people. A total of 2617 households with 16,000 people represent these VCGs. At the Cox's Bazar and Hakaluki Haor sites, 36% and 29% VCG members are women, respectively.



Service of haor ecosystem

© Sakib Ahmed

Almost all VCGs in both ECA regions were formed under the Coastal and Wetland Biodiversity Management Project (CWBMP, 2003–2011). All of these were registered with the Department of Cooperative. Each VCG has a 9 member Executive Committee, consisting of 1 president, 1 vice-president, 1 secretary and 6 members. The VCGs' office bearers received training on different topics on many an occasion: on leadership, VCG management, MCG management, management of infrastructures, and so on. VCG members also received training on natural resource management, wildlife conservation, sanctuary management, agriculture activities and alternative income generation activities, like handicraft making, tailoring, cattle rearing, duck rearing and fish culture.

The VCGs as community based organisations had two major groups of activities: ecosystem conservation (Chapter 4) and livelihoods improvement (Chapter 5). All the VCGs have received Micro Capital Grant (MCG) once or twice under the CWBMP in 2008 and 2010 and once under the CBA-ECA Project in 2015. They also have monthly saving schemes (Taka 20, 50 or 100 per member), annual share scheme (Taka 100 per member) and profit from service charge applied on lend out money. As per the MCG operational guidelines, members can borrow money for a certain period with 10% service charge. Financial mechanism and performance of the MCG is detailed out in Chapter 5 of this book. Being the core of the whole community led initiatives in the ECAs, the VCGs are also represented in the ECA Management Committees at the union and upazila levels. These linkages and representations are discussed in Chapter 6.

Evolution of people's organisation

Some VCGs of the Hakaluki Haor area were originally formed as Village Committees under the Sustainable Environment Management Programme (SEMP, 2002–2005). In Cox's Bazar region, on the other hand, some villages were part of the Empowerment of Coastal Fishing Communities (ECFC) project which organised

fisher communities into community based organisations. In some cases, these VCGs were taken up by other projects (eg by IPAC in Hakaluki Haor) after the end of the CWBMP and before starting of the CBA-ECA Project. It was noted that some VCGs although initially had larger membership, had reduced number of members as they could not performed well and irregular in paying membership fees. On the contrary, Mohammad Shafir Beel VCG in Teknaf, for example, had 22 members when it was formed under the CWBMP in 2007; but in 2015, the membership stood encouragingly at 54.

Under the CBA-ECA Project, the VCGs have shown better performance than the CWBMP phase, in relation to fund management, conservation effort, understanding value of ecosystem and strengthening relationship with other ECA Management Committees. Under this project, the VCGs received a common place called Village Conservation Centre (VCC), a well structured multipurpose building for sharing their ideas, taking decisions with regard to conservation, organising conservation related events, and showing their own products and heritage. The CBA-ECA Project is a pioneer in implementing this unique idea in Bangladesh.

Performance of the organisations

Performance of the VCGs is depended on several factors. First is the composition of the VCG membership. In many cases, most of the VCG members were male. Although women were there in the Executive Committees, their role was limited due to local culture and norms. Things were different in other VCGs. Tulatoli VCG in Teknaf, for example, is a women led VCG. This group has shown very good performance in understanding the values of ecosystem and reducing their dependency on resources by managing their MCG efficiently.

Inauguration ceremony of Village Conservation Center
© Department of Environment



Second is leadership. Good, effective leadership has always been a key to make a community based organisation work, grow and sustain. In most of the cases, such leadership can be seen among the CBA-ECA's VCGs. Some leaders have been continuing for very long time (eg Surjomukhi, Juri, Hakaluki Haor VCGs). In some cases, leadership change took place on a regular basis. In most of the cases, leaders are senior members of the local community. Udayan VCG in Pabijuri, Hakaluki Haor, on the contrary, was formed by a group of young people in 2006 under the CWBMP and is still led by them currently under the CBA-ECA Project.

Third is tradition. Rakhain para VCG (Cox's Bazar) is a progressive VCG consisting ethnic Rakhain community, embedded with majority Bangla speaking community. The traditional role of women and men within their society helped move forward. Traditionally ethnic women are involved in income generating activities along with men, and do not restrict themselves within the households. The progressive mentality of the women and support from their male counterparts helped both in coming forward to improve their lives and livelihoods and to enhance their role in conservation.

Awareness Motivation Commitment

The VCGs of the CBA-ECA Project and the communities showed a commendable level of awareness, motivation and commitment. It is indeed a culmination of long term involvement of these people in SEMP, the ECFC, the CWBMP, IPAC, and in the recent years in the CBA-ECA Project all focusing on natural resource management and biodiversity conservation by engaging and organising the local people.



Staging folk show for awareness raising among local communities

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Now, the members of VCGs can confidently articulate the need for conservation of natural resources, necessity for alternative livelihood options and importance of climate resilience. The members of Judistipur VCG (Hakaluki Haor) can explain how the protection of swamp will increase fish production in the haor through creating fish breeding ground, and how that will protect settlements from wave erosion, ultimately improving community wellbeing. Such understanding of the inter-linkages between swamp forest protection with fish production, livelihood improvement and flood protection could strengthen commitment of the communities towards conservation. Mohammad Shafir Beel VCG and Borodeil VCG (Teknaf) can convincingly explain how turtle conservation will reduce abundance of jelly fish and this in turn will increase fish availability in the sea. President of Mamunpara VCG (Cox's Bazar) explains that installation of solar irrigation plant will facilitate availability of ground water and help them cultivate fallow land effectively, shifting their livelihoods from unsustainable coastal fishing to sustainable rice and vegetable cultivation.

“ This is our moral duty to protect our birds, trees and fish. Getting return in terms of money is not everything.. We have to conserve nature for our future generation.”

– President, Surjomukhi VCG, Hakaluki Haor

The disaster preparedness of the coastal ECA communities, like listening and understanding early warning signals, avoiding deep sea fishing during signals and going to cyclone shelter on time has improved tremendously through the project interventions. They are now more courageous about facing natural disasters. The VCG members are also aware of their children's education. Their improved income has enabled them to send their children to school. Some of the members are expecting to buy solar home systems, which they believe would help their children to study at night and improve their lives in general.

The project participants now understand the importance of having an institution like VCG to lead their conservation and development agenda forward. They value the importance of good leadership. Senior community leaders also feel honoured to become the office bearer of the VCGs. The VCG election in Shilkhali (Teknaf) is a good example to showcase how a community practices democratic process to elect leaders, turning the election into a festival.

All the VCGs show their strong intention to continue with their activities in absence of any project support. They promised to save their plantations and sanctuaries even when the salary now coming from the project for



Democratic process of VCG election

© Department of Environment



Proactive participation of members in VCG election

© Department of Environment

guarding ends. They truly believe that these conservation ventures are really theirs and have a strong sense of ownership. The VCGs have sustained effectively during the one and a-half-year gap between the CWBMP and the CBA-ECA Project due to capacity building efforts on organisational management by the CWBMP.

Capacity and Strength

There are some exciting examples where VCGs have been successfully protecting habitats and species. Swamp plantation in Fingler kanda has been protected by Surjomukhi VCG. This community based organisation of Hakaluki Haor was originally formed in 2004 under SEMP. They have managed to reduce migratory bird hunting by 80% in their locality. Successful re-excavation and protection of fish sanctuaries are also on their success list. In Teknaf, Mohammad Shafir Beel and Borodeil VCGs, for example, have been able to conserve sea turtles by saving eggs even when project stopped its activities. The VCGs also involved other non VCG members in their conservation work, like homestead plantation.

The VCGs have been recognised as a good force while enforcing ECA rules by the Department of Environment (eg VCGs of Cox's Bazar). There have also been examples (eg Udayan VCG, Hakaluki Haor) where VCGs have come forward to stop illegal fishing in the sanctuaries and poison fishing when local administration and government agencies delayed to arrive on the scene. The VCGs have also been acting as watchdog and have so far taken part in 57 events with law enforcing agencies to protect illegal and harmful activities, like use of illegal nets, and collection of shells and snails from the ECAs.



Annual planning of VCG

© Department of Environment

A total of Taka 6.8 million has been provided to 68 VCGs as MCG under the CBA-ECA project to run the organisations and to create alternative income sources for the VCG members. Most of the VCGs were performing satisfactorily in terms of lending out MCG to its members. Almost all cases, loan recovery was 100%. Performance of the MCG is further discussed in Chapter 5.

The VCGs have been calling for physical interventions, like Village Conservation Centre (VCC) building, watchtowers, solar irrigation systems and solar desalinisation plants since long to improve their conservation effort as well as resilience. Materialisation of these expectations under the CBA-ECA Project has been very encouraging for them. The VCGs are aware of their responsibilities for managing these physical interventions. Detailed management guidelines have been prepared for each structure and shared with the communities to guide participatory post intervention management and maintenance. Inclusion of Department of Environment representatives in the management bodies would provide further management support, advice and technical back stopping beyond the project period.

Aspiration and Vision

The long involvement through the CWBMP and the CBA-ECA Project has created commendable aspiration and vision among the VCGs to take conservation efforts forward in their respective ECAs. Almost all of the VCGs now look forward to include new members for strengthening their financial capital. In Borodeil of Teknaf and Mohammad Shafir Beel at Ukhia, the communities around the VCGs have shown their interest



Community led enforcement on shell

© Department of Environment

in engaging with the VCGs. Shurjomukhi and Udayan VCGs of Hakaluki Haor have predicted Taka 1 million capital investment for making their organisations stable, sustaining conservation interventions initiated by the CWBMP and the CBA-ECA Project. The VCG of Judistipur of Hakaluki Haor look forward to the benefits from ecotourism: income from selling tickets to visitors for using the watchtower, and creation of local jobs and business to provide services to the tourists.

In all cases, VCG currently represent a small portion of the community they belong to. Due to interest shown by other people of the communities to be part of the VCGs, many VCGs have been planning to extend their membership. But there are some challenges to materialise that. A few VCGs have identified insufficient financial capital like MCG as the main reason for not recruiting new members (eg Mohammad Shafir Beel, Teknaf). Some other VCGs have identified calculation of the enrolment amount for new members as a challenge (eg Borodeil VCG, Teknaf). Such amount should consist of the total monthly savings, annual shares and portion of profit generated from investments and accumulated over the last 6-8 years for a VCG member. This amount is a large sum for a poor villager to afford and pay in one go.

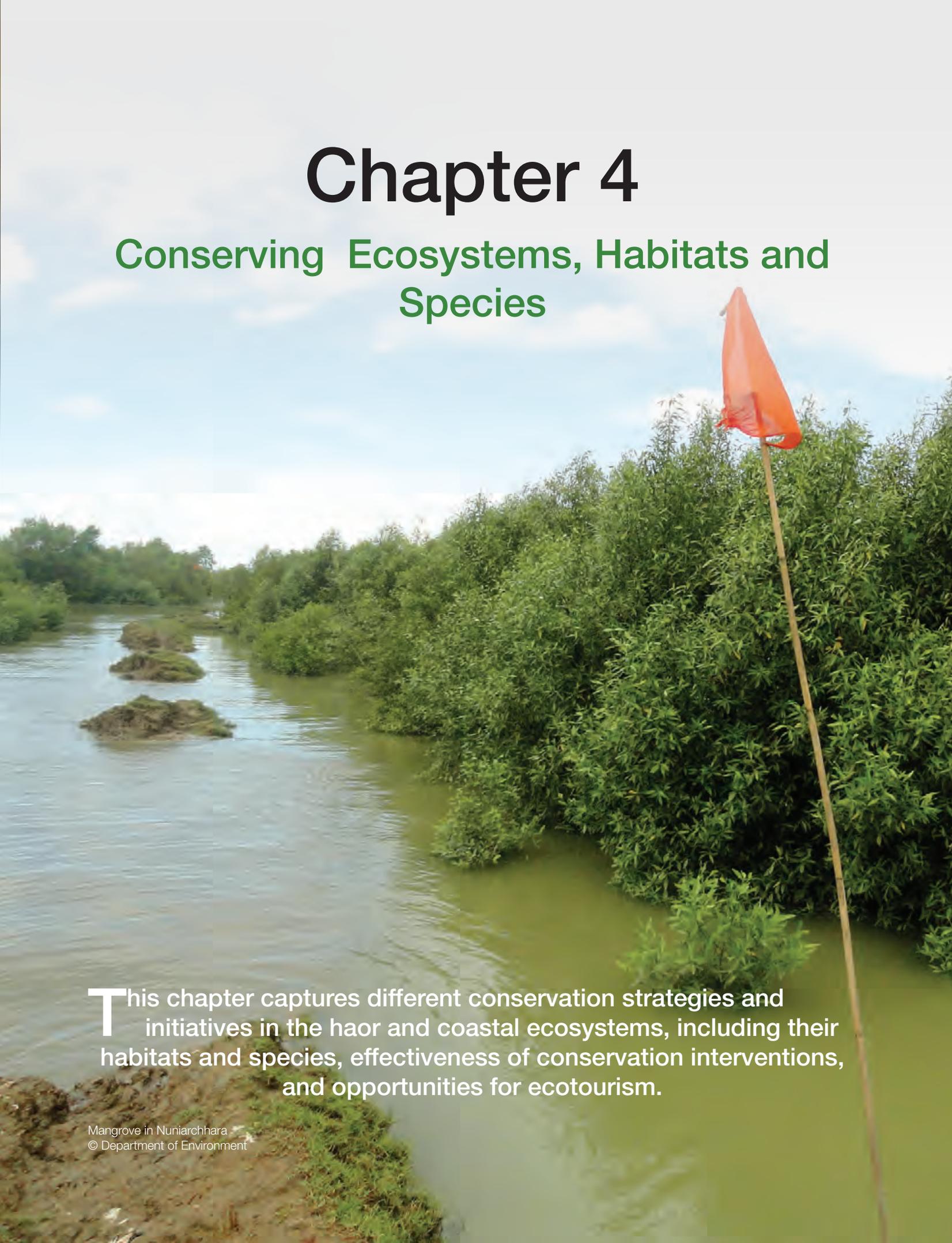
“..... If you cut a tree at its apex, new branches will come out. Problems are like that. You have to cut the base of the tree of problem.”

– President, Borodeil VCG, Teknaf

As the CBA-ECA Project ended in its current form, all VCGs have felt that they need more assistance from the Department of Environment in taking the recently initiated activities forward. In a discussion with Judistipur VCG in Hakaluki Haor, longer presence of Department of Environment has been expected to bring back Hakaluki Haor to its original ecological state — the state that was destroyed over the first 30 years after the independence of Bangladesh in 1971. This expectation in fact explains communities’ understanding of their current capabilities, remaining and future conservation needs. Thus, they are continuously exploring opportunities to meet those needs by getting constant advice and knowledge, and enforcement and follow up by different projects, like the CBA-ECA Project. Such support may be needed in the coming days as well, given the complexity in ECA management in Bangladesh.

Chapter 4

Conserving Ecosystems, Habitats and Species



This chapter captures different conservation strategies and initiatives in the haor and coastal ecosystems, including their habitats and species, effectiveness of conservation interventions, and opportunities for ecotourism.

পরিবেশ টাওয়ার, নয়াপাড়া

পরিবেশ টাওয়ার
নয়াপাড়া
পরিবেশ টাওয়ার
নয়াপাড়া

The Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project (CBA-ECA Project) has intervened in two ecologically diverse regions of Bangladesh: the haor basin of the north-east, and the coast of the south-east. Hakaluki Haor is the largest inland freshwater ecosystem of Bangladesh with maximum monsoon surface area of 24,715 hectares. In dry season, the haor retains only one fifth of its monsoon size consisting of perennial beels. In 1999, the Government of Bangladesh declared 40,466 hectares of Hakaluki Haor and its surrounding areas as an ECA. The haor consists of agricultural land, beel (deeper portion of the haor where water remains almost 12 months) and kanda (raised land with settlement). The socio-economic condition of people living around Hakaluki Haor is poor. The main economic activities of these people are agriculture, fishing and livestock rearing. The ecosystem was once rich in biodiversity, which has degraded over the years. A study conducted in 1993 reported 107 fish and 125 bird species in Hakaluki Haor, which were found 75 and 41, respectively, in another study in 2009¹². The CWBMP estimated 20 tree, 28 shrub, 120 herb and 10 climber species in 2005. These were reduced to 11, 15, 38 and 5 species, respectively, in 2009. The total number of birds has increased however, with reduced number of species.

Cox's Bazar-Teknaf Peninsula bears the longest sandy sea beach of the world, and Sonadia Island has a unique mangrove ecosystem that can withstand high salinity. The biologically diverse resources of the Bay of Bengal and its coasts, not only comprise fishes, but also many microscopic and large animals and plants. This area hosts reasonably diverse cetacean populations, like those of dolphins and whales. Besides, two globally Critically Endangered bird species, namely Spoon-billed Sandpiper and Indian Skimmer are found in the coastal mudflats of Bangladesh in winter. With rich biodiversity, the marine and coastal ecosystems of Bangladesh are facing different types of threat, like over exploitation of fisheries resources including collection of post larvae of shrimp, coastal and marine pollution, ship breaking, impact of coastal aquaculture on environment, frequent natural hazards and sea level rise as a result of climate change. Unplanned commercialisation and tourism development have made management of biodiversity in Cox's Bazar and St. Martin's Island ECAs more complex. For preventing these resources from depletion, a number of initiatives have been taken by the government.

12 Islam et al. (2011)



Spoon-billed Sandpiper
© Sayam U. Chowdhury

Conservation of the ecosystems and the species of ECAs with the local communities was a main pillar of the Sustainable Environment Management Programme (SEMP), the Empowerment of Coastal Fishing Communities for Livelihood Security Project (ECFC), and the Coastal and Wetland Biodiversity Management Project (CWBMP). That approach was strongly followed by the CBA-ECA Project as well. The CBA-ECA Project was built on the investments made in building people's capabilities on biodiversity conservation in previous initiatives of the Government of Bangladesh. Nonetheless, urgency of adapting to climate change and evolution of new concepts like resilience building and ecosystem-based adaptation have given newer meaning to biodiversity conservation in the ECAs.

The CBA-ECA Project implemented both ecosystem conservation and species conservation interventions. For ecosystem conservation, all components of an ecosystem, namely soil, water, air, flora and fauna were considered. On a more operational aspect, all stakeholders brought under same umbrella to take effective conservation measures. The CBA-ECA Project strengthened the linkage of community based organisations (Village Conservation Groups, VCGs) with different stakeholders like the local governments at the union and upazila (sub-district) levels, local authorities like District Administration and Department of Environment for improving natural resource governance in the ECAs. Such linkage has facilitated VCGs to be part of the ECA management structure, and has led towards coordinated effort for preventing illegal activities in the ECAs. Side by side, capacity of VCGs has enhanced and a financial mechanism like Micro Capital Grant (MCG) has been established for engaging in alternate income generation for diversifying their livelihoods. The CBA-ECA initiative has contributed to enhancing household income as well as resilience that ultimately engaged them in biodiversity conservation.

In case of ecosystem conservation and management, habitat improvement under the CBA-ECA Project was often undertaken through biological interventions, like rocky intertidal zone protection, turtle breeding ground conservation, sand dune regeneration, and swamp conservation. Such habitat improvement measures have sometimes included physical interventions as well, such as beel and canal re-excavation, engaging the community and the local government. In some cases, formal declaration of an area as a conserved area like a sanctuary has been made under existing rule and regulations. In other cases, declaration of a conserved area has been more of a community led initiative, facilitated by the CBA-ECA Project. Species conservation measures have always been done in the natural habitats. Such measures included plantation



Asian Openbill (*Anastomus oscitans*)
© IUCN/ Sakib Ahm

and protection of swamps, mangroves and sand dunes; establishment of turtle hatcheries; and recruitment of native fish fingerlings to the beels. In all cases, communities have been actively engaged with the processes. In the following sections, different conservation initiatives taken under the CBA-ECA Project are described along with their impacts.

