

**Report of the**

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**STAKEHOLDER WORKSHOP ON THE GEF CLIMATE RESILIENT  
FISHERIES AND AQUACULTURE DEVELOPMENT PROJECT IN  
BANGLADESH**

**Dhaka, Bangladesh, 29–30 August 2012**



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## **PREPARATION OF THIS DOCUMENT**

This report documents the outcomes of the FAO workshop on “GEF Climate Resilient Fisheries and Aquaculture Development Project in Bangladesh”, 29–30 August 2012, Dhaka, Bangladesh. This document comprises the key aspects of presentations made by different professionals, including the outcomes of the working group and question-and-answer sessions. Three appendixes comprise the workshop schedule, list of workshop participants and the participants’ expectations from the workshop, while a fourth provides extended summaries of the presentations. The workshop was jointly organized by the FAO Fisheries and Aquaculture Department (Aquaculture Service [FIRA], WorldFish, Dhaka and the FAO Representation in Bangladesh in collaboration with the Ministry of Fisheries and Livestock, Government of Bangladesh and Department of Fisheries, Government of Bangladesh. The organization of the workshop was funded by FAO Rome.

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*Report of the Stakeholder Workshop on the GEF Climate Resilient Fisheries and Aquaculture Development Project in Bangladesh, 29–30 August 2012, Dhaka, Bangladesh.*

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### **ABSTRACT**

The workshop was hosted jointly by WorldFish and the Department of Fisheries (DOF) Bangladesh, with financial assistance from FAO. The 60 workshop participants were policy-makers, professionals and practitioners. Presentations covered the understanding of climate change impacts and fisheries, adaptation for fisheries and aquaculture to the adverse impacts of climate change (CC) in the context of Bangladesh, and the process of Project Identification Form (PIF) development to access global funds for CC adaptation for the least-developed countries. A dozen presentations focused on: (i) CC impacts on fisheries and aquaculture; (ii) global perspective and adaptation funding opportunities; (iii) CC impacts on fisheries and aquaculture in Bangladesh; (iv) CC hotspots in Bangladesh and fisheries; (v) current efforts by government and other actors in addressing CC and fisheries; and (vi) Global Environment Facility (GEF) fisheries project proposal development (PIF) and next steps.

Workshop discussions largely focused on CC impacts on fisheries and aquaculture systems, especially some CC-related hotspots (e.g. the coastal zone and haor basins). Participants emphasized the need to enhance understanding of CC impacts through conducting adaptive research on different CC hotspots. They also recommended possible interventions to adapt to CC threats. Sea-level rise, salinity intrusion, cyclones, drought, erratic rainfall, flash flooding and sedimentation were identified as the key CC-related threats to fisheries and aquaculture. Major recommendations included improvement of fisheries-related national policies and strategies by incorporating CC issues, including capacity building of DOF and communities dependent on fisheries and aquaculture for their livelihoods. Discussion also revolved around development of CC-resilient technologies for aquaculture and fisheries management for the CC hotspots in Bangladesh. Based on the workshop recommendations, a PIF for the adaptation of Bangladesh fisheries and aquaculture to CC will be developed with three components: (i) climate-resilient fisheries sector and relevant national capacity development; (ii) strengthening knowledge and awareness of fisheries/aquaculture-dependent communities facing the adverse impacts of CC; and (iii) enhancing local adaptive capacity to support climate-resilient fisheries/aquaculture management and alternative livelihoods in the face of CC.

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## ACRONYMS AND ABBREVIATIONS

AIGA	alternative income generating activity
BAU	Bangladesh Agricultural University
BCAS	Bangladesh Center for Advanced Studies
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BFRI	Bangladesh Fisheries Research Institute
BOB	Bay of Bengal
BSFF	Bangladesh Shrimp and Fish Foundation
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
CBA-ECA	ecologically critical areas through biodiversity conservation and social protection
CBACC-CF	community-based adaptation to climate change through coastal afforestation
CC	climate change
CCA	climate change adaptation
CCTF	Climate Change Trust Fund of Bangladesh Government
CIP	Country Investment Plans of Bangladesh
CDMP	Comprehensive Disaster Management Programme
CNRS	Center for Natural Resource Studies
COP17	Seventeenth Session of the Conference of the Parties
DC	deputy commissioner
DFO	district fisheries officer
DOE	Department of Environment
DOF	Department of Fisheries
DRR	disaster risk reduction
DU	Dhaka University
EWS	early warning system
FAOR	FAO Representative
FD	Forestry Department
FGD	focus group discussion
FIRA	Aquaculture Branch of FAO Fisheries and Aquaculture Department
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GIS	geographic information system
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICT	information and communications technology
ICZMP	integrated coastal zone management policy
IEC	information, education and communication
IPAC	Integrated Protected Area Co-management Project
IPCC	International Panel on Climate Change
IUCN	International Union for Conservation of Nature
IUU	illegal, unreported and unregulated (fishing)
LDCs	least-developed countries
LDCF	Least Developed Country Fund
MIS	management information system
MOA	Ministry of Agriculture
MOEF	Ministry of Environment and Forests
MOFDM	Ministry of Food and Disaster Management
MOFL	Ministry of Fisheries and Livestock
MOL	Ministry of Land
MOWR	Ministry of Water Resources
MPA	marine protected area
NAPA	National Adaptation Programme of Action