Ecosystem Conservation

Plantation in degraded swamp forest areas, protection of natural swamps and mangrove patches, and management of fish sanctuaries are major interventions to improve important ecosystems. Besides, a large number of seedlings of different species were distributed in the villages of project areas to improve the overall local environment. Plantation along the roads as well as on submergible dyke was also supported.

Swamp plantation, protection and restoration

Swamp forests offer important ecosystem services to a haor ecosystem. They act as the breeding ground for native fishes during the monsoon. Mammals take shelter in these habitats in the dry season. Water birds and migratory birds also take refuge in these freshwater forests. These vegetation play a vital role in climate change adaptation and mitigation by protecting settlements from strong waves in the haor and sequestering carbon from the atmosphere. A swamp forest also supports adjacent communities by supplying fuel wood. To sustain these unique and diversified roles of swamp forests, the CBA-ECA Project has taken initiatives to protect, enrich and conserve swamp vegetation in the Hakaluki Haor ECA.

Once covered with thick freshwater swamp forests, even in the 1960s, all haors of Bangladesh have lost this fantastic feature over the 1970s and 1980s. Thus swamp forest restoration by locally raising seedlings was initiated in wetland management initiatives since the late 1990s. It was initiated in Hakaluki Haor in the period 2002–2005 under SEMP. A total of 71.72 hectares khas land (government owned land) and institutional premise spaces was planted with 146,093 hijol (*Barringtonia acutangula*) and korocho (*Pongamia pinnata*) seedlings¹³. Protection of existing 515 hectares swamp forests to encourage natural regeneration was also supported under SEMP. The CWBMP continued this pioneering work, but to a much greater extent when 700 hectares of freshwater swamp were protected.

13. IUCN Bangladesh, 2005. Major Interventions for Sustainable Wetland Resource Management. IUCN Bangladesh Country Office, Dhaka, Bangladesh, x+135 pp.

Table 4.1. Protection of natural swamp under the CBA-ECA Project

No.	Site	Village Conservation Group (VCG)	Location	Area (hectare)
1.	Satbila Beel & Singjuri Beeler kanda	Hakaluki Jagorony	Talimpur, Barlekha	50
2.	Moiajuri Beel Dakshin Kanda	Udayan	Talimpur, Barlekha	25
3.	Zallar Beeler Dakshin-purbo Kanda	Dashghori	Sujanagor, Barlekha	50
4.	Zallar Balijuri Beeler Kanda	Halla	Talimpur, Barlekha	50
5.	Nauriya Beeler Kanda	Judhistipur Badedeouli	Ghilachara, Fenchuganj	15
6.	Haoya Beeler Kanda	Shasarkandi	Bhukshimoil, Kulaura	50
7.	Shingjuri and Kalapani Beeler Kanda	Shasarkandi	Bhukshimoil, Kulaura	50
8.	Kangli Beeler Kanda	Bargaon	Vatera, Kulaura	50
9.	Farami Beeler Kanda	Rakhalsha	Bhukshimoil, Kulaura	15
10.	Maislardak Beeler Dakshin Kanda, Khairati Beeler Uttar Kanda, Balikury	Surjumukhi	PaschimJuri, Juri	65
11.	Barlekha Swamp	Judhistipur Badedeuli	Ghilachara, Fenchuganj	80
Total				500

Under the CBA-ECA Project, nine VCGs have protected 500 hectares of natural swamp forests at 11 sites (Table 4.1). These sites ranged from 15 to 80 hectares with Barlekha Swamp Forest as the largest in Ghilachara of Fenchuganj upazila. At six sites, 18,450 seedlings have been planted in 17.29 hectares (Table 4.2). Those have been managed by seven VCGs. The project has also supported small number of guards to protect the plantation sites.

Table 4.2. Swamp plantation under the CBA-ECA Project

No.	Plantation Site	Village Conservation Group (VCG)	Location	Area (hectare)	No. of saplings
1.	Birali Khal	Judhistipur Badedeuli	Ghilachara, Fenchuganj	1.56	3750
2.	Moiajuri Beel	Udayan	Talimpur, Barlekha	1.25	3000
3.	Tekoni Beel-1	Judhistipur Badedeuli	Talimpur, Barlekha	1.04	2500
4.	Tekoni Beel-2	Judhistipur Badedeuli	Talimpur, Barlekha	0.98	2350
5.	Ronchi Beel	Akota	Talimpur, Barlekha	1.25	3000
6.	Kontinalar Kor	Belagaon	Jayfornagor, Juri	1.60	3850
Total				7.68	18,450

Mangrove plantation, protection and restoration

Mangrove is one of the unique ecosystems in the world that can tolerate varied levels of salinity. The ecosystem harbours many species of flora and fauna, including molluscs, crabs, crustaceans, insects, fish, birds and

mammals. Mangrove also offers fuel wood for the communities living nearby. Community also gets opportunity to earn from tourism in and around a mangrove ecosystem. Mangrove forest protects communities from the damage of cyclones and tidal surges, and reduces carbon level in the atmosphere through sequestration.

The Bangladesh part of the world's largest mangrove forest, the Sundarban, is situated in the south-western districts of the country, namely Satkhira, Khulna, Bagerhat, Patuakhali and Barguna having an area of 6,017 square kilometre. The major plant species of the Sundarban mangrove forest are sundari (*Heritiera fomes*), goran (*Ceriops decandra*), gewa (*Excoecaria agallocha*), pasur (*Xylocarpus mekongensis*), kankra (*Brugueiera gymnorrhiza*), keora (*Sonneratia apetala*), and golpata (*Nypa fruticans*). There are other mangrove patches found in Nijhum Dweep, Sonadia Island, and Cox's Bazar, but the species abundance is different from that of the Sundarban. Mainly bain and keora plants can be seen in these areas.

Under the CBA-ECA Project, a total of 361 hectares of mangroves have been planted with local mangrove species (2 species of bain) and one species of keora in 19 spots of Cox's Bazar-Teknaf Peninsula (Figure 4.1). On an average, 15,000 to 17,000 saplings have been planted per hectare. In addition, about 500 hectares of degraded mangroves in five locations, namely Naaf estuary 150 ha, Khuruskul 60 ha, Nuniarchhara 80 ha and Badarmokam 14 ha, have been protected under the project. The plantation and protection of mangrove forest have enriched the habitat for wildlife. Seven species of kingfishers now are seen in Nuniarchhara mangrove forest and this indicates abundance of native fish in and around the regenerated and protected mangrove forest of Nuniarchhara.



Turtle hatchery at Pechardwip
© NACOM

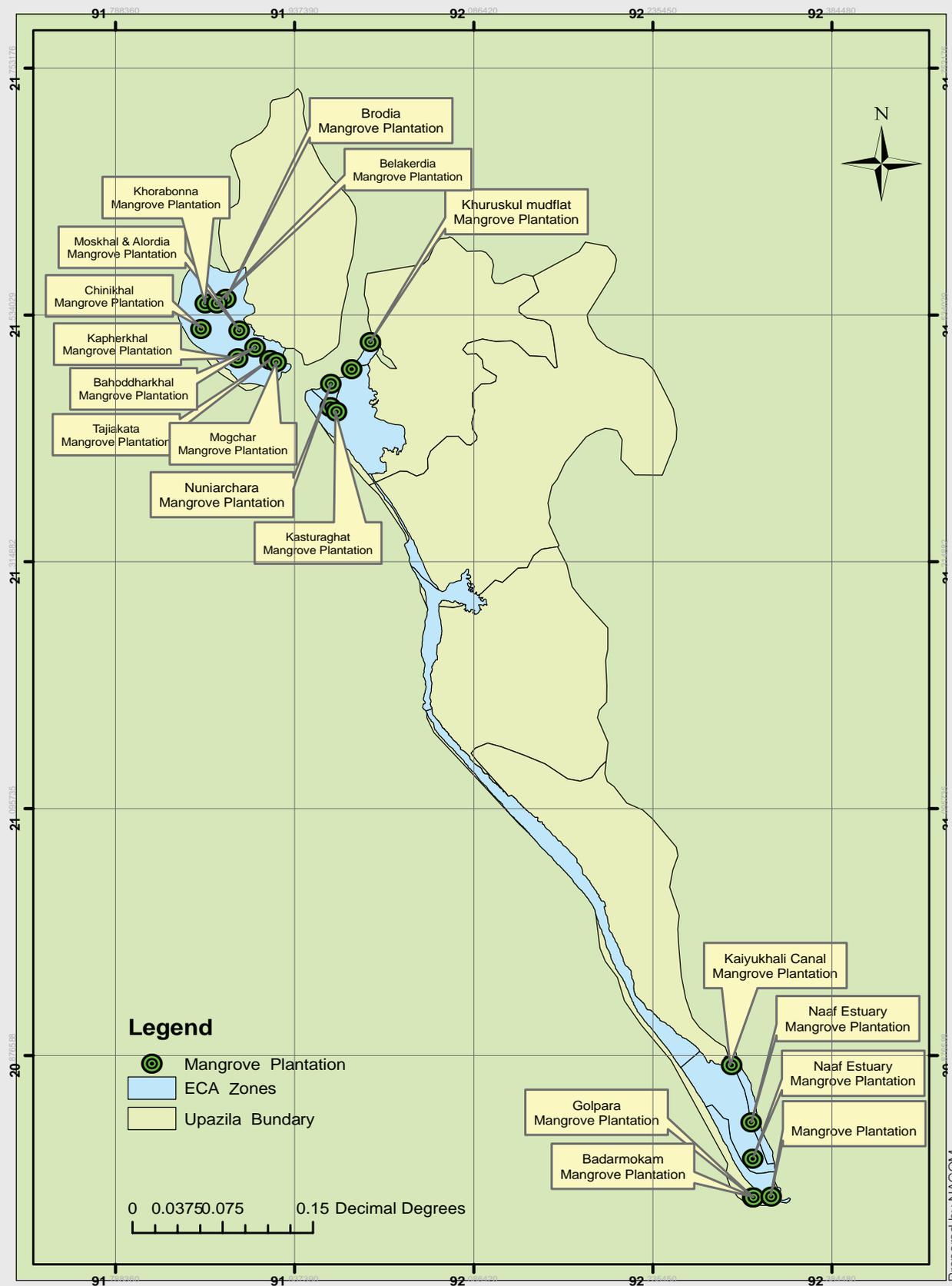


Figure 4.1. Location of mangrove plantation and protection areas in the Cox's Bazar-Teknaf Peninsula and Sonadia Island ECAs.

Box 4.1: Nuniarchhara Mangrove: A conservation success of the Department of Environment

Back in 2007, the 162 hectares of land in Nuniarchhara carried degraded patches of mangrove forest threatened by illegal shrimp farming. The once rich mangrove ecosystem had lost all its ecosystem services to extensive and intensive shrimp culture.

The Coastal and Wetland Biodiversity Management Project (CWBMP) of the Department of Environment started plantation in this degraded mangrove patch in 2007. To strengthen this conservation initiative, Nuniarchhara Village Conservation Group was formed under the project in 2008. The Department of Environment, in association with local NGO partner, engaged the community for plantation and safeguarding for regeneration in 162 hectares of mangrove. This venture has continued in the CBA-ECA Project. The community played a vital role in plantation and protection of mangrove by safeguarding from various external factors, such as illegal felling of trees and land encroaching by illegitimate land grabbers, for reviving the rich past of mangrove of that area.



Nuniarchhara mangrove
© DoE/ AKM Rafiqul Islam

The effective conservation and protection by the CWBMP and the CBA-ECA Project have helped Nuniarchhara mangrove to regain its richness. Now Nuniarchhara is blessed with about 90 bird species, including 30 winter migrants. Since this area is near the Bakhkhali River and the Bay of Bengal estuary, nearly 80 fish species find shelter in this mangrove patch as their nursery ground. Endangered Horse Shoe crab (Rajkakra) are also available here now because of conservation efforts. Biodiversity enhancement in this area has created scope for ecotourism that could help the community diversify their livelihood.

Other Habitat Improvement Initiatives

Sand dune forms at the interface of the land and the sea. It acts as a natural barrier, and is the primary defense structure against cyclones, tidal surges and beach erosion. Therefore, it is important to plant and conserve sand dunes of the beaches. A total 62 hectares of planted sand dune vegetation at seven locations along the beach of the Teknaf Peninsula ECA and Sonadia Island ECA has been brought under the protection scheme for regeneration by engaging local communities. *Keya* (*Pandanus furcatus*), *nishinda* (*Vitex negundo*), *haora/khair* (*Saccharum sp.*), *sagarlata* (*Ipomoea pes-caprae*), *akonda* (*Calotropis gigantea*) and *kolmi* (*Ipomoea fistulosa*) have been planted in the sand dunes. Once degraded sand dune habitats have now been restored to a great extent with luxuriant vegetation growth under the CBA-ECA Project.

Two rocky intertidal zones with a total area of 120 hectares have been identified and protected namely i) Jahajpura to Noakhalipara at Teknaf, and ii) Inani to Rupoti at Ukhia. Moreover, a total of 10 mudflats consisting of about 358 hectares have been established and maintained as mudflat conservation areas in the Cox's Bazaar-Teknaf Peninsula and Sonadia Island ECAs.



Sand dune plantation at Cox's Bazar site
© Department of Environment

Wetland Sanctuaries

Wetland sanctuaries are deeper part of wetland where fishing and collection of other aquatic resources are restricted. The CBA-ECA Project has taken management of wetland sanctuaries to restore fish habitats and breeding grounds. Usually wetland sanctuaries are established in the deeper part of a wetland so that in dry season fish species can survive. The wetland sanctuaries also contribute to the restoration of other aquatic resources, like aquatic plants, phytoplankton and snails.

Table 4.3. Fish sanctuaries in Hakaluki Haor under the CBA-ECA Project

No.	Name	Area	Location
1.	Takoni Beel - 1	80.38	Talimpur, Baralekha, Moulvibazar
2.	Tekoni Beel - 2	21.65	Talimpur, Baralekha, Moulvibazar
3.	Mojajuri Beel	28.20	Talimpur, Baralekha, Moulvibazar
4.	Ronchi Beel	224.00	Talimpur, Baralekha, Moulvibazar
5.	Maislerdak Beel	63.45	Jafornagar, Juri, Moulvibazar
6.	Agder Beel	22.20	Jafornagar, Juri, Moulvibazar
7.	Koiarkona Beel	14.45	Jafornagar, Juri, Moulvibazar
8.	Khorua Beel	14.75	Shorifganj, Golapganj, Sylhet
9.	Birali Khal	12.45	Ghilasara, Fenchuganj, Sylhet
10.	Continalar Kor Khal	4.40	Jafornagar, Juri, Moulvibazar
	Total	485.93	

A total of 12 wetland sanctuaries have been formally established under the CBA-ECA Project. Ten sanctuaries have been re-excavated to improve the fish habitats (Table 4.3). All such earth work has been done by respective VCGs, with support from the project. The amount of re-excavation has been based on need and available resources. Other investments in these conservation areas included putting katha (bamboo and tree branches) in the water bodies to create aquatic habitats and food supply to the fish. Selected sanctuaries have also been protected from fish theft.

Wildlife Conservation

The habitat improvement initiatives taken in the terrestrial, aquatic and coastal habitats of the ECAs under the CBA-ECA Project have subsequently increased the richness and diversity not only of wild plants, but also wildlife, especially birds. In addition to that, a wide range and intensive awareness campaigns on importance and needs for protecting wildlife had been followed by some specific conservation measures on wildlife in all the three ECAs.

Box 4.2: Pakhi Bari — A Model of Conservation by the Community

In the late afternoon, while walking towards the edge of the haor in Halla, one would find hundreds of birds flying back from haor to take shelter in a particular house surrounded by tall, big trees. This house is popularly known as the ‘house of bird’ or the pakhi bari.

It all started 15 years back when the residents found a few birds taking shelter on the big trees of their homestead. With the passing of days, the number of birds increased. Some people of that area tried to hunt them, but the residents did not allow that. One day there was a clash between the hunters and the residents of the pakhi bari, and the local people supported the hunters, as they did not have knowledge on conservation. The people of pakhi bari could resist the hunters from killing the birds resting in their house, but could not do much when they hunted birds in the haor.

When SEMP launched in this area in 2001, awareness level of the people started to increase regarding nature and wildlife protection. The awareness level reached to such a level with the interventions of the CWBMP and the CBA-ECA Project that local people started resisting hunters by providing support to the pakhi bari. Now birds are not only safe in pakhi bari, but also in the haor of Halla. People now feel proud for having pakhi bari in their neighborhood.

Birds started returning to Pakhi Bari in the evening
© Department of Environment



Protection of waterfowls from hunting and poaching has been very important for Hakaluki Haor and Sonadia Island — two important habitats of some globally endangered species. In one village in Halla (Hakaluki Haor), a homestead had become pakhi bari or ‘the house of birds’ (Box 4.2.) is a fascinating example of *in situ* conservation, where wildlife and humans share common homestead together. Similarly, the coast of Cox’s Bazaar was nesting ground of some globally significant marine turtles, which was nurtured under the CBA-ECA Project, including a breeding programme to facilitate improved turtle population (Box 4.3.).The project also facilitated an MSc for carry out research on turtle conservation.

Box 4.3: Turtle Conservation along the Coast of Cox’s Bazar

Marine turtles play an important role in maintaining coastal and marine ecosystems. They feed on phytoplankton and zooplankton, crustaceans especially lower arthropods and jelly fish, thus reducing pressure on fish population. Their egg shells are good source of nutrients for the sand dune vegetation. Green turtles graze on the sea grass helping the plant grow faster, which in turn creates a healthy breeding ground and refuge for many marine fishes.

Conservation of marine turtles has been one of the crucial conservation issues of the Cox’s Bazar-Teknaf Peninsula and Sonadia Island ECAs. This area is a major breeding ground for four species of marine turtles, namely the Olive Ridley Turtle (*Lepidochelys olivacea*), Green Turtle (*Chelonia mydas*), Logger head Turtle (*Caretta caretta*), and Leatherback Turtle (*Dermochelys coriaca*). These species are both globally and nationally endangered.

Under the CWBMP, protection has been provided to 51 kilometers along the beach by engaging community guards. A total of 32 nests were protected *in situ* condition. During 2007–2009, 28,642 eggs were collected from four hatcheries, and 26,408 hatchlings were released to the sea.

As a continuation of the CWBMP, the CBA-ECA Project established five turtle hatcheries at five strategic locations along the beach (Figure 4.2). Within the project period, 39,511 eggs have been collected from 260 nests, and transferred to five hatcheries. The number of eggs per nest has varied from 38 to 190 with an average clutch size of 122 eggs. Average hatching rate has been 86%. In total, 33,935 hatchlings of turtle have been released to the sea from five hatcheries. Besides, 25 nests have been protected through *in situ* measures. Extensive awareness campaign was also conducted throughout the period in these important turtle nesting sites.



Release of turtle hatchling
© Department of Environment

A thorough scientific research is still required to monitor the changes in turtle population because of the project interventions. Since only mature turtles come to beach for nesting, the visible impacts on nesting population would take a longer time. The CWBMP baseline study, however, showed that about 35 individual persons of the project area were engaged in turtle egg collection either for home consumption or for selling. Due to project activities almost all of them now no longer involved in egg collection. The devouring of nests/eggs by dogs has also reduced significantly. A huge number of hatchlings have been released in the sea from hatcheries and that would also have positive impact on the overall turtle population.

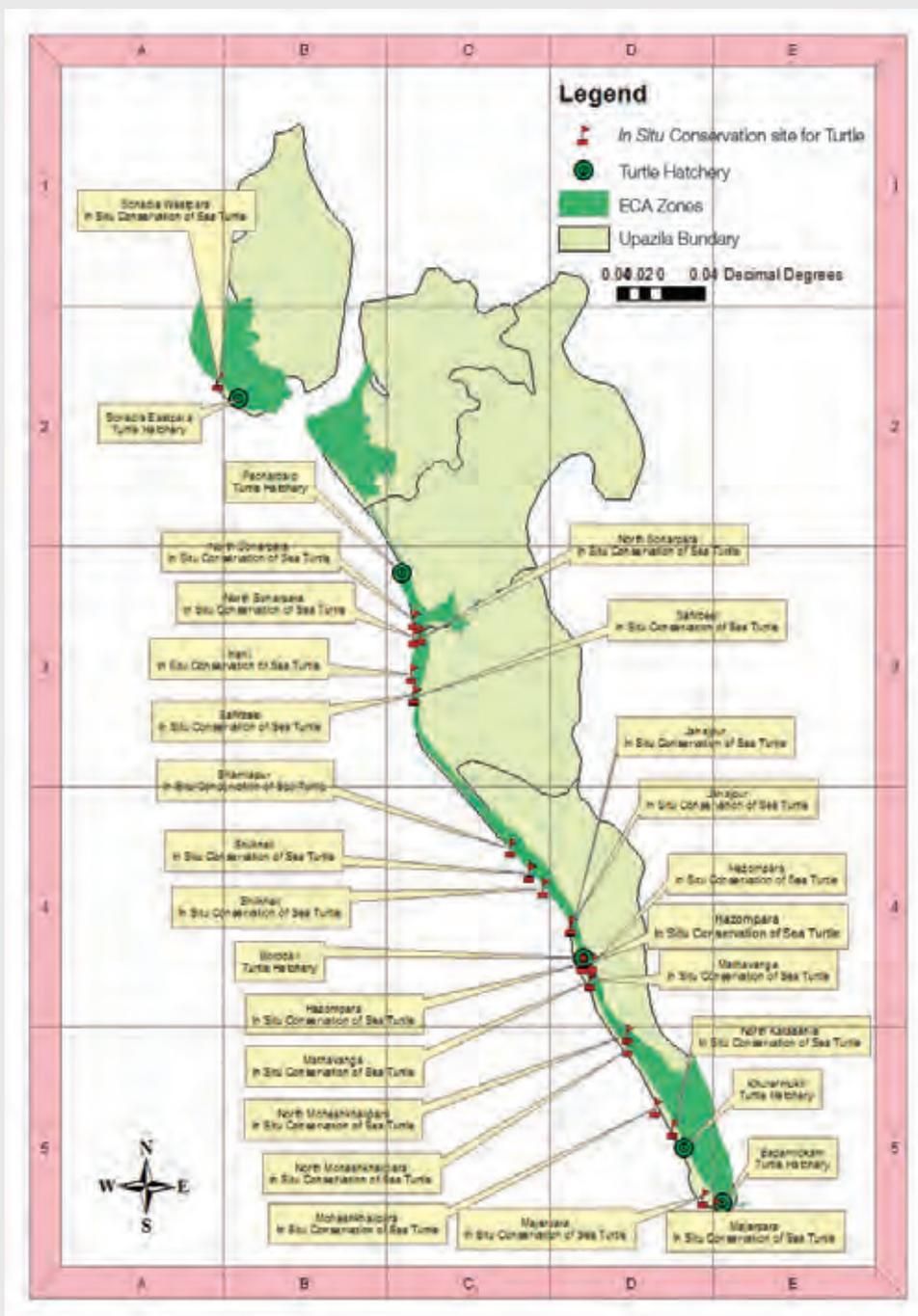


Figure 4.2. Map of the CBA-ECA Project showing locations of turtle hatcheries and *in situ* conservation areas

Box 4.4: Watchtower — A Symbol of Conservation and Ecotourism

The watchtowers built under the CBA-ECA project have dual functions: surveillance of conservation areas and promotion of tourism in and around those conserved areas that could create livelihood opportunities for the local community. In haor, fishermen are also known to take shelter on watchtower during storms. The towers erected under the project are 14 meter tall and have been designed to suite the local context and purpose.

Each watchtower is managed by the respective Village Conservation Group (VCG). The members VCG have been trained to manage it as per the 'Watchtower Management Guidelines'. It has been suggested in management guideline to collect fee from tourists to recover maintenance cost for guarding and equipment.

In the Coastal and Wetland Biodiversity Management Project (CWBMP), the predecessor of CBA-ECA Project, promotion of nature based tourism in the ECAs was an essential component. The sheds established under this project around Hakaluki Haor for example, were widely used by visitors and students and researchers. Local people were trained and guided tourists. In winter, the peak season, each guide could earn Taka 1000–1500 per month from guiding.

Given the past experience, the watch-towers of the CBA-ECA Project popularly known as the Environment Towers, have great potential to promote eco-tourism in the ECAs. It is important to develop some facilities around these structures to encourage ecotourism and attract tourists. Such facilities need to be developed sustainably, without hampering the natural beauty and biodiversity of these rich habitats.



Environment tower

© Department of Environment

Impacts of Conservation Efforts

Freshwater swamps and mangrove forests play important roles in conserving biodiversity of their ecosystems by providing food, shelter and breeding ground and other ecosystem services. The people living around haor are vulnerable to wave erosion in monsoon. Freshwater swamps protect them to by reducing frequent wave action. Mangroves are playing a vital role in protecting coastal communities by reducing the damage from cyclones and tidal surges. Both types of swamps contribute to mitigation of climate change through carbon sequestration.



Mangrove plantation in mudflat

© NACOM

The forest patches formed and conserved under the CBA-ECA Project have created refuge for aquatic and terrestrial wildlife. These have also created habitats for other small and large plant species. For example, alarmingly disappearing aquatic plant makhna (*Euryale ferox*) has now reappeared in the haor. Dewatering of beels to take out the last fish has stopped in many of CBA-ECA Project villages after extensive campaigning over the last decade. This has created opportunities for fish to regenerate in the following monsoon. It has been reported that fish sanctuaries have increased fish availability and diversity in these beels. Fish species like kalibaush and pabda have increased in some beels like Belagaon.

In Cox's Bazaar, both the planted and regenerated mangrove areas have shown healthy growth and dense coverage. From bird surveys and monitoring, it has been noted that migratory and shore birds are now more prevalent than before. For example, in Nuniarchhara, rapid assessments carried out in 2011 and 2013 have found 24 wildlife species (Table 4.4). These numbers are far greater than 14 wildlife species reported in the CWBMP (2007–2010). It is anticipated that these mangrove patches will have tremendous impact on the local fisheries, as mangroves are suitable nursery and breeding grounds for many marine fish species.

As a result of conservation efforts, some rare species have been sighted in the recent years, such as the fishing cat and monkey in Fenchuganj. Tremendous increase in Purple Swampphen (Kalim) bird in reed patches has also been reported. Similarly, other habitat improvement interventions, like protection of rocky intertidal zone and mud-flat are also expected to bring benefits to the local marine biodiversity.

Table 4.4: Wildlife species available at Nuniarchhara planted mangrove under CWBMP and CBA-ECA Project of Department of Environment

No.	English/Local Name	Scientific Name	CWBMP (2007–10)	CBA-ECA (2011–13)
Birds				
1.	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	√	
2.	Indian Pond Heron	<i>Ardeola grayii</i>	√	√
3.	Little Egret	<i>Egretta garzetta</i>	√	√
4.	Intermediate Egret	<i>Mesophoyx intermedia</i>	√	
5.	Little Cormorant	<i>Phalacrocorax niger</i>	√	
6.	Common Kingfisher	<i>Alcedo atthis</i>	√	√
7.	Spotted Dove	<i>Streptopelia chisnensis</i>	√	
8.	Common Myna	<i>Acridotheres tristis</i>	√	√
9.	Asian Pied Starling	<i>Sturnus contra</i>	√	√
10.	House Sparrow	<i>Passer domesticus</i>	√	√
11.	House Crow	<i>Corvus splendens</i>	√	√
12.	Black Drongo	<i>Dicrurus macrocercus</i>	√	√
13.	Barn Swallow	<i>Hirundo rustica</i>	√	
14.	Oriental Magpie Robin	<i>Copsychus saularis</i>	√	
15.	Fulvous-breasted Woodpecker	<i>Dendrocopos macei</i>		√
16.	White-throated Kingfisher	<i>Halcyon smyrnensis</i>		√
17.	Pied Kingfisher	<i>Ceryle rudis</i>		√
18.	Ashy Wood Swallow	<i>Artamus fuscus</i>		√
19.	Chestnut-tailed Starling	<i>Sturnus malabaricus</i>		√
20.	Common Tailorbird	<i>Orthotomus sutorius</i>		√
21.	Oriental White-eye	<i>Zosterops palpebrosus</i>		√
22.	Oriental Magpie Robin	<i>Copsychus saularis</i>		√
23.	White-throated Fantail	<i>Rhipidura albicollis</i>		√
24.	Baya Weaver	<i>Ploceus philippinus</i>		√
Mammals				
1.	Indian Pipistrell	<i>Pipistrellus coromandra</i>		√
2.	Flying Fox	<i>Pteropus giganteus</i>		√
Reptiles				
1.	Checkered Keelback Snake	<i>Xenochrophis piscator</i>		√
Amphibians				
1.	Cricket Frog	<i>Fejervarya sp.</i>		√
2.	Skittering Frog	<i>Euphlyctis cyanophlyctis</i>		√
3.	Common House Toad	<i>Bufo melanostictus</i>		√

Box 4.5: Reverting Shrimp Farms into Mangrove Forests

Before 2007, the rich mangrove patches of Sonadia Island and Nuniarchhara, Cox's Bazaar were converted into shrimp farms by illegal land grabbers. The encroachers made dykes along the tidal zone and trapped water for a long time, which resulted in destruction of the mangroves. The Department of Environment tried to convince people not to destroy mangroves. It did not get expected success due to non-cooperation from the local communities and the encroachers.

To achieve sustainable management of mangroves and biodiversity, a combined drive was taken in February 2007 to evict illegal shrimp farms from Sonadia Island. With support from the Coastal and Wetland Biodiversity Management Project (CWBMP) of the Department of Environment, other government agencies, namely Cox's Bazar district administration, police, Bangladesh Navy, Combined Force, Bangladesh Forest Department, Department of Fisheries, local government authorities and Village Conservation Groups (VCGs) came on the same platform and evicted all illegal shrimp farms from the Sonadia Island ECA. Before this large-scale eviction programme, stakeholder awareness was created by the Department of Environment. These awareness programmes created the drive among stakeholders to evict the illegal shrimp farms for restoring the degraded mangrove ecosystems.

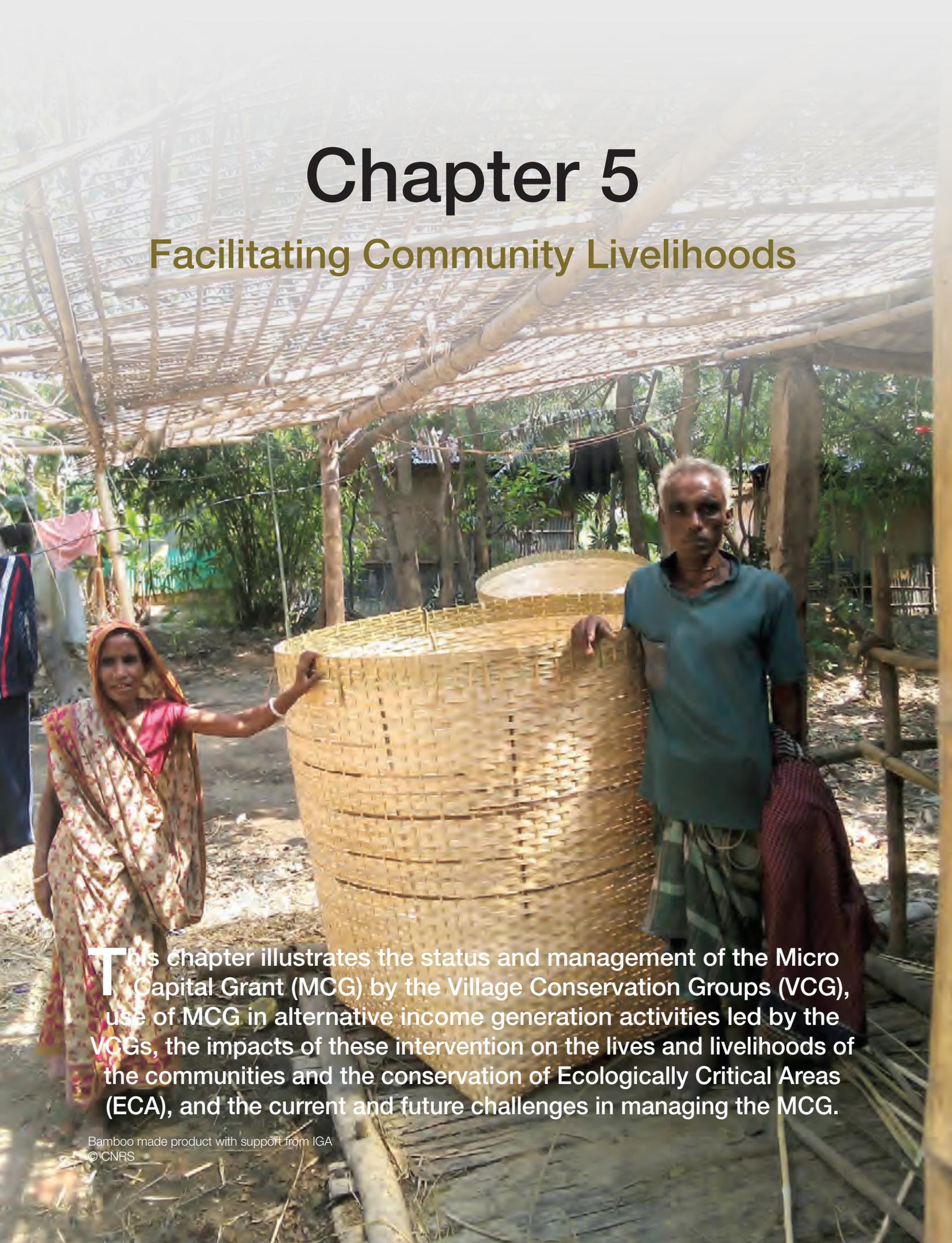
After eviction, mangrove plantation has been done on a large scale by the Bangladesh Forest Department and the Department of Environment on Sonadia Island. The effort has established more than 2000 acres of mangrove forest on Sonadia Island, which now harbours different species of wildlife. Along with the eviction of shrimp farm from Sonadia Island, the Department of Environment did the same in Nuniarchhara of Cox's Bazaar. The mega eviction operation is the success of mass awareness and effective coordination among government agencies which demonstrates how joint effort can diminish muscle power.



Community conserved mangrove forest
© Department of Environment

Chapter 5

Facilitating Community Livelihoods

A photograph showing a man and a woman standing next to large, cylindrical woven bamboo baskets. The man is on the right, wearing a green t-shirt and a patterned sarong, holding a red cloth. The woman is on the left, wearing a colorful sari. They are under a thatched roof structure made of bamboo and palm leaves. The background shows a rural setting with trees and a building.

This chapter illustrates the status and management of the Micro Capital Grant (MCG) by the Village Conservation Groups (VCG), use of MCG in alternative income generation activities led by the VCGs, the impacts of these intervention on the lives and livelihoods of the communities and the conservation of Ecologically Critical Areas (ECA), and the current and future challenges in managing the MCG.



Products of VCG members produced with IGA support
© Department of Environment

It is very difficult and is not wise to keep people away from natural resources derived from the ECAs, whose lives are dependent on these resources. What can be done, as one of the best alternatives, is to help create alternative income generation activities with an aim to support livelihoods that can reduce poverty and can contribute towards the conservation of ECA resources. When these activities contribute to communities' livelihood and fulfil other basic needs like education, sanitation and family welfare, they must feel less allured to go back to the ECA resources. With this principle in mind, the basic idea of the CBA-ECA Project was to enhance people's alternative incomes, so that their dependency on haor and coastal ECA resources reduces. Here alternative is in the sense of less dependency on natural resources of the ECAs. The project has earned a significant level of capacity building in financial management through Micro Capital Grants (MCG) to support alternative income generation activities.



MCG distribution ceremony
© Department of Environment

Micro Capital Grant Management

The Village Conservation Groups (VCG), established during the Coastal and Wetland Biodiversity Management Project (CWBMP) (2006–2011), were given Micro Capital Grant (MCG). The purpose of the MCGs is to provide small funding support to the qualified VCG members to look for better alternative sources of income rather than vowing to the ECAs for their livelihoods. In 2008, each VCG received Taka 100,000. In 2010, Taka 100,000 was given to each of some selected VCGs. Under the CBA-ECA Project

(2011 – 2015), Taka 100,000 per VCG has been given to all in early 2015. Most of the VCGs have therefore received Taka 200,000 or Taka 300,000, while only two newest VCGs have got Taka 100,000 since 2008. Currently, each VCG has the following MCG funding sources:

- i) Grants from the CWBMP and CBA-ECA Project, Taka 100,000—300,000
- ii) Membership share, one share is Taka 100 per member per year
- iii) Membership fee, varies from Taka 20 to Taka 100 a month per member
- iv) Service charge, earned from lending out MCG to VCG members, and
- v) Earnings from Village Conservation Centre (VCC) rental, solar irrigation system, solar desalination plants and eco-tourism fee (expected, not fully in operation yet).

There is a guideline to manage the MCG, which is compiled by every VCG. The VCG members have gone through a thorough level of training on how to behave institutionally while managing their MCG. They have learnt to keep VCG books, like maintaining accounting ledgers, writing meeting minutes and maintaining bank accounts. They have been taking decisions on crucial financial issues like which VCG members should be granted MCG or how could a defaulter member will be treated to recover the MCG money. The following sections delineate the management of MCG, and impacts of this fund on ECA dependent people's livelihoods and on the natural resource harvested from the ECAs.

Lending out MCG

In almost all cases, the VCGs have granted MCGs to individual VCG members, not to a joint venture of a group of VCG members. As per the MCG Guidelines, the maximum lent amount is Taka 15,000. The



Duck rearing by VCG member with support from MCG
© Department of Environment

MCG service charge is 10% of the lent amount. This service charge is much lower compared with well established micro credit system in Bangladesh, which often charge higher interests. Predominantly Muslim VCG members also preferred MCG lending system as it did not charge any interest per se, which is prohibited in Islam. The service charge rate, however, increases month wise when someone fails to repay the lent money in time, as a means of penalty. However, there are variations from VCG to VCG on imposing extra charges. While some VCGs charge extra from defaulters, some again exempt service charge due to the delay for one or two months on humanitarian ground. There is no hard and fast rule dealing with the delay issues.

Recovery

Lending of MCGs to the VCG members is done against no physical asset as collateral. Yet, the recovery rate of the lent money is very well, in almost all cases 100%. There are rare cases of grant defaulting, where VCGs sometime struggle to gain recovery on time. Only a few grants have been disbursed to a group of VCG members for their joint venture. These amounts have been recovered in full and mostly on time as well.