NCCU	National Climate Change Unit
NGO	non-governmental organization
PaCFA	Partnership for Climate, Fisheries and Aquaculture
PIF	Project Identification Form
PPG	Project Preparation Grant
SCCF	Special Climate Change Funds
SLR	sea-level rise
SREX	Managing the risks of extreme events and disasters to advance climate change adaptation (IPCC commissioned special report)
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VTMS	vessel traffic management system
WF	WorldFish

## 1. INTRODUCTION

### 1.1 Background

Bangladesh is one of the world's leading fish producers with a total production of 3 124 677 tonnes in 2011, a total capture fisheries production of 1 600 918 tonnes (marine: 546 333 tonnes; and inland capture fisheries: 1 054 585 tonnes) and an aquaculture production of 1 523 759 tonnes.<sup>1</sup> Inland capture fisheries and aquaculture together contribute about 82.5 percent (33.8 percent and 48.8 percent, respectively) of total fish production in the country. Bangladesh is one of the top-ten aquaculture-producing countries in the world, with natural advantages in inland and coastal aquaculture.

Climate change (CC) is a real concern for the country, as it can lead to more frequent floods, cyclones, and storm surges, as well as drought. Climate models foresee an increase in the annual precipitation in the monsoon period and a decrease in the winter months. Sea level is expected to rise and will affect the agriculture sector, as the plains in the coastal area are the most important resource that supports various important economic activities, including crop production, livestock rearing, shrimp culture and ship-breaking harbour activities. Climate change is also threatening the level of self-sufficiency of the country in foodgrains, as increased temperature will produce a decrease in rice and wheat yields that will not be fully mitigated by the increases in yield due to higher levels of carbon dioxide in the atmosphere.

Although the extent has not been ascertained, it is most likely that the impact of CC seriously threatens the production of fish. Considering that fish is a key element to food security and livelihoods in the country's coastal zones, adaptation in the aquaculture and fisheries sector must be addressed with urgency. The most serious impacts include:

- Continuous sea-level rise (SLR) is threatening freshwater fish production in coastal farms owing to increasing salinity that may render some fish species unsuitable or less suitable for current farming practices.
- Sea-level rise and increased flooding frequency and extent will cause further damage to fish and shrimp aquaculture ponds and cages and could threaten the ability of the whole coastal zone to produce fish.
- Increased water temperature and salinity can reduce oxygen content and increase fish stress, enhancing disease risk.

### 1.2 National Adaptation Programme of Action (NAPA)

The Bangladesh NAPA<sup>2</sup> is intended to support the country in a programme for adaptation to CC. The NAPA addresses the previously described impacts and emphasizes the increased saline water intrusion and inundation of coastal lands with higher exposure to storms and flooding. As described by the NAPA, flooding is an annual phenomenon in Bangladesh, but recent experience shows that both the frequency and intensity of flooding have increased. Every year, many parts of the country are devastated by floods, often causing losses to agricultural crops, livestock and fish production. Every year, thousands of aquaculture ponds are inundated and washed away due to floods, resulting in the loss of fish, and the poor fish farmers incur financial losses. The Bangladesh NAPA contains two general project concepts:

- Concept No. 13 – Adaptation to fisheries in areas prone to enhanced flooding in Northeast and Central Region through adaptive and diversified fish culture practices (US\$4.5 million).
- Concept No. 14 – Promoting adaptation to coastal fisheries through culture of salt-tolerant fish species in coastal areas of Bangladesh (US\$4 million).

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<sup>1</sup> FAO. 2013. Fishstat – FAO Fishery and Aquaculture Global Statistics, Version 2.0.0. Rome, FAO. (available at [www.fao.org/fishery/statistics/software/fishstatj/en](http://www.fao.org/fishery/statistics/software/fishstatj/en)).

<sup>2</sup> [www.thegef.org/gef/sites/thegef.org/files/documents/document/ban01%20\(1\).pdf](http://www.thegef.org/gef/sites/thegef.org/files/documents/document/ban01%20(1).pdf)

These concepts are intended to contribute towards improving adaptive capacity to threats of CC in the fisheries and aquaculture sector, thus