On some rare occasions, several VCGs have gone beyond the MCG management guidelines and invested in different businesses. The VCG of Mohammad Shafir Beel has recently lent the owner (a VCG member) of a betel nut garden an amount of Taka 25,000. In exchange, the VCG has fixed an amount for every year, to be paid by the borrower, after visiting the garden at the production stage. Such fixed price is usually much higher than the 10% service charge; in this particular case it has been Taka 7000 for a season. This amount has been deposited to the MCG by the borrower. The borrower VCG member has invested the borrowed money in his own business, profit from which will be fully reaped by him. The VCG reserves the right to ask for the full amount of loan any time if needed. The VCG of Mohammad Shafir Beel invested in this way in seven of its VCG members. This arrangement is a kind of mortgage system traditionally practiced in the rural areas; here the difference is, instead of rich individuals, VCG is the money lender.



Effort of women in post harvest processing
© IUCN/ Sakib Ahmed

There are a number of factors that ensure such a satisfactory recovery rate. The factors are: (1) An MCG borrower is one of the proud owners (lender) of the MCG money, and thus, feels inspired to comply with the loan management policy of the VCG; (2) Constant guidance and observation, through VCG meetings, of an MCG borrower about refunding the money on time while maximising the return from MCG investment; (3) Constant pressure from other VCG members who were in a queue to get the approval of new MCGs on refund of the existing MCGs; (4) The incentive that, an on time refund warrants a further (and possibly bigger) MCG next time; and finally (5) The borrower's mental satisfaction and financial solvency motivates her or him to refund the loan on time.

Promotion of Alternative Livelihoods Options

People living in and around the ECAs are mostly dependent on natural resources due to their poor economic condition and inadequate alternative opportunities. It is not easy to reduce people's dependency on ECA without providing alternating income sources. The CBA-ECA Project has supported alternative income generation activities of different trades as listed in Table 5.1. Others included sewing, fish culture, fruit business, rice business, vegetable business, saloon business, egg business, furniture business, and cloth business. A total of 217 VCG members received alternative income generation options with training. They also received input support of Taka 10,000–12,000 each from the CBA-ECA Project.

Diversification of income sources

The MCG has helped create alternative income generation activities. The VCG members have been found to adopt traditional and newly introduced products to produce and sell at home to the neighbours or to a fixed buyer — or in the existing local markets. A summary of such income generation activities is given in Table 5.1.

Table 5.1: Status of alternative income generation activities (AIGA) created through Micro Capital Grants in the CBA-ECA Project areas

AIGAs	Domestic experience	Training received	Marketing initiative	Individual or Collective	Traditional or New	ECA resource dependency
On-farm						
Cattle fattening	Yes	No	No	Individual	Both	Reduced
Duck rearing	Yes	No	No	Individual	Traditional	Reduced
Chicken rearing	Yes	No	No	Individual	Traditional	Reduced
Betel Nut	Yes	No	No	Collective	Traditional	Reduced
Betel leaf farming	Yes	No	No	Individual	Traditional	Reduced
Pond leasing	Yes	No	No	Collective	Traditional	Reduced
Off-farm						
Dry fish	Yes	No	No	Individual	Traditional	Reduced
Fresh fish business	Yes	No	No	Individual	Traditional	Reduced
Flour coated peanut	Yes	No	No	Individual	Traditional	Reduced
Non-farm						
Tailoring	Yes	Yes	No	Individual	Traditional	Reduced
Cap making	No	No	No	Individual	Both	Reduced
Stone bag making	No	Yes	No	Individual	New	Reduced
Mora making (bamboo-made seat)	Yes	No	No	Individual	Both	Reduced

AIGAs	Domestic experience	Training received	Marketing initiative	Individual or Collective	Traditional or New	ECA resource dependency
Mat weaving	Yes	No	No	Individual	Both	Reduced
Artificial hair making	Yes	No	No	Individual	Both	Reduced
Cosmetic business	No	No	No	Individual	New	Reduced
Groceries	Yes	No	NA	Individual	Traditional	Reduced
Tea stall business	No	No	No	Individual	Traditional	Reduced
Pharmacy	No	Yes	NA	Individual	Traditional	Reduced
Rickshaw pulling	Yes	No	NA	Individual	Traditional	Reduced

Note: The list is not exhaustive.

The MCG assisted alternative income generation activities have i) Increased the VCG member's household income; (ii) Improved their life style; (iii) Diversified income sources to have something to do throughout the year; and (iv) Made the income climate resilient.



Box 5.1: Sewing dreams together – Shahara’s story

Shahara Begum, a member of Salia-Kazirbondh VCG of Hakaluki Haor, lost her husband few years back. She had to return to her own village with her four year old daughter. She lost her dream to educate her child. Her brother was the only earning member of that family who used to work in construction and that was mainly in dry season. In wet season, when her brother did not get any work, he had to go for fishing for the whole night.

In 2014, Sahara received a sewing machine from the CBA-ECA Project and started sewing garments. In 2015, she earned an average Taka 2000 per month from this business. With the income of Shahara and her brother, the family became self reliant. Her brother does not have to go for fishing at night in monsoon. She has been saving some money from her income to secure her daughter’s future.

Shahara has a plan to increase her savings in the coming days. She has also planned to take longer training courses on sewing to increase her capacity, thus increasing her income. She has a dream to purchase more sewing machines from her income, and set up a tailoring shop in their village. She dreams her child will grow up to be a school teacher someday.



Shahara sewing her dream*
© Md. Ahsanul Wahed

Performance of Alternative Income Generation Activities

The performance of alternative income generation activities depends on several factors. Capacity of the individual for managing the alternative option is the most important factor of all. Sufficient capacity building of the individuals is necessary to receive full benefit from any alternative income generation activity, especially if it is new to that person or to her/his locality. In some trades, like sewing and handicraft making, longer training is needed along with apprenticeship.

Under the CBA-ECA Project, some VCG members of Hakaluki Haor have done well with their alternative income generation activities because of their past experience in trying those alternative options. The stories of Shahara Begum and Arab Ali talk about compelling attempts by Hakaluki Haor dwellers to improve their lives with alternative livelihood options, thus reduce dependency on the haor (Boxes 5.1 and 5.2). Similarly, Md. Najir, a member of Borodel VCG in Teknaf, some time back received Taka 10,000 from the MCG. He then added Taka 2000 from his own savings, and purchased six goats with a couple of pregnant ones. A few months later, he sold several goats for Taka 6500. In May 2015, he has seven goats and the market price of these are Taka 25,000.



IGA support helped in diversification of profession
© Department of Environment

Choosing the right alternative income option for specific person through proper need assessment is another factor that helps to select the best alternative income generation venture. In many cases, the CBA-ECA Project supported alternative livelihood options on the basis of members' past experience. Such approach has been found to be successful in almost all cases. In cases where households have been trying out new livelihood options supported by the project, long term follow up is needed to attain notable impact from those options.

Another important factor for getting visible profit from alternative income generation activities is creation of market chains to sell products. Some VCG members of Nuniarchhara and Purba Kutubdia have received training on handicraft. They have been selling their products within their villages, and now exploring opportunities to market the same in Cox's Bazar and Dhaka. One hundred families of Saliya-Kazirbondh village of Hakaluki Haor have long been involved in mat making. They also have tremendous potential to promote their product in bigger markets (Box 5.3).

Capacity and skill development training for alternative income generation has notably empowered female members of the VCGs. They now have become more resourceful members of their households. Beside other household incomes, they have been earning money for their families. Some of the VCGs have been led by women leaders. Their success stories have further enhanced the confidence of the local women. They now feel much more empowered and confident than they used to be before the alternative earning options were introduced by the CBA-ECA Project.

Honey collection from bee hive
© Department of Environment



Box 5.2: Duck rearing — a means to reduce dependency on natural resource harvest

Arab Ali is a middle aged haor dweller. Until three years ago, he was a fisherman catching fish regularly in a group with net with very small mesh size (locally called kafri jal) in Hakaluki Haor. Local lease holders and local administration sometimes appeared in the beels, and destroyed their nets and income. He could hardly manage his family of six with monthly income of Taka 5,000 from fishing and agriculture.

In 2012, an opportunity was created by the CBA-ECA Project to provide grants to the haor dependent Village Conservation Group (VCG) members to reduce their dependency on natural resources. Arab Ali, a member of Belagaon-Sonapur VCG, received 100 ducklings from the project and started rearing. Six months later, ducks started laying eggs, and benefit started coming in. He noticed that his income rose up to Taka 9,000 per month. He decided to invest in other enterprises, and felt confident to borrow money from the Micro Capital Grant (MCG) of his VCG. He put MCG and his profit from duck rearing together, and purchased a paddy threshing machine and a cow. His income started increasing even more.

In 2014, Arab Ali joined his two relatives to purchase a power tiller. They stopped renting power tiller for their fields, and started renting out their power tiller to other farmers. Arab Ali also started renting out his paddy threshing machine to other farmers in the harvesting season.

With the income from his all enterprises, Arab Ali set a grocery shop investing Taka 60,000 in the middle of 2014, and put his son to manage it. Now his family income is Taka 15,000 per month. Arab Ali proudly tells that he does not have to depend on haor anymore. He feels much more secure, having several earning sources.



Arab Ali threshing paddy with his own machine
© Department of Environment

Box 5.3: Paati Graam (the Mat-Village)

It takes a woman of Kazirbondh of Hakaluki Haor about three weeks to make a mat of murta (a local variety of reed). Before, the murta was readily available around their homesteads, but now the women purchase the dry murta stalks from the market. They invest Taka 200 for the murta, Taka 100 for colour, and their labour to make a mat. They sell each mat for about Taka 1500. Prices varies with the size and quality of the mats, and can even go up to Taka 3000 a mat, depending on the intricacy of the design. This skill has been transferred from generation to generation—mothers mentoring their daughters how to weave and no formal training has been received. These women prefer to work from home, and usually, the handicrafts are bought by fellow villagers. Most of the handicrafts, such as these mats, are traditionally made for their own use, like weaving an ornate mat for a daughter’s wedding.

About 100 women of this village alone are skilled in making mats from murta. The women do not think that a shop for selling mats would work in their village, as most people do not buy this item too often since it lasts for a long time, and is expensive. But, there is a very good potential for marketing these products to urban centres by creating linkages.

Given their positive attitude towards conservation and self-improvement due to awareness creation by the CBA-ECA Project, these women can be facilitated to build market linkages with urban centres in Sylhet, Dhaka and elsewhere. Capacity building programme is needed for them to make mats with attractive designs, and to add value to the traditional mat by adding materials like a piece of cloth or leather. They also need training in fixing prices of the product, negotiation skills, and management of production and supply chain to meet the demand of the clients on time. A shift from individualistic to collective approach would increase their income, enhance their adaptive capacity and strengthen conservation efforts within the ECA.



“We do not catch brood fish, as this is our loss as we will get less fish next year. Our husbands are traditional fishermen, and even though we do not go out to fish, we protect our forests and fish for our children and future generations”

Women engagement in patti making
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Impact of Alternative Income Generation Activities and the Micro Capital Grant on Ecologically Critical Area Conservation

The Micro Capital Grant (MCG) has been used for generating alternative income sources by the VCG members. The MCG assisted livelihood diversification has not only increased the household income, but has also reduced people's dependency on ECA resources (Table 5.1). It has also enhanced the understanding of the CBA-ECA Project participants on how and why to protect the ECAs. The resource tapping rate from the ECAs has decreased significantly in recent years. Some of the ECAs have been under re-plantation for quick restoration. Fish fries have not been caught during the breeding and growing season. The MCG and livelihood diversification have indirectly been helping the conservation of the ECAs.

Selecting appropriate alternative livelihood options for the participants in the light of CBA-ECA Project objective is also very important. Participants having no or very little dependency on ECA resources would not fulfil the purpose of livelihood diversification. Further, VCG members receiving alternative livelihood support are a small part of the whole ECA depended community. An effective plan is also needed to bring in the larger ECA communities under alternative livelihood venture. Such plan needs to be supported by guidelines so that people's awareness and motivation can be successfully channelled to restore ECAs sustainably.



Training programme on handicraft

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The Issue of Self Reliance

The MCG has had remarkable impacts on the management of VCGs, improvement of livelihoods of the community, and ECA conservation. One of the major challenges of the MCG is self reliance of the VCGs. Most of the VCG members are now confident to manage their VCGs, and to continue on-going ECA conservation actions on their own. Many of members also acknowledge their limitations to continue some of the VCG activities, such as running the VCG and managing the MCGs, without support from the project people. They expect continued project support for a few more years.

Self-reliance, on the other hand, has its own challenge. When the VCGs are more self reliant, they would feel the urge to expand their VCGs. In that case, a big issue might appear — collective management of the MCG lending system. A small number of VCGs sanctioned MCG to a group of members to do short term business. However, they did it following no set guidelines. VCGs therefore need to get prepared for more demand for collective MCG in the coming years.

Cow rearing by VCG member with support from MCG
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Chapter 6

Building on the Institutions



This chapter documents the effectiveness and efficiency of existing Ecologically Critical Area (ECA) management structure, and its committees. It further discusses the role and performance of the Endowment Funds available at ECA's upazilas (sub-districts) in overall ECA management.



Swamp plantation in Hakaluki Haor
© DoE/ AKM Rafiqul Islam

Institutional functions for ecosystem conservation are different from ordinary institutions. For conserving ecosystems, on one end the institution has to consider the grassroots community as they are the custodian of the ecosystem. On the other end, consideration has to be made for having good mechanism which is critical for safeguarding the ecosystem. Therefore, combination of co-management and community management is inevitable for ecosystem conservation.

Over the first decade of this millennium, many different activities had been undertaken to connect the Hakaluki Haor and Cox's Bazar-Teknaf Peninsula Ecologically Critical Areas (ECAs) and its people, especially under three projects: the Sustainable Environment Management Programme (SEMP) in Hakaluki Haor, the Empowerment of Coastal Fishing Communities for Livelihood Security Project (ECFC) in Cox's Bazar-Teknaf, and the Coastal and Wetland Biodiversity Management Project (CWBM) in both sites and St. Martin's Island. Under these initiatives, various types of awareness programmes were undertaken, the communities were motivated, and community based organisations were set. The objective of such organisations was to let the community groups be active, and come forward to conserve the wetland and coastal resources in a sustainable manner. To let the community groups to continue as such and to be sustainable in the future, the initiatives also thought of sustainable income generation mechanism for these groups, and let the community be benefited. In some cases, attempts were made to establish institutions at the upper levels as well, eg federation of community based organisations; union, upazila and district management committees; and apex bodies at the ecosystem level. All these appreciated the importance of country's administrative structure and governance mechanism to ensure sustainable management of the ecosystems beyond project tenure.



Consultation with Upazila ECA committee, Barlekha
© Department of Environment

The CBA-ECA Project, as the successor of the CWBMP, has further upheld the Village Conservation Groups (VCG) has and reformed and formed new VCGs, brought them under registration with the Department of Cooperatives of the government, provided Micro Capital Grant (MCG) to be lent out to their members to explore alternative livelihood options, and has made VCGs the lead in ECA management on the ground. The CBA-ECA Project has also taken forward the ECA governance structure established by the CWBMP bringing in local government and local administration, from the union (the lowest local government administrative unit) to the district levels, with representation from the VCGs. The following sections first discuss the theoretical aspects of institutions and governance, and then summarise the existing ECA management systems facilitated and promoted by the CBA-ECA Project.

Institutions and Governance

Institution is an entity that has a structure and possesses mechanisms to regulate the behavioural pattern of members of a group, which it deals with. In case of public or government institutions, on the one hand, the main functions are well defined, often possess a set hierarchy. In community based institutions, on the other hand, the social aspects are deeply involved, and very often use 'discussion based decision making process'. Such institution needs to regulate the behavioural aspects of the community involved while materialising or implementing the decisions taken. The formal mechanism for establishing a rule of law centres on some form of institution. Thus to ensure proper functional behaviour of a group of people or of any organisation, an institutional structure is essential.

Community based organisation is a generic term applied to all organisations governed by a community¹⁴. Community based organisations generally fall into two major categories:

1. Institutions, such as the Village Development Committees (VDC), that have 'public' functions at community level, and are meant to represent the interests of the entire resident population; and
2. Common Interest Groups (CIG) that have 'private' functions, and represent the personal interests of their members. Examples of this category might be a women's enterprise group or a water users' association or a farmers' association or a village savings cooperative.

By 'community institutions' we mean the rules that govern institutions, like kinship, marriage, inheritance, and sharing of oxen at community level and organisations that operate at community level, and are controlled by their members. Development practitioners tend to pay attention to relatively formal, visible institutions. Examples include development agencies or various forms of organisation and associations which can be found in the communities. This is because such organisations are relatively easy to identify, and usually have fairly clearly stated purposes. Institutions, however, often overlap. Informal, unstructured social or socio-cultural institutions, for example caste, gender or informal 'rules of the game', might exist throughout society and within formal, structured institutions. Such institutions may undermine the formal objectives and effectiveness of achieving those objectives.

Community institutions need to have a strong and powerful traditional authorities and decision making structures. This is very important for local and indigenous communities to protect themselves from external pressures on

¹⁴ Based on: Carloni, A.S. and Crowley, E. 2005. Rapid Guide for Missions: Analysing local Institutions and Livelihoods. Food and Agriculture Organization of the United Nations, Rome Italy.



Law enforcement for stopping illegal trade of shell

© Department of Environment

their lands and livelihoods. It is also crucial for them to facilitate decision making regarding natural resource use. Community leaders need to have good networks as well. That may be achieved through regular meetings to discuss collective issues, concerns, and strategies. Exchange and exposure visits would also help in this regard.

The major contribution of an institution to the social system is governance. Governance refers to “all processes of governing, whether undertaken by a government, market or network, whether over a family, tribe, formal or informal organisation or territory and whether through laws, norms, power or language”¹⁵. It relates to “the processes of interaction and decision making among the actors involved in a collective problem that lead to the creation, reinforcement, or reproduction of social norms and institutions”¹⁶. Whether an organisation is a geopolitical entity (like nation-state) or a corporation (a business or organisation incorporated as a legal entity), a socio-political entity (chiefdom, tribe, family, etc.), or an informal one, its governance is the way the rules, norms and actions are produced, sustained, regulated and held accountable. The degree of formality depends on the internal rules of a government or organisation or both.

15 Bevir, M. 2013. *Governance: A very short introduction*. Oxford University Press, Oxford, UK.

16 Hufty, M. 2011. *Investigating Policy Processes: The Governance Analytical Framework (GAF)*. In: Wiesmann, U., Hurni, H., et al. (eds.), *Research for Sustainable Development: Foundations, Experiences, and Perspectives*. pp. 403–424, Geographica Bernensia, Bern.

Institutions for Ecologically Critical Area Management

The Village Conservation Groups (VCG) formed under the CWBMP and the CBA-ECA Project have been the heart of ECA management. The goal of the VCGs is to conserve the biodiversity of the respective ECA. For the VCGs to remain effective, functional and operational they need to have some kind of earning. To assist their income generation,

1. The VCGs have been trained on organisational management, MCG management, conservation, and alternative income generation activities.
2. They have received Micro Capital Grant (MCG) (Chapter 5).
3. They have been registered with the Department of Co-operative of the government to generate funds with their own contributions, and use that for their alternative income generation.
4. The VCGs have been given physical assets such as (Chapters 4 and 7):
 - a. Village Conservation Centres (VCC buildings)
 - b. Watchtowers,
 - c. Solar irrigation systems, and
 - d. Solar desalinisation plants for potable waterso that they can manage these assets for further income generation; and
5. Some alternative income generating facilities have also been given either to the members of VCGs or to the members of their communities, to enhance the income level of the community people.

The VCGs have been linked with the ECA Management Committees, especially at the upazila (sub-district) level. Government notifications have been issued for the formation of ECA Management Committees at the union (lowest local government unit), upazila and district levels. Under the CBA-ECA Project, one ECA Management Officer (a Department of Environment staff) has been positioned at each ECA to maintain a close liaison between the VCGs and other relevant entities, such as Upazila and Union ECA Management Committees and Union Council. This ECA Management Officer has been continuously providing guidance to the VCGs in resolving any problem that they face and for their future activities.



Solar irrigation plant

© DoE/ AKM Rafiqul Islam

Besides, an Endowment Fund has been placed with the Upazila Nirbahi Officers (UNO, the executive government officers at the sub-district level) concerned. The interest gained from investing this fund into financial schemes has been used towards the assistance and well beings of the VCGs, ECA management, enforcing law against illegal activities in the ECA, and undertaking conservation initiatives. The utilisation of Endowment Fund is discussed in the second half of this chapter.

Institutional and Governance Systems under the CBA-ECA Project

The VCGs of the CBA-ECA Project are required to be properly and effectively functional to execute the envisaged responsibilities. To do so, a good institutional setup is essential to ensure the governance aspect as well as to accomplish the desired outputs. To start with, the VCGs are registered with the Department of Cooperatives of the Government of Bangladesh thus abide by Department's rules. It allows VCGs to collect membership subscriptions on a regular basis. The VCGs are audited by the Department of Cooperatives at least once a year. The defaulters lose their membership, and are removed from the VCG. The VCGs are therefore closely linked with the Department of Cooperatives as an important component of its institutional mechanism.

The presidents of all VCGs of a given upazila are the members of the Upazila ECA Management Committee. The UNO is the chair of that committee, and a Department of Environment official (usually the ECA Management Officer) is its member secretary. This committee discusses various performances as well as the future programmes that are going to be undertaken in a given ECA. This upazila committee is a very important forum for the VCGs and their members, not only for getting guidance but also for discussing the

Consultation with VCG
© Department of Environment



problems that the VCGs are facing in connection with their activities, especially the law and order related challenges for conservation of biodiversity. The VCGs often face law and order problems, especially about illegal fishing in the ECA. Since the VCGs have developed acquaintance with the upazila administration through this upazila committee, they can approach the UNO as and when needed. This forum also develops programmes, and approves how the endowment fund's benefits are to be used. The contribution of the VCGs in this forum has an important bearing based on its institutional aspect, and is a component of its institution.

All the VCGs are members of the union level ECA Management Committee. The chairman of the Union Council is the chair. Though no Department of Environment personnel are in this committee, government officials related to natural resource management, especially of the Department of Fisheries and the Department of Agricultural Extension are there. Since the legal authority of this committee is the Union Council Chairman, the committee can play a limited role in calling police or enforcing law. As the VCGs mostly need such type of assistance from the upazila administration, the linkage of the VCGs with the union is sometimes not enough. Some VCGs, however, take the assistance of the Union Council chairman to undertake afforestation programmes along the union road sides. There the VCGs have entered into an agreement with the Union Council following the social forestry norms of the country to secure the lion's share of the revenues that will be accrued from the sale of the trees. These activities of the VCGs need to be steered through an institutional setup. This aspect of VCG activities is therefore a component of its institutional composition.



MCG distribution ceremony

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The VCGs have been given MCG to lend funds to their members under the principle of revolving funds modality in exchange for minimal service charges. The management of this fund lies with the VCGs. Selection of persons interested to take the MCG, disbursement of the MCG, recovery of the disbursed funds, for example, are the activities of the VCGs. These activities need to be steered through an institutional setup, thus this aspect of VCG activities is a component of its institutional arrangement.

The VCGs have been given hard core assets, such as VCC buildings, watchtowers, solar irrigation systems, solar desalinization plants, and afforested areas. In all cases these have been handed over to the VCGs through registered deeds. The VCGs are now legally responsible to manage these valuable assets and properties and institutions. The VCGs have constituted committees for each of these assets to look over the management issues. The activities of the VCG towards the management of these assets and properties are guided through an institutional arrangement.

In view of the above analyses, the existing institutional and governance situation of CBA-ECA Project is given in Figure 6.1.

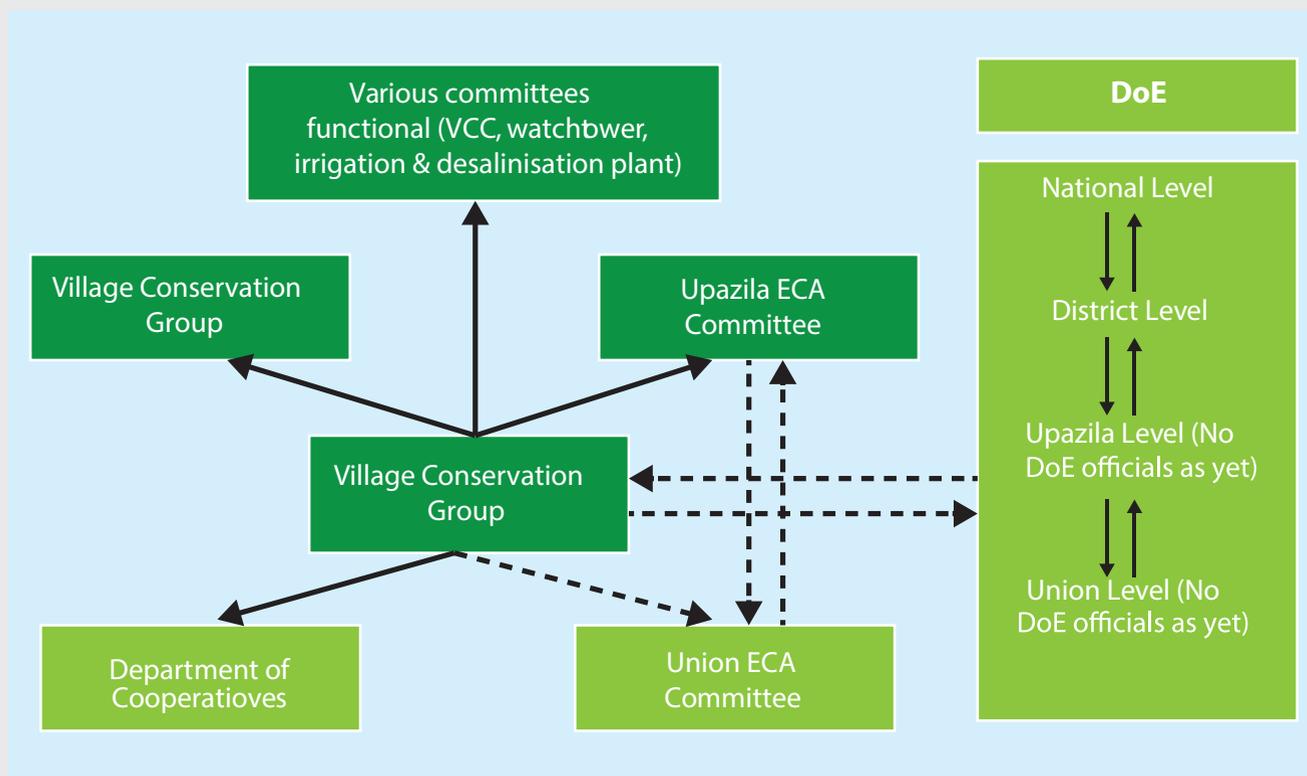


Figure 6.1. Existing institutional arrangement under the CBA-ECA Project. The solid lines indicate strong linkages, while the dashed line indicates weak linkages.

Endowment Fund

An endowment fund is an investment fund set up by an institution or the government in which regular withdrawals from the invested capital are used for ongoing operations or other specified purposes, specifically by not-for-profit organisations. Normally the fund has three main components, and these are: 1) An investment policy which dictates the type of work where endowment fund can be invested in; 2) An

withdrawal policy which determines the amount of money to be withdrawn each time from the endowment fund; and 3) A fund use policy or guideline which ensures that the money from the endowment fund is being used properly, and for the purposes set out by the fund.

Keeping these principles aligned, an endowment fund was created in 2010 before the end of the CWBMP to run the activities of 72 VCGs, and the Union and Upazila ECA Management Committees. The main objective of this fund was to retain and sustain the ecosystem conservation momentum attained from 2003 through 2010 under the CWBMP. The disposable amount of money from the fund is 90% of the profit earned through the termed deposition of the endowment fund, while the remaining 10% being added to the original fund or capital for the next round compounding (Figure 6.2).

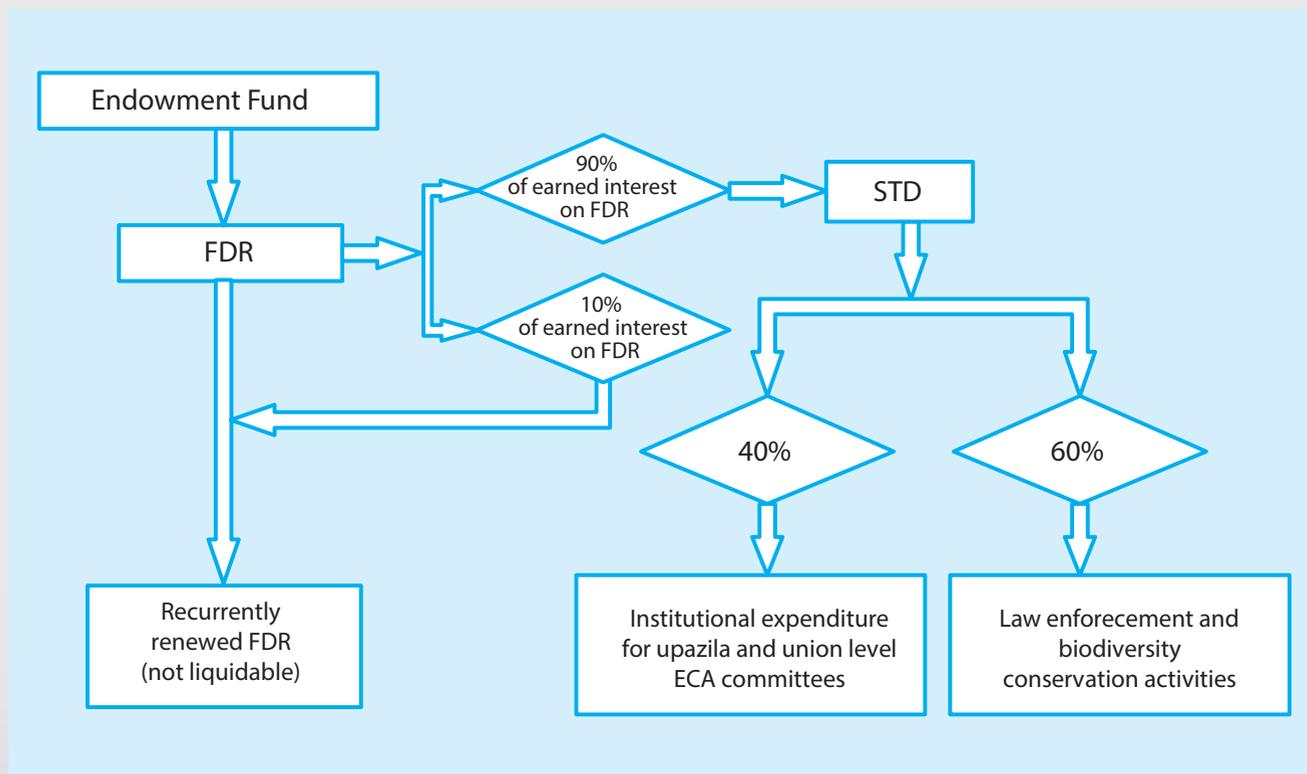


Figure 6.2. The management and use of Endowment Fund under the CBA-ECA Project. FDR, Fixed Deposit Receipt; STD, Standard Disposal.



Excavation of Agdar Beel

© Department of Environment

As per the management guidelines of the Endowment Fund, the responsibility of the fund is given to the UNO at upazila, but decisions are often taken by the Upazila ECA Management Committee as the governing institution. Forty percent of the profit generated from the Endowment Fund is used to run administrative costs of the ECA committees in unions and upazilas (Figure 6.2).

The remaining 60% of the profit is mainly used in conservation of ecosystem. Although it varies from upazila to upazila, the conservation activities can be categorised into four major groups. First, it is used for biodiversity conservation, such as re-excavation of canals (Hakaluki Haor) and conservation of sea turtles (Teknaf), establishment of turtle hatchery (Sonadia Island), and establishment of bio-fences with dhoincha (*Sesbaniabispinosa*). Dhoincha plant has multifaceted benefits to the environment and the people: it improves soil quality, creates natural hedges around the agricultural land and plantation (if any), and is used as fuel when it dies and dries out. Second, the fund is also used in cooperative or collective farming of some crops, such as sunflower and pumpkin. This enhanced VCG members' income to a little extent, which



Glossary shop established with MCG support

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might have reduced their dependency on ECAs' natural resources. Third, the fund is used in conducting mobile court for enforcing natural resource conservation laws or buying fuel for speed boat for patrolling by the government officials concerned in and around the ECA (Hakaluki Haor). Fourth, the fund is also used to establishment of demonstration plots and creating ECA conservation awareness among people.

Every year under the leadership of the UNO, and with representation from the Union ECA Management Committees and VCGs, a planning session is organised to identify priority activities, and fund availability for conservation and management of the ECA resources. On the basis of availability of usable money, and following fund management guidelines, decisions are taken by the Upazila ECA Management Committee to carry out priority interventions for ECA management. The Endowment Fund has been found to be effective for conservation and management of ECA resources subject to its wise utilisation. Continuous assistance is, however, necessary from the Department of Environment to the Upazila ECA Management Committee for its better utilisation beyond the project period.



Cultivation of sun-flower
© CNRS/ Md. Bashir Ahmed

Chapter 7

Enhancing Resilience to Climate Change

This chapter captures the effectiveness and efficiency of hard and soft adaptation measures in the Ecologically Critical Areas (ECA) – in order to create more resilient communities, better equipped to cope with climate induced changes in the environment, like enhanced wave erosion and salinity intrusion. These initiatives include creation of green belt and submersible embankments, swamp plantation, mangrove plantation, swamp and mangrove protection, education, awareness and training on climate resilient agriculture and alternative livelihoods to reduce resource dependency. Measures like solar irrigation, solar desalinisation, improved cooking stoves and solar home systems that have mitigation potentials, and address the basic needs of the people living in and around the ECAs, such as food security and access to potable drinking water, are also highlighted.



In Bangladesh, climate change challenges the countries' ability to achieve future sustainable development goals needed to reduce poverty and improve resilience. It is predicted in Inter-governmental Panel on Climate Change (IPCC)'s Fifth Assessment Report and Bangladesh Climate Change Strategy and Action Plan (BCCSAP) that in the coming years, there will be more frequent and severe floods, tropical cyclones, storm surges, and drought, which will disrupt the life of the nation and the economy. In the Ecologically Critical Areas (ECAs), such as Hakaluki Haor and Cox's Bazar-Teknaf Peninsula (including Sonadia Island), local people have reported that they experience unpredictable and untimely occurrence of climatic events, which in turn affect the hydrological regime and cropping patterns. The changes in climatic pattern also affect the freshwater ecosystem in haor and marine and coastal ecosystems in Cox's Bazar.



Fishing in Hakaluki Haor

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In the Hakaluki Haor region, the observed changes include frequency and intensity of lightning and hail storms, early onset of flood (almost by one month), torrential rains, *afal* (local name for giant waves), an increase in diseases that attack their livestock, like anthrax, and increased gap between early and monsoon rain. Siltation is a major problem in the haor ecosystem, because of anthropogenic (hill cutting and deforestation in the upstream) factors. Due to early rainfall, fish migrate from other places to the haor, but get trapped when monsoon rainfall delays. In the Cox's Bazar-Teknaf Peninsula and Sonadia Island, salinity intrusion is a major climate induced problem that disrupts the coastal ecosystem and traditional crop calendar. Deep sea fishermen feel that the weather is now more unpredictable than ever before. Regular floods are anticipated by the people of this region, along with landslides because of soil mining, deforestation, and hill cutting all coupled with torrential rainfall.

Paradigm Shifts: From Vulnerability to People Centered Resilience

Community based adaptation is “a community led process, based on communities’ priorities, needs, knowledge and capacities, which should empower people to plan for and cope with the impacts of climate change.”¹⁷ Resilience refers to the ability of a system, community or society to resist, absorb and cope with (recover) from the effects of hazards, and to adapt to longer term changes in a timely and efficient manner without undermining food security or wellbeing ¹⁸. It is therefore important to build the adaptive capacity of vulnerable people so that they have the assets, resources and capacities to respond not only to present threats, but also to potential and unknown challenges in the future. The sustainable livelihood framework, on the other hand, focuses on five capitals of a community to ensure its well being: social, natural, human, financial and physical. Depending on the needs of a community, these can be translated into actions like strengthening community organisations, management of natural resources, promoting access to skills and technologies, enhancing market linkages and employment opportunities and ensuring secure living conditions.

‘We don’t fell trees and stop others from destroying our forests. Nurturing a tree is like taking care of a child, and even if DoE project ends, we will continue to look after our natural wealth, together as a group’

The overarching goal of the CBA-ECA Project is to strengthen the ecosystem based co-management model of ECAs. This approach is basically capitalising on communities’ social capital as demonstrated through formation of Village Conservation Groups (VCG) and ECA Management Committees. Capacity building of the VCG members on different aspects has directly improved the human capital in the community to manage these organisations, financial and physical resources. To reduce people’s livelihood dependency on natural resources, ECA communities have also been provided with alternative income generation options. These in turn has improved their financial capital, while wisely managing their natural capitals. Funds like Micro Capital Grant (MCG) and Endowment Fund further enhanced financial capital for ecosystem conservation. Biological interventions like protecting, enriching and restoring wide range of habitats in the haor and on the coast improved the natural capital of the ECA dwellers. Physical interventions, like Village Conservation Centre (VCC) buildings and watchtowers contributed to building physical capital as well financial capital through multifaceted use of these structures. The CBA-ECA Project has introduced several community based adaptation and mitigation measures, such as mangrove and swamp forestation, green belt creation, solar irrigation and solar desalination plants. These physical ventures improved the physical and natural capitals of the ECA communities against natural calamities, and at the same time improved human and financial capitals by improving human health and safety, and food security.

The CBA-ECA Project was initiated with funding from the Government’s Bangladesh Climate Change Trust Fund, aimed at reducing vulnerabilities, and enhancing the adaptive capacities of local people living with climatic extremes. The activities geared towards creating more resilient communities, while conserving the unique biodiversity of the ECAs. People’s needs and priorities were at the heart of the project, especially in terms of empowering women, and ensuring well-being of communities, including children. The hard and soft adaptation measures to building resilient ECA communities are described in the following sections.

17 Reid, H., Cannon, T., Berger, R., Alam, M. and Milligan, A. (Eds.), 2009. Community-based adaptation to climate change. Participatory Learning and Action 60. IIED, London.

18 Pasteur, K. 2011. From Vulnerability to Resilience: A framework for analysis and action to build community resilience. Practical Action Publishing, UK.

Construction of Submersible Embankment and Creation of Green Belt

Creation of green belt on submersible embankment is an inimitable ecosystem based option that can contribute to biodiversity conservation, as well as adaptation and mitigation to climate change. A submergible embankment is designed in such a way that it can restrict inundation of certain portion of a wetland for certain period of time, and people can get scope to harvest their crops. When heavy rainfall starts then such an embankment goes under water, and fish and other aquatic species can move freely throughout the wetland. The swamp plantation that is done on an embankment, on the one hand, offers strength and protection to the embankment from wave action. Additionally, the swamp plantation acts as habitats for aquatic animals and birds.

Under the CBA-ECA Project submersible embankments have been constructed at Hakaluki Haor, to protect the villages from erosion, such as — in Barlekha which is 770 m long, and is planted with indigenous tree species.



Submersible embankment

© Department of Environment

Swamp and Coastal Afforestation

Swamp forests are an integral part of the haor ecosystems, and regenerate naturally in the raised lands along the periphery of the wetlands (locally termed as kanda) with species, such as hijol, korocho, borun, nol and khagra, and various other species of herbs and shrubs. In order to protect and allow regenerate

the forests, the CBA-ECA Project has undertaken plantations as well as mobilised resources to conserve the resources, and protect it from encroachment and deforestation. Community guards have also been deployed, along with areas demarcated with boundary fencing. In the haor region, 17 hectares have been planted with indigenous varieties of saplings at 10 different canals and beel, along with protection of 685 hectares of existing forest land. Watersheds were also brought under the management of the project in the Hakaluki Haor where more than 15,000 saplings have been planted in degraded hill slopes and riparian areas.

In Nuniarchhara, Cox's Bazar, more than 250 acres of mangrove forest has been recreated and regenerated beside the Bakkhali River, which is maturing. This has been done by mobilising the local community, and getting rid of the shrimp farms during the Coastal and Wetland Biodiversity Management Project (CWBMP) of the Department of Environment. In Sonadia Island, 361 hectares of mangrove and in Cox's Bazar, 62 hectares of sand dunes with species namely (*Pandanus furcatus*), nishinda (*Vitex negundo*), haora/khair (*Saccharum sp.*), sagarlata (*Ipomoea pes-caprae*), akonda (*Calotropis gigantea*) and kolmi (*Ipomoea fistulosa*) have been planted, along with the protection of about 500 hectares of natural vegetation. If there is free interplay of tides, natural regeneration can take place at a steady rate. In Jaliapara (near Shah Porir Dweep), there are natural and planted forests and watchtowers constructed near the mangrove patches are aimed not only for monitoring the ECAs, but also a strategy to stop land encroachment and promote eco-tourism at the sites. The VCG members strongly believe that mangrove forests protect them from disasters and they are not willing to trade it with money or anything else. They do not catch or eat the crabs or the birds that are spotted in these forests, like egrets, magpie robins and sparrows or the migratory winter birds that come here to roost.



Conserved swamp forest and fish sanctuary
© IUCN/ Sakib Ahmed



Consultation with VCG

© IUCN/ Sakib Ahmed

Awareness, Education and Training on Adaptive Options

To improve communities understanding of climate change and resilience, training and capacity building activities have been carried out by the CBA-ECA project. Besides, focused group discussions have been held at all project sites, along with workshops, observance of landmark events, such as the World Environment Day and performance of folk drama and art camps in schools, to make communities more aware of their circumstances.

Under the CBA-ECA Project, practical training sessions on income generating activities, like duck rearing, cow rearing, fish culture, small business, handicrafts, tailoring, vegetable and betel leaf cultivation have been provided to the communities to diversify their livelihood options as coping mechanism. Demonstrations of alternative technology and practices, like cultivation of salt tolerant rice varieties (BRRI Dhan 47), cultivation of short duration rice varieties, less water tolerant varieties, integrated pest management and crop diversification have also been introduced through hand on training to improve adaptive capacity of the ECA dwellers, in 487 plots in the Cox's Bazar and Hakaluki Haor ECAs.

Changes in the climate are affecting the traditional cropping patterns and cycles, and in order to enhance the coping capacity of farmers, Farmers' Field Schools were organised in Hakaluki Haor following curriculum of the Department of Agricultural Extension. About 40 farmers from two upazilas have been trained for 11–14 weeks, and have been introduced to organic methods of farming.

The promotion of crop diversification has also reduced demand of water than traditional rice cultivation, and improved soil quality by balancing nutrient uptake from different levels of soil. A total of 170 farmers have been capacitated through training on crop diversification techniques, in order to better cope with changing climatic conditions. In addition, in order to enhance the coping capacities of the members (primarily farmer and fishermen communities), 94 members (both men and women) from four different VCGs, have been trained on adaptation strategies.

All the training sessions have had follow-up activities, where the VCG members have been provided with financial support or materials, like duck, materials for handicrafts making (bamboo, cane, bits and threads etc.), goods for small business, tea stalls, grocery shops, fish culture, vegetables cultivation, cow rearing, and hair cutting, to pursue activities related to their newly acquired skills and training, under the supervision of the local officials of Department of Agricultural Extension and other relevant agencies.

Diversification of Livelihoods

About 500 men and women have been trained on alternative income generating activities, such as, training on paramedics, sewing, tailoring, small business, handicrafts, duck and poultry rearing and raising livestock. About 230 persons received material support in order to reduce their dependency on the ECA resources. The diversification of livelihoods through alternative incomes have not only enhanced the skills of the local people, but strengthened their capacities to tackle climatic disasters, and situations leading to poverty and insecurity. This is especially true for female VCG members (Box 7.1), who now have a voice and more decision-making authority, driven by their incomes and social status in the family.

Besides conventional alternative livelihoods, in both the ECA sites, there is immense potential for promoting sustainable and responsible eco-tourism. Both sites attract tourists because of the adjacent attractions — tea gardens in Sylhet, and the Cox's Bazar-Teknaf sea beach, the longest stretch of unbroken sandy beach in the world. These places are potential hubs of demonstrating climate resilience by vulnerable communities along with nature based tourism.

Box 7.1: Skills and Technologies Transforming Lives

Purba Kutubdia Para in Cox's Bazar is inhabited by migrants from Kutubdia Island of Chittagong (hence the name), after the 1991 cyclone, and more displaced migrants after 1998 flood. In this Ward 1 of Purba Kutubdia Para, there are 700 households, and 40 of them are VCG members.

The women make handicrafts; they were trained in making ladies handbags and purses, cane seats, and mats. About 30 of the female VCG members received training on poultry and dairy rearing and vegetable cultivation. The produce, like eggs and milk, are first used to meet the family's nutritional needs, and the surplus is sold to the market.

Now, because of conservation activities and awareness, people of the Purba Kutubdia Para do not harm the jellyfish or the turtle hatchlings. As many of them have received improved cooking stoves, they also do not cut trees for fuel wood. Women's health has improved, because of the reduction in indoor pollution. The major influencing factor here is that men and women of this hamlet have less disparity; they are more educated and empowered.



Cultivation of watermelon
© Department of Environment

Box 7.2: Making the Kitchen Safer

Improved cooking stoves introduced in the Hakaluki Hoar have led to less destruction of the kanda forests for fuel wood. At the same time, it has improved the health of the family in general, because of less indoor pollution. A total of 345 ultra poor households received improved cooking stoves during 2010–2013. Massive awareness campaigns have been carried out, to promote the use of improved cooking stoves that are made with local and affordable materials and of cost of Taka 850 a unit.

In Teknaf, Cox's Bazar, 755 improved cooking stoves were distributed to the families dependent on fuel wood for cooking. The women only VCG from Tulatoli in Teknaf use 'bondhu-chula', a kind of improved cooking stoves. According to them, this is more energy efficient as it requires less fuel wood (4 kilogram, in place of 7 kilogram before). It also improves women's health as they are no longer exposed to indoor air pollution and 'do not cough like before'. Improved cooking stoves not only bring direct benefits in terms of less fuel consumption, but also render indirect high impact benefits, like ensuring the health and well being of an entire family.



Improved cooking stove
© Department of Environment

Powered by the Sun

Solar Home System

The ECAs are in remote and vulnerable areas of the country, and hence are not always covered by the national power distribution grids. Alternative, cost effective energy option is therefore a basic demand of these areas. Under the CBA-ECA Project, 40 solar home systems have been installed in the coastal ECAs. Sonadia Island is one of the ideal sites for this physical intervention, where 20 solar home systems have been changing the lives of the communities.

The women in Cox's Bazar and Teknaf very much appreciate how the lives of those who received solar home systems have been transformed. Those families now can work after sunset, and their children can study at night using the solar powered light bulbs. The solar home systems now have reduced household fuel cost. These have also reduced carbon emission used to produce from kerosene lamps, lanterns or candles to lit homes. There is still large demand for more solar home systems and improved cooking stoves (Box 7.2) — energy options that benefit the entire family, and are environment friendly.



Distribution of solar panel among VCG members

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Solar Irrigation System

Solar irrigation pump runs by sunlight, thus makes the environment safer by reducing emission of carbon from burning fossil fuel or wood. In the haor region, people only can cultivate crop in the dry season after flood water recedes. But during winter, it is difficult to manage water for irrigation. As a result, people have

to depend on surface water from adjacent perennial beels for irrigation. Withdrawal of water for irrigation from those habitats makes aquatic biodiversity and peoples' livelihood vulnerable. Keeping this in mind, the CBA-ECA Project has installed solar irrigation pumps in the haor area. This physical intervention contributes to mitigation and adaptation to climate change, and increases resilience of the people by increasing VCGs income from the irrigation pump. In Cox's Bazar, climate change induced salinity has increased uncertainty in cultivation of crops and made livelihood of coastal community vulnerable. To reduce vulnerability of those communities, the project has installed solar irrigation plants to ensure freshwater availability, and to reduce crop production cost. The technology has also created the scope for crop diversification in the area as a means of adaptation.



Solar irrigation plant

© Department of Environment

Under the CBA-ECA Project, five solar irrigation pumps powered by solar panels have been installed: three at the Hakaluki Haor, and two at the Cox's Bazar-Teknaf ECA sites. Each pump has three main parts: a) 36 solar panels for generating power amounting to 7.2 kilo Watt, b) an irrigation pump, and c) a pump controller. The solar irrigation pumps are better than conventional, diesel run ones, as they do not require electricity or fuel to run and operate and at the end of the day are relatively cheaper. In Mamunpara, Cox's Bazar, for instance, irrigation costs have reduced to Taka 2,500/kaani (local unit for land) compared to Taka 3,500 for the same piece of land using conventional pumps. They can also grow aus crops (monsoon varieties of highly dependent on water) and vegetables on the embankments, which was unthinkable in the past because of the shortage of rain and high levels of salinity.



Inauguration of solar irrigation plant

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These pumps provided local farmers with the facilities for irrigation and growing crops during the dry season in the haor area, and they have been especially effective in the saline laden soils of Cox's Bazar-Teknaf ECA, at the location of the plant where there is no supply of electricity. The pumps have been constructed on lands owned by VCG members, and there is a committee that is responsible for ensuring timely supply of water and maintenance of the structure.

As no fossil fuels are burnt to operate the solar irrigation pumps and no air pollution takes place, they have high mitigation potentials. In order to avoid pollution from batteries, these irrigation plants have not used any batteries, so energy is only generated and used when there is sunshine. In order to ensure uninterrupted supply of water, even when there is cloud coverage or fog, a storage tank can be placed on a raised platform (machang), so that farmers can get water even when the weather is not conducive.

Solar Desalinisation Plant

Solar desalinisation plant is extraordinary, practical intervention, especially for the areas where availability of fresh water, even for drinking purposes, is limited. A solar desalinisation plant uses reverse osmosis technology, with activated carbon filters and ultra violet unit that not only remove the salt, but also bacteria, viruses and suspended solids. A plant has three chambers: one for the pump that draws water from the uncontaminated underground water layer, and the other two are for storage and filtration of the water. Apart

from the supply of safe water for coastal communities, these solar desalination plants also have a role to play in reducing carbon emissions as it runs by the sun and burning of any fuel is not required for operating the plant.

The CBA-ECA Project has set up two desalination plants in Nuniarchhara, Cox’s Bazar and Jaliapara, Shah Porir Dweep (Box 7.3), Teknaf ECAs in the coastal regions of the country, where there is an acute shortage of potable drinking water because of the high levels of salinity in both surface and ground water. The desalination plants were located on private properties, belonged to the members of the VCG, in order to avoid future conflicts over land tenure, and to create a sense of ownership.

In Nuniarchhara, for example, the desalination plant was a need of the community, especially for women and adolescent girls, the ‘water managers’ of the families. Because there is no available fresh water sources nearby, women and adolescent girls had to walk to a source about one and a half hour away every day and carry heavy loads of over 20 liters. They had been suffering from this crisis for about 25 years, since a devastating cyclone hit this region in 1991. Their sufferings were over by the installation of desalination plants.

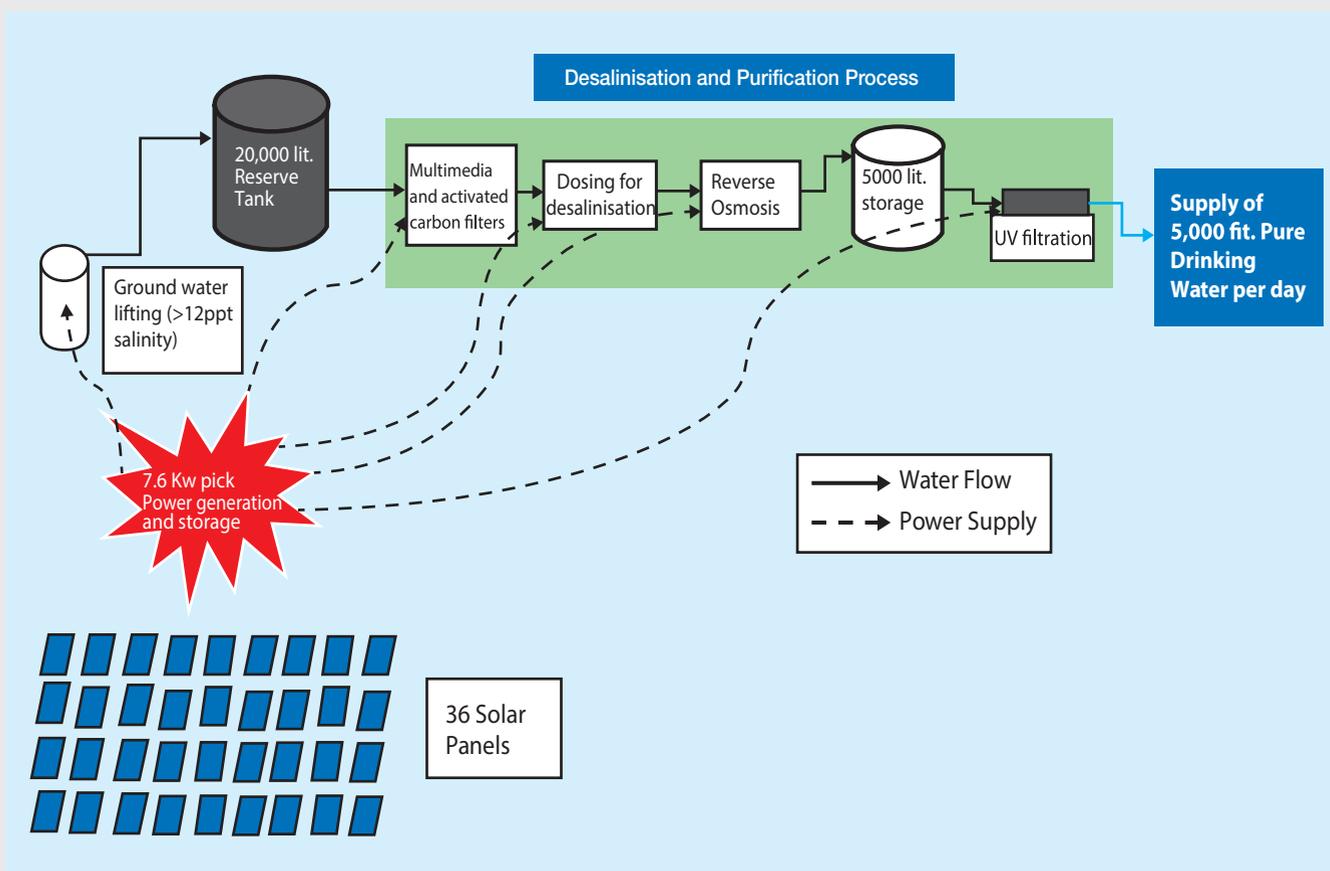


Figure 7.1. Schematic diagram of solar desalination plant

Now each desalination plant produces 8,000 liters of potable water every day, and this can support a minimum of 500 families with an average size of five people. Additionally, the surplus water can be purified and sold to neighbouring communities at a subsidised price, for generating income needed for repair and maintenance of the structure.

The most interesting change that these solar desalination plants have brought about is the socialisation of women, as the pumps created a social space for the women. As the primary water carriers and managers, women now gather around the pump in the mornings and afternoons to collect water and engage in conversations and exchange information with one another. These new water points have also given the women and girls the social security and dignity, as they no longer need to travel long distance for collecting.



Solar desalination plant

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Box 7.3: Solar Desalinisation Plant: A Means for Enhancing Resilience against Salinity

About 400 households with more than 2,600 people have been living in Jaliapara at Shah Porir Dweep, Teknaf for more than 25 years. The people of this village are mostly fishermen who go to the sea on a regular basis. Surprisingly, for household use, like cooking, washing, and bathing, people used to take saline water from the beginning of this settlement as they did not have any freshwater sources in their territory. Female members of the households have been burdened with collection of drinking water from places far away from the village. Occurrence of water borne diseases, such as diarrhea, dysentery has been very common among this community. Most of the people of this village suffer from health related problems due to excessive use of saline water.

In 2015, the CBA-ECA Project installed an environment friendly, solar desalinisation plant in Jaliapara. Most of the desalinisation plants take water from surface water sources, which have negative impact on marine life. Fish and other aquatic organisms get killed on the intake screens (impingement); organisms small enough to pass through, such as plankton, fish eggs, and larvae, are also get killed during processing of the salt water. But this newly installed plant takes saline ground water with certain limit of salinity for processing, and avoids destruction of marine biodiversity.

The plant can produce more than 5000 liters of drinking water every day. Now the people of Jaliapara have access to pure drinking water, and fishermen and their families are very happy with the service they are receiving. Fishermen now carry freshwater with them to the sea. The solar desalinisation plant has created scope for processing saline water without hampering marine life. It has also enhanced the availability of fresh water for household consumption, thus contributing



Inner portion of solar desalinisation plant

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to achieving health security of marginalised people living in Jalipara (fishermen village) of Shah Porir Dweep. Because it does not require any fossil fuel for operating — the desalinsation plant also offers mitigation potentials.

Chapter 8

Sustaining the Achievements



This chapter brings together the achievements and lessons learnt from different activities of the CBA-ECA Project described in previous chapters, and show their inter linkages. It further assesses the sustainability of these achievements by exemplifying implemented activities, investments made, and institutions established.



Swamp in Hakaluki Haor
© DoE/ AKM Rafiqul Islam

The Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project (CBA-ECA Project) has drawn on the experiences, investments and lessons learnt from previous community based natural resources management projects, particularly its predecessor the Coastal and Wetland Biodiversity Management Project (CWBMP). In 2010, the CBA-ECA Project has aimed at strengthening the ecosystem based co-management model for selected Ecologically Critical Areas (ECA) by incorporating climate change adaptation and mitigation measures as well as alternative livelihoods for the ECA dependent communities. By combining community based ecosystem conservation, community development and resilience building of vulnerable people, this project has created a unique case of ecosystem conservation through institutionalised community conservation groups. The lessons learnt and experiences gathered from this project have created an excellent opportunity for on-going and future environment development projects of Bangladesh and elsewhere, especially dealing with ecosystem conservation and climate change adaptation.

While designing the CBA-ECA Project, continuation of previously run interventions have been combined with new ones by considering local context and people's demand. Many an interventions of this project continued from the CWBMP, for example the communities engagement under the umbrella of Village Conservation Groups (VCG) for ecosystem conservation of the ECAs, institutional arrangement like ECA Management Committees at different tiers, financial tool like Micro Capital Grant (MCG) at the VCG level and Endowment Fund at the upazila level and its management by the VCGs and Upazila ECA Management Committee. It has also continued promoting wide range of alternative income generation activities among the communities, mangrove forest restoration, swamp forest protection, and turtle conservation. Some new interventions have been introduced in response to popular demand, and mostly included climate change adaptation and mitigation activities. Examples include establishment of submergible embankment with green belt, promotion of improved cooking stoves and solar home systems, installation of solar desalination plants and solar irrigation systems, protection of rocky intertidal zones, sand dunes and mudflats, and construction of watchtower and Village Conservation Centre (VCC) buildings.

Putting the Pieces Together

With a balanced combination of old and new, all the interventions of the CBA-ECA Project contributed to the specific project objectives through a community based approach. Figure 8.1 shows the inter connectivity among different institutions, project interventions, instruments, outputs, and impacts of the CBA-ECA Project. These linkages are further elaborated below.

The CBA-ECA Project started with engaging the ECA stakeholders in the Hakaluki Haor, Cox's Bazar-Teknaf Peninsula and Sonadia Island ECAs. Like the CWBMP, the CBA-ECA Project also started with raising awareness of the people about biodiversity, changing climate regime, and their impacts on people's lives and livelihoods. The awareness level of the project participants now stand out at all projects sites. The awareness is not only confined within the VCG members and their families. It has spread out, and has created self-awareness in the community as a whole, thus supporting the cause promoted by the CBA-ECA Project. The project then took the motivated people and strengthened their organisations — the Village Conservation Groups (VCG).



VCG member giving speech in MCG distribution ceremony

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As designed, the VCGs are the core of all ECA centred activities: biodiversity conservation, livelihoods promotion, habitat protection, climate change adaptation and mitigation, law enforcement or physical infrastructure management. All VCGs are registered with the Department of Cooperatives making them legally bound, responsible organisations. Some VCGs also have Village Conservation Centre (VCC) buildings — a place of their own to meet, to discuss, to share, to decide, to work and to socialise for greater good.

The VCGs were supported with the Micro Capital Grants (MCG). The MCG was used by the VCGs to improve the livelihoods of the members by supporting alternative income generating options. The project also provided training and input support to selected VCG members to maximise the benefit out of the MCGs. Alternative livelihoods indeed improve the income of participating households, at the same time it reduced pressure on the ECA resources by shifting the livelihood focus of the ECA dwellers.

The VCGs are the building blocks of a much larger ECA governance system, and they are the custodians of their local ecosystems and biodiversity. These are linked with the ECA Management Committees at union, upazila and district levels. These committees act as the guiding bodies of ECA management — both soft and hard interventions. The Upazila ECA Management Committee, headed by a UNO (the chief executive at upazila level), also holds an Endowment Fund provided by the CWBMP. A portion from the profit of this fund is used to undertake law enforcement in an around the ECA, and in many cases supporting conservation measures with the help of respective VCGs.

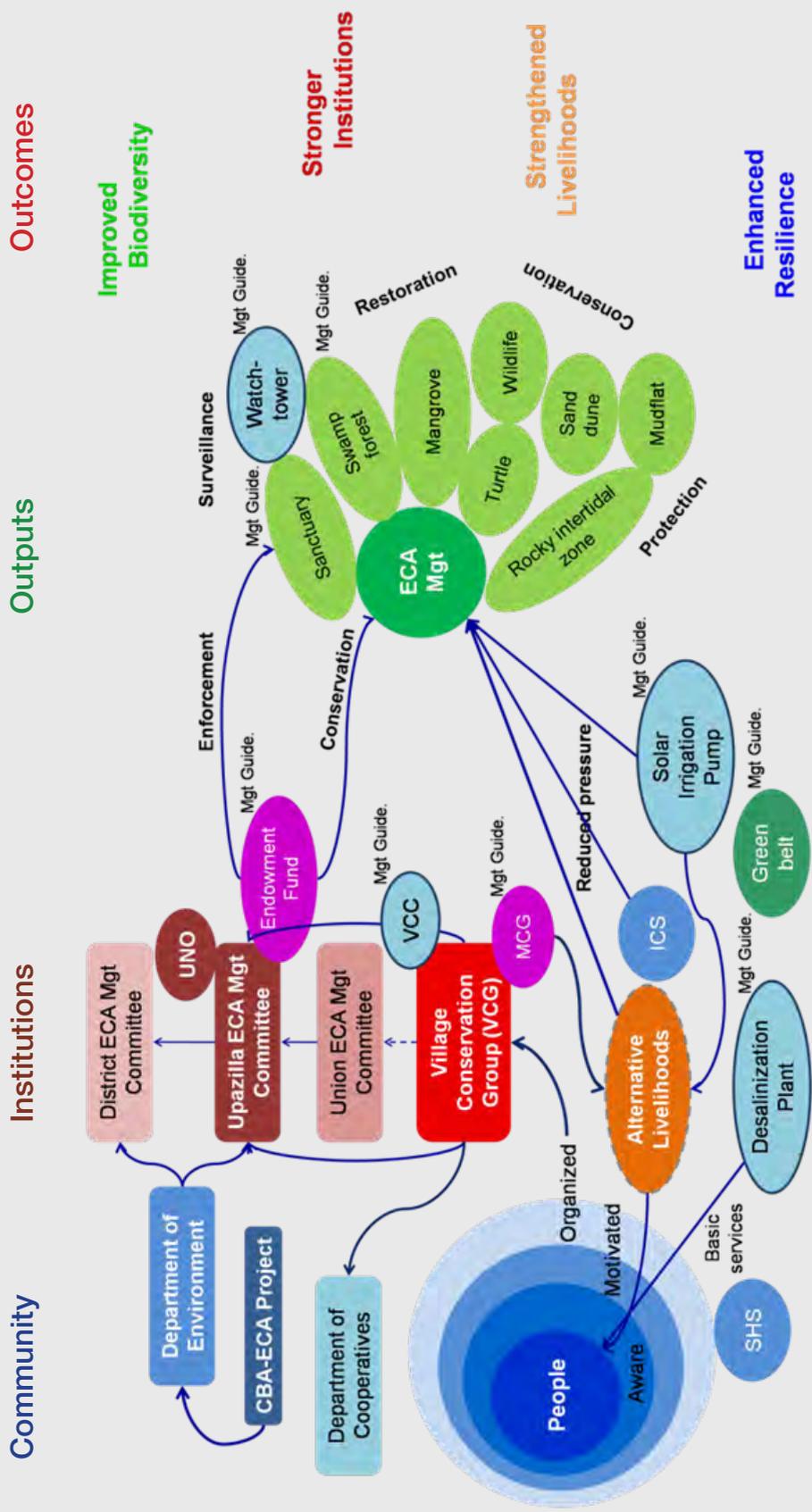


Figure 8.1. Schematic diagram presenting integration among institutions, activities, instruments, outputs, and impacts of the CBA-ECA Project of the Department of Environment. ECA, Ecologically Critical Area; Guide., guidelines; ICS, improved cooking stove; MCG, Micro Capital Grant; Mgt, management; SHS, solar home system; UNO, Upazila Nirbahi Officer (government executive office at sub-district); VCC, Village Conservation Centre Building.



Inauguration ceremony of VCC

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The Department of Environment is represented at upazila and district levels, but not at the union or village level. The project team has facilitated the processes at those two tiers. This governance structure and the unique Endowment Fund work very well in coordinating among committees, carrying out law enforcement against illegal activities, and taking conservation measures for managing the ECAs.

Biodiversity conservation activities make up the largest portion of the CBA-ECA Project. A large number of context specific conservation measures have been undertaken over the project period ranging from turtle hatchery establishment on Cox's Bazar sea beach to swamp restoration in Hakaluki Haor. Conservation measures focusing on ecosystems include protection, regeneration and plantation, thus facilitating restoration of degraded habitats. In some cases, physical interventions were necessary, like establishment of fish sanctuaries. Watchtowers, a novel addition of the CBA-ECA Project, played a dual role – both surveillance against any harm to the conservation areas and an opportunity for nature based tourism in some of the most biologically diverse parts of Bangladesh. Patrolling and guarding around the ECA were done by the local administration and community, respectively. While enforcing the ECA rules, the local administration and the Department of Environment office have been joined by the VCG members and local communities. The CBA-ECA Project therefore has combined alternative livelihoods support, technological promotion, surveillance and enforcement to improve biodiversity of areas in ecologically critical conditions.

Introduction of adaptive options is one of the objectives of the CBA-ECA Project. This has made this project different from the previous natural resource management projects. Knowledge of adaptation of



Museum within the VCC

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the community has been built through awareness raising and training programmes. Establishment of submersible greenbelt and mangrove restoration increased biodiversity and resilience of community towards wave action and cyclone in Hakaluki Haor and Cox's Bazar, respectively. Adaptation in agriculture, alternative livelihoods, promotion of improved cooking stoves, and distribution of solar home systems, not only meet basic household needs, but also increased income and reduced expenditure. Solar desalination plants offer drinking water in cyclone affected saline prone areas benefiting thousands of people who remained unattended for about 25 years. Solar irrigation pumps help communities to undertake rice and vegetable cultivation in areas where it was impossible before, thus encouraging alternative livelihoods to reduce pressure on the ECA resources, and to conserve water in dry season in beels and canal for aquatic life.

While undertaking large, physical interventions, like re-excavation of beels or construction of watchtowers, project implementation committees have been formed with representatives from VCGs, local leaders and project team. After completion of a physical intervention, management has been handed over to respective VCGs. In some cases when the intervention involved highly technical matters, such as solar desalination plants and solar irrigation systems, management committees included representations from the Department of Environment to ensure smooth operation and maintenance of the systems. For all physical interventions management guidelines have been prepared to maintain and get maximum benefit out of them.

All these interventions of the CBA-ECA Project directly contribute to the specific purpose of the project,

by improving the biodiversity in three ECAs, enhanced alternative income generating options for the ECA dependent people, helping them with climate adaptive measures, and making the ECA governance system stronger by facilitating the relevant institutions.

Department of Environment Mandated for Ecologically Critical Area Management

The perspectives and capacity of the Department of Environment have evolved and strengthened while implementing the CBA-ECA Project. Such change is one of the objectives of this project. The project is not just a replication of the CWBMP model of ECA management, it has grown beyond that through able initiatives and clear vision from the Department of Environment while designing, fund searching and implementing the project. Several facts would support that assumption.

First, the CBA-ECA Project has combined natural resources management with adaptation to climate change — an innovative approach in Bangladesh. Second, the CBA-ECA Project has taken less number of ECA, than the CWBMP, as project sites to give more concentration on the included ones to test this model. Third, the Department of Environment has applied for Bangladesh's own fund — the Bangladesh Climate Change Trust Fund to implement the project — without relying exclusively upon external grants. Fourth, the Department of Environment has always wanted to include some infrastructural interventions, long demanded by the communities, in its ECA management venture. It had looked for further resources and finally has made those interventions happened, on a limited scale, with timely support from the Embassy of the Kingdom of Netherlands (EKN) in Dhaka through the UNDP. Fifth, the Department of Environment demonstrated some unique concepts through some novel interventions, like VCC buildings, solar desalination plants and solar irrigation plants, first time in Bangladesh. Finally, the Department of Environment has built on the experience of the CWBMP while facilitating VCGs, MCG and Endowment Fund, showing able leadership in community based natural resources management in Bangladesh.

Contribution of the CBA-ECA Project to National and International Strategies and Action Plans

The CBA-ECA Project is in line with the Government of Bangladesh's initiatives to attain environmentally sustainable growth, and becoming a middle income country by 2021. The project objectives and interventions are directly linked with several national and international strategies, frameworks and action plans.

Sustainable Development Goals

In 2015, the world leaders have approved 17 new Sustainable Development Goals (SDGs) to succeed Millennium Development Goals (MDG). The interventions carried out by the CBA-ECA Project largely contribute to the Sustainable Development Goal (SDG) 15 (Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss) as the main objective of this project is to conserve biodiversity through ecosystem based conservation. The project has taken several initiatives to conserve freshwater ecosystems, like establishment and management of sanctuaries engaging community and other stakeholders and restoration swamp forest. Degraded mangrove forest also been restored under



Re-excavation of canal, Hakaluki Haor

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this project. Capacity building of communities over AIGAs and awareness building of communities played a vital role in reducing dependency of ECA communities over resources. The inland wetland ecosystem conservation, degraded forest management and reduction of resource dependency over resources that have been prioritised by SDG 15, have been extensively considered in the CBA-ECA Project.

Having Cox's Bazar-Teknaf Peninsula and Sonadia Island ECA as project sites, the CBA-ECA Project has directly contributed to the SDG 14 (Conserve and sustainably use the oceans, seas and marine resources) through its interventions. The conservation activities in marine ecosystem included establishment of sea turtle hatchery and release of hatchlings to the sea, guarding of beach for safe hatching of eggs of turtles, mangrove plantation, facilitating regeneration, and restoration for providing service to both terrestrial and aquatic components and ecosystem as well.

The adaptation and mitigation options taken by the CBA-ECA Project for enhancing community resilience have contributed to the SDG 13 (Take urgent action to combat climate change and its impacts). A number of adaptation measures, like crop diversification, cultivation of saline tolerant rice, early rice and vegetable varieties, and livelihoods diversification have been undertaken in this project. Mitigation options, like, solar home systems, solar irrigation plants and solar desalination plants have been introduced by the project in the poverty stricken ECAs. Interventions like plantation and restoration of swamp forest and mangroves,

submersible embankment with green belt in Hakaluki Haor, and sand dune plantation in Cox's Bazar have contributed to both adaptation and mitigation.

The CBA-ECA Project has ensured supply of safe drinking water through solar desalination plant. About 900 families of Nuniarchhara and Jaliapara of Cox's Bazar are now getting safe drinking water instead of saline water, which fulfils the SDG 6 (Ensure access to water and sanitation for all). In addition to the desalination plant, installation of solar based irrigation pump and solar home system by the CBA-ECA Project has also contributed in the SDG 7 (Ensure access to affordable, reliable, sustainable and modern energy for all).

National Strategies and Action Plans

The CBA-ECA Project has helped implement the Bangladesh Climate Change Strategy and Action Plan. Specifically it contributed to The Theme 1: 'Food Security, Social Protection and Health' and its Programmes 7 and 8 (Water and sanitation programme in climate vulnerable areas and Livelihood protection in ecologically fragile areas). By undertaking forest protection, afforestation and reforestation activities, and by installing solar irrigation and solar desalination plants, the CBA-ECA Project supports the implementation of Theme 5: Mitigation and Low Carbon Development. It also contributed to Theme 6: Capacity Building and Institutional Strengthening by mainstreaming climate change in national conservation project.

The CBA-ECA Project has also contributed to the implementation of National Biodiversity Strategy and Action Plan (NBSAP) prepared as a commitment to the United Nations Convention on Biological Diversity (CBD). Essentially a biodiversity conservation project, the CBA-ECA Project has supported several of the 16 strategies and 117 short term, medium term and long term action points of the NBSAP. It has also contributed to the Biodiversity Targets 2010.

As a signatory of the CBD, Bangladesh is currently updating the NBSAP. As part of this, the Government has been preparing a list of national targets against the 20 Aichi Targets (2011-2020). The CBA-ECA Project experience gives Bangladesh the confidence to set realistic national targets. The awareness building by the CBA-ECA Project for conservation of biodiversity and ecosystem resulted in attitude change. In one end, communities along with the administration has taken action against unsustainable resource harvesting in Hakaluki Haor and Cox's Bazar ECAs, and in the other end, the communities have taken initiative to guard their resources which contributed to take one step ahead in achieving the Aichi Target 1. The project has promoted integrated pest management, which is a biodiversity conservation friendly technique and contributed in achieving the Aichi Target 3. Plantation and protection for restoration of degraded swamp forest added value to the Aichi Target 5. The Aichi Target 6 has been fed by conservation of aquatic resources through conserving sanctuaries and swamp forests. Introducing alternate livelihood option for increasing resilience and minimising pressure of population over ecosystem, the project has contributed to the Aichi Target 10. The CBA-ECA Project has contribute to the Aichi Target 12 by taking initiative to conserve threatened sea turtles through enabling proper environment for hatching of eggs and releasing them to the sea. The Aichi Target 15 has been fed by plantation and protection of swamp forest in Hakaluki Haor and Cox's Bazar as an option of adaptation and mitigation with regard to climate change.

Harnessing the Success

Specific achievements of the CBA-ECA Project have been highlighted in different chapters of this book. There are several special ones that stand out among all others and make the CBA-ECA Project a success.

1. All the Village Conservation Groups (VCG) are well aware of conservation issues, and are clear about the logic behind improving wellbeing. The VCGs of Borodeil and Mohammad Shafir Beel at Cox's Bazar, for example, can clearly link the abundance of fish with conservation of sea turtles. Judhistipur VCG of Hakaluki Haor can explain that the protection of swamp will increase fish production through enabling fish breeding ground, and will also protect settlements from wave erosion that ultimately improve community wellbeing. The scope for transformation of profession from unsustainable fishing to sustainable agricultural production through installation of solar irrigation pump has been convincingly explained by the Mamunpara VCG.
2. Women's empowerment enhanced through alternative income generation activities, and capacity and skill development training. Women headed VCGs like Kutubdia Para, Tulatoli in Cox's Bazar, run their organisation and MCG on their own indicating substantial empowerment.
3. The VCG members are more active, and can approach upazila administrations and relevant authorities to share their concerns and demand for actions. The VCGs have participated in 57 law enforcing attempts along with the local administrations to stop illegal activities in the haor and to cease illegal products (eg shell, gill net).
4. The MCG and alternative income generation activities contributed to reducing natural resources dependency of the ECA dwellers. The 100% return of MCG loans by the VCG members indicates that the MCG has positive impact on their household income.
5. The members of VCGs were collectively managing their institution and contributing to conservation of ECA.
6. Awareness and extra income from MCG and alternative income generation activities have helped the members to uptake other interventions, like improved cooking stoves and solar home systems, contributing to fulfilling basic needs, like improved health and education.
7. Field observations have indicated increase in biodiversity due to conservation activities. Due to plantation and protection of Nuniarchhara mangrove forest, 24 wildlife species are recorded against the baseline of 14 species a few years back. Fishing cat in Baralekha-Fenchuganj and monkey in Fenchuganj have recently been sighted. Tremendous increase in Purple Swampphen (Kalim pakhi) in reed patches has also been reported at the Hakaluki Haor site.
8. Structures, like Village Conservation Centre buildings, watchtowers, solar irrigation pumps, solar desalination plants have created an opportunity to increase income of the VCGs that could further contribute to reducing people's dependency over ECA resources.

To sustain above successes, long term programme is needed for managing the ECAs, and to continue with the CBA-ECA model. It is important to conduct regular monitoring of ECAs' health, in terms of biodiversity and natural resource utilisation, which would duly capture the impacts of the CWBMP and the CBA-ECA Project. This should be accompanied by a comprehensive knowledge management component. The current Endowment Fund management policy needs to appreciate the mandate of the Department of Environment and the role of the VCGs for its effective utilisation. Collective management of the VCGs and the MCG is needed for better organisational management by increasing membership pool. Such membership growth will also strengthen current conservation efforts. Many products of alternative income generation activities have market potential; that need to be promoted by establishing proper market linkages. Establishment of nature based tourism and relevant income generating activities need to be introduced in the ECAs. Proper capacity building and long time nurturing is necessary for management of profit from high investment infrastructures. A longer follow-up programme in the ECAs can bring these issues together, and ensure sustainability of the achievements of the CBA-ECA Project.



Chapter 9

Future Directions

A photograph showing four men from behind, walking across a vast green field. They are carrying large, round, brown pots on their shoulders using long wooden poles. The sky is bright and hazy, suggesting a clear day. The men are dressed in simple, everyday clothing.

The chapter contains specific recommendations for possible future actions to harness the achievements, and to overcome the challenges, constraints, and uncertainty identified from the experience of the CBA-ECA Project.



Ruddy Shelduck (*Tadorna ferruginea*)
© Samiul Mohsanin

The CBA-ECA Project has established an ecosystem conservation co-management model for the ECAs under changing climate regime. Given the complexity of ECA management, the project has identified some major issues that need to be considered to ensure sustenance of its achievements. The VCGs have received rigorous training, funds and management guidelines from the project over its tenure. These community based organisations now need to show their self reliance in the light of the supports received. It is important to broaden the membership base of the VCGs, and bring the larger community under the MCG to substantially reduce pressure on the ECA resources. To increase the efficiency of MCG and for the sustenance of alternative income generation activities, it is essential to link the products with markets chain. Motivated communities and tangible, visible progress of the project still face challenge and pressure from certain groups with vested interest. To minimise this challenge, further concerted effort is needed by the community, local government, administration and the Department of Environment. The interactions among the VCGs and with other ECA Management Committees could be further improved to create togetherness in protecting the ECAs. It is important to undertake a comprehensive assessment to show the real impacts of the conservation efforts, especially in terms of people's wellbeing and economic benefits. Such assessments could have encouraged further investments in the conservation efforts in ECAs.

To explore these opportunities, capitalise on the success of the CBA-ECA Project and to make future similar endeavours better, some specific recommendations are made on the major components of the CBA-ECA Project.

Village Conservation Group

The VCGs are the basic institutions of all activities of the CBA-ECA Project. Presently, they represent maximum one tenth of the total population of a village. It is therefore important to expand VCGs by recruiting new members to create substantial impact on ECA management.

To expand VCGs, the biggest question is: Who should be newly included in the VCG? A neutral and acceptable way of selecting a new VCG member should be done using a well designed selection tool. The VCG members in association with the Upazila Cooperative Office can frame the tool, and conduct necessary selection process. Emotional considerations such as extremely poor, widow, very old are some thumb considerations often override the formal selection procedure. If that is the case, the VCG might fail to make its breakthrough in the long run.

The opposite is also true — expelling a member from the VCG. It happened in the past that some members were forcefully expelled from the VCG since they failed to comply with the interest of the VCG. This forceful expelling is not a good idea. It should also have a key to reach an expelling decision. This will help take a good decision, and at the same time, a valid ground for the expellee as to why s/he is expelled from the VCG. Thus, expansion of VCG might face a number of challenges: 1) Who can be a VCG member? – Need a guideline; and 2) How can the issue of VCG share and membership fee be fixed? – Need a profit sharing mechanism based on capital invested in the VCG. Solution to both issues is described in the following sections.

VCG member selection guideline

- (a) Name and address of the VCG member (only for record purpose):
- (b) Education:
 - Up to class V = 5 points
 - VI to VIII = 10 points
 - IX to X = 15 points
 - Above X = 20 points
- (c) Has the applicant got any externality benefits from ongoing VCG activities? The benefit might be financial, motivational, and knowledge about conservation. If Yes = 5 points, if No = 0 point.
- (d) Last five year history of ECA related activities which the VCG members clearly know about. Each positive activity (such as patrolling or protecting or planting) = 5, each negative activity (such as deforestation, killing fish fries during spawning season, helping ECA destroyers with any means) = -5 points.
- (e) Social connection of the applicant that may be deemed influential in conservation of ECA resources. If Yes = 5 points, otherwise zero.
- (f) Willingness to pay for membership share: For each year = 2 points. Note that, one share is allotted for each which costs BDT 100 only.
- (g) Willingness to comply with all the regulations of the VCG. If Yes = 5, otherwise = 0
- (h) Previous loan management history from other organisations (if known to other VCG members at all):
If refunded on time in full = 5, if defaulted = 0 point.
- (i) Tenure right on household land:
 - 1. The household land is owned by the VCG member = 2 points
 - 2. The household land is not owned by the VCG member = 5 points
- (j) Existing involvement in ECA conservation activities (such as plantation, patrolling etc)
 - 1. Yes = 5 points
 - 2. No = 0 points
- (k) ECA resource dependency ($[(\text{ECA resource related income}/\text{total household income}) \times 100]$)
 - 1. 90%-100 % = 5
 - 2. 60%-80% = 3
 - 3. 50% or less = 1
- (l) Family dependency ratio ($[(\text{number of non-working family members}/\text{total family member}) \times 100]$)
 - 1. 80% and above = 2
 - 2. 60% and above = 5
 - 3. 50% and above = 7
 - 4. Less than 50% = 10
- (m) The gender of the applicant
 - 1. Widow = 10
 - 2. Female but not widow = 7
 - 3. Male = 5

Using this tool, a new VCG member can be selected provided the applicant obtains a minimum of 30 points (or as is decided in the VCG meeting). The final approval lies with the VCG and the Upazila Cooperative Officer (if such an obligation exists). It can be noted that, this is a preliminary membership. With satisfactory

compliance of the new member to the VCG regulation for one year, the VCG can decide offering her/him permanent membership or can decide to terminate her/his membership.

Benefit sharing mechanism

A new VCG member should avail all the benefits through the VCG like an existing general member. However, this is subject to 1) his/her service length to the VCG, 2) his/her number of share in the VCG, and 3) her/his membership fee contributed to the VCG. Benefit sharing issue may occur in two different situations: when 1) the VCG decides to distribute the benefit (or profit) among its members, and when 2) a member is willing to exit from the VCG with the share he has with the VCG. However, the distribution may be made according to the following convention:

Benefit of member K

$$= \frac{\text{Time weighted share money paid by K} + \text{Time weighted membership money paid by K}}{\text{Time weighted share money paid by all} + \text{Time weighted membership money paid by all}} \times \text{Total amount}$$

Biodiversity Conservation

Biodiversity conservation is the most vital component of the CBA-ECA Project. To improve future engagement better, some action points can be considered. First, the dependency of local people on ECA resources must be reduced by promoting appropriate alternative livelihoods options to greater mass with provision for market linkage.

Second, it has been noted that the benefits gained from conserving fish in a beel with the guarding community is very important to make conservation effort successful and ecosystem management sustainable. Therefore, it is important to have a benefit sharing system in place under ECA management. Such arrangement requires attending to existing Jalmohol Law, which favours only registered fishing organisations, not organisations like VCGs.

Third, given limited resources and vastness of Hakaluki Haor, there have been many incidences when it was not possible to enforce existing laws by the local administration despite their full intentions. Sufficient resource allocation to protecting forests and sanctuaries is crucial to protect the gain of the CBA-ECA Project.

Fourth, adequate resource allocation for physical intervention through proper assessment needs to be made. A branch of the Konthi River was re-excavated recently, but not the full channel. Insufficient investments can make existing investment less effective. Similarly, the swamp forests and sanctuaries needed continuous guarding by the community, patrolling (with boats) and maintenance (katha for sanctuaries, re-excavation of canals). The VCGs and ECA Management Committees needed further guidance and support to sustain the investment made so far.

Fifth, coordination is needed among projects (like CBA-ECA and CREL), government agencies (eg Department of Environment and Bangladesh Forest Department), and local administrations (at upazila and

district levels) to make conservation measures effective. It is important to guide local administration on technical matter of ecotourism and conservation to make conservation efforts effective.

Sixth, hydrology of the haor region is a challenge. The Juri River is now much shallower due to siltation. It often overflows in the monsoon causing flood in the area, whereas remains dry in the winter. Making effective connection between the Juri and Kushiara Rivers is also important. Interventions need to be carried out investigating reason behind siltation and identifying proper management options to maintain required environmental flow of the important rivers feeding a wetland to support any conservation efforts in those ecosystems.

Finally, knowledge management is very important to monitor and document the changes in biodiversity as result of project interventions. People's perceptions and observations of such changes need to be substantiated by in-depth, scientific observations as well.



Pallas's Fish Eagle
© IUCN/ A.B.M. Sarowar Alam

Livelihoods Improvement

Alternative income generation is an important aspect of any community based natural resources management project. The CBA-ECA Project has facilitated and promoted a good number of livelihood diversification ventures taken up by the communities. Based on that experience a number of action points are identified.

First, the aim of livelihood diversification is to reduce dependency over natural resources of ECAs. It is therefore important to be careful during participant selection. Selection of a person not substantially dependent on ECA resources may not fulfil the envisaged purpose.

Second, most of the alternative income generation activities are either selected by the MCG grantees or are promoted by the project based on available resources. Before, sanctioning MCG, a need assessment is thought to be a wise step to select most potential income generation options for the MCG grantees.

Third, to get better outcome from livelihood diversification, it is necessary to provide sufficient training so that the participant can get sufficient knowledge to carry on the activity, and can manage good output from the option that can reduce dependency over ECA resources. The training should also be followed by regular monitoring and backstopping support to attain expected result.

Finally, before producing any product, especially new product, it is important to look for the potential market system for that product. Inaccurate or no market information, business unfriendly supply chain will increase cost of production. Failing to maintain equi-marginal production cost of a product with other competitors in the market will push the product out of the market. Also, poorly informed rural sellers fall a victim to a monopolist who grabs most margin of profit for the products. Thus, looking for a well informed competitive market before producing a product is essential.

Life and livelihood
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Micro Capital Grant (MCG)

When the VCGs will be more self reliant, they will feel the urge of expanding the VCGs. In that case, a big issue might appear – collective loan management. Some of the VCGs have sanctioned loan to a group of members to do short term business. However, they did assign money individually. For greater growth, bigger business venture is required. But managing a big amount of money is often risky. The VCGs should start practicing collective loan management. At the initial stage, they can go for a three to four member group for funding. The group may opt for fish cultivation in a pond, for example. A number of such experiences in a line will enable the VCGs to manage collective loan with reduced level of risk.

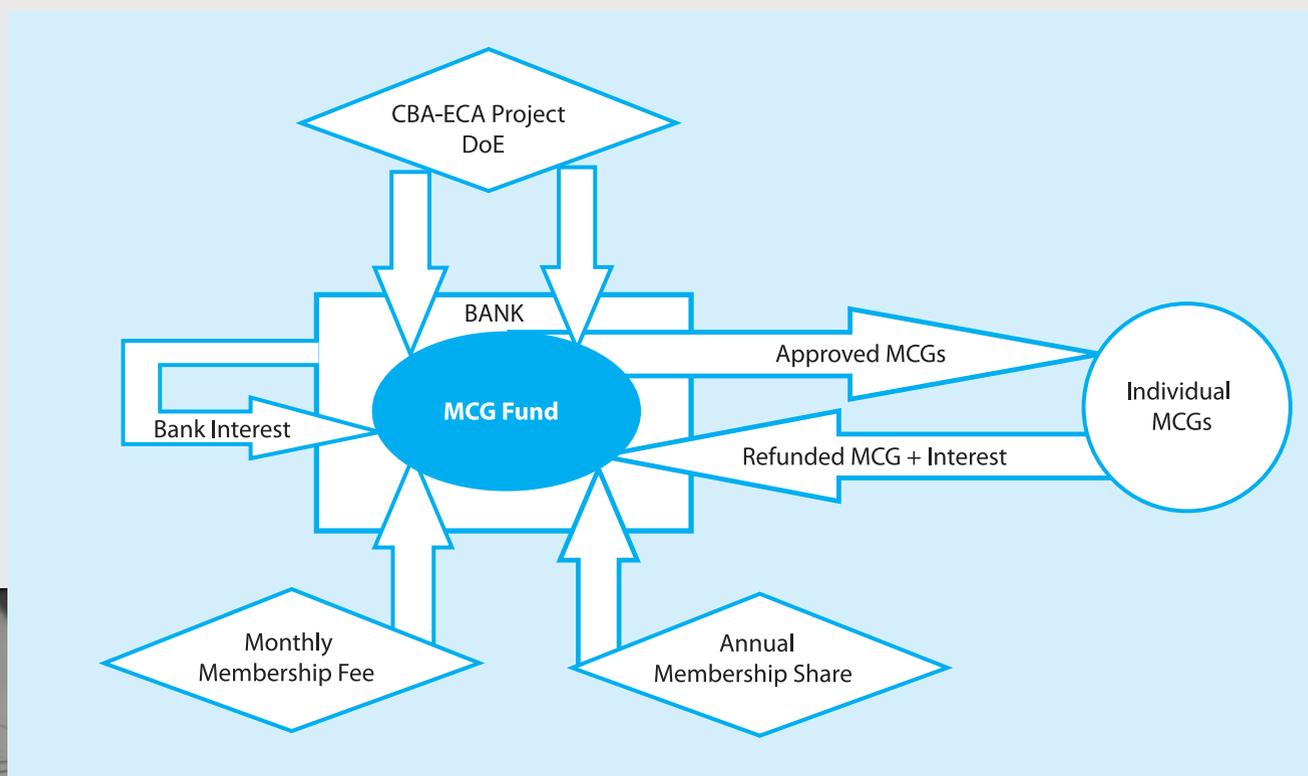


Figure 9.1. The sources of Micro Capital Grant fund and its uses.



MCG distribution ceremony in Hakaluki Haor site
© Department of Environment



Traditional fishing

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Institutions and Governance

The institutional set up established by the CWBMP, and promoted and facilitated by the CBA-ECA Project is performing well given the resources in presence of the project. The followings two major recommendations are made for its further improvement.

First, an 'Apex Upazila Committee of VCGs' may be constituted in each upazila involving the presidents and secretaries of the existing VCGs of the given upazilas. This 'Apex Upazila Committee of VCGs' will ensure co-ordination and dissemination of common group interest of all the VCGs to respective VCGs in the given upazila. This committee will also work to create pressure on relevant authorities to secure the lawful rights and privileges of the VCGs towards proper functioning of the VCGs to serve interest of ECA management. The VCGs of the upazila will make arrangements to fund the 'Apex Upazila Committee of VCGs' for its routine activities under the given context.

Second, the VCGs and their members are yet to acquire the knowledge and skill required, to stand on its own. Capacity building has to be done of the VCG members to inculcate the institutional responsibilities and accountabilities. To look into all the financial aspect of the VCG one member should be adequately trained and entrusted with this assignment. S/he may be given a small remuneration by the VCG. Department of Environment's support needs to continue for a while, if possible through a donor funded project.

Endowment Fund

This fund is very important for ECA management in a upazila. Some recommendations are proposed specifically to rethink its management and utilisation.

Use of endowment fund In the present set up, the VCGs have no direct right-to-use the fund. In addition to meeting the institutional expenses of the ECA Management Committees, the use of endowment fund could be extended to the institutional purposes of the VCGs too. However, this can be done probably in two ways: 1) Supporting the institutional needs of the VCGs, especially VCG meetings, with the endowment fund, and 2) Keeping the existing use confined to the institutional expenses of the Upazila and Union ECA Management Committees provided, both the committees have representations of all the concerned VCGs.

Mobilising the endowment fund While the existing MCG fund is not big enough to meet the VCG members' borrowing needs, endowment fund is just left idle. Rethinking on alternative use of endowment fund can be useful. One suggestion is to mobilise at least 40% of the existing endowment fund through VCGs in the form of MCGs while another 60% remains in the existing bank account as a fixed term deposit (FDR). The profit from the FDR may be used for law enforcement for natural resource conservation in the ECAs. Since the VCGs will be using 40% of the endowment fund for which they will have remain accountable and loyal to the respective UNO(s), there will be a constant check and balance communication between the VCGs and respective UNO(s). This will help the VCGs remain on track even at the exit of the existing project support.

UNOs' obligation to exhaust the fund The existing trend of endowment fund use is that, most of the usable fund is left unused. A clause can be an addendum to the existing endowment fund use policy that: at least 90% of the usable profit of the endowment fund should be used in a budget year. The UNOs should be held accountable to Director General of Department of Environment for the use of this fund.

Efficient use of disposable interest on endowment fund According to the endowment fund management policy, the disburseable money is quite small. The fall of interest rate with the schedule or state owned banks will make this fund availability even scarcer. The available data shows that, the small amount of disposable interest money is left unused. While people around ECAs have immense hunger for loan to enhance their livelihood, excess amount of idle money in the endowment fund does not signal anything positive. The respective UNO, the Upazila ECA Management Committee chair, can take effective strategy to use the disposable fund to the fullest extent possible.

Strengthening the institutional behaviour of the VCGs Since the VCGs are registered cooperative organisations with the Upazila Cooperative Office (UCO), the UCO can oversee the institutional growth of the VCGs. The ECA Management Committee chair can authorise the UCO to monitor the endowment fund money (40% of the disposable money) management in the institutional activities of the VCGs (see above). This authorisation will release the UNO from bothering with this money while s/he has many other jobs in the queue. This will probably reduce the volume of unused money in the bank account, and help institutional growth of the VCGs, which ultimately will sustain VCG members' cash income from alternative income sources and their motivation to be responsible towards conservation of ECAs.

Climate Change Adaptation and Mitigation

Suitable plantation programmes along the coastal line and green belt creation along the swamp areas with indigenous species has been done in the current and previous phases of the project, and should be expanded in the next phase.



Solar desalination plant

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The Department of Environment's ECA Management Unit staff need to have the necessary equipment and training for biodiversity monitoring and EIA and SIA needs to be conducted for all activities (such as alternative income generation activities) and constructions (watchtower, VCC, solar irrigation and solar desalination plants), before these investments are made by the Department. In addition, for structural interventions like the solar irrigation and desalination plants, communities need to be better trained about maintenance and operation and the cost benefit ratios calculated, for the long term.

There is a huge demand for solar home systems and improved cooking stoves. In the future initiatives, variations for making improved cooking stoves more user friendly in the local environmental context need to be considered.

Ecotourism

There is much potential for developing ecotourism in the Hakaluki Haor and the watchtower can be used for bird watching. During the CWBMP phase, shaded resting spaces were created inside the haor, which was used by researchers and tourists as a resting spot. The watchtowers are built with the primary intention of monitoring the status of the forest and to observe the changes in biodiversity. But it can also be an abode for fishermen out in the haor, during a storm, and the local people/VCG members can become 'guards' (community patrolling).

The local communities can earn alternative incomes from being tour guides, boatmen, hospitality management and selling locally produced handicraft items. Currently, the boatmen/fishermen earn an additional income of about Taka 3000 a month during the tourist attraction seasons: monsoon and winter months.

An 'Apex Body' can be created for facilitating coordination and avoiding conflicts. For instance, if ecotourism is developed, then an important stakeholder will be the Bangladesh Parjatan Corporation (national tourism authority of Bangladesh), and they need to be brought on board.

Final Words

The consecutive 'build-on' effect of the various environmental projects in the ECAs areas since 2001, there have been noticeable changes within the ECA communities. Based on the challenges faced, lessons learned, and the sustainability of CBA-ECA Project interventions, some recommendations have been put forward for future community based ecosystem conservation and adaptation mitigation initiatives in the ECAs of Bangladesh. Project based initiatives are not always adequate, especially if they are for short time span and dealing with complex fields like ECA management. CBA-ECA model developed, practiced and continued that engaged community and all the stakeholders in the process. Sustainable ecosystem management requires long term continuous effort and the proven CBA-ECA model of community engaged ecosystem based approach of management of ECAs and the ecosystems of the country as a whole is very imperative to continue with support from all corners.

Based on learning of the CBA-ECA Project, a long term vision is needed for each ECA accompanied by an action plan to achieve that vision. Any new initiative to take the CBA-ECA Project experience forward should aim at implementing the action plan in an organized fashion. In this way, focus should be shifted from short term, resource driven piece-meal projects to a more organized initiatives under a long term strategic program engaging all the stakeholders. This will eventually ensure proper ECA biodiversity management engaging the community under changing climate.



Birds taken shelter at Moiajuri Beel wetland sanctuary

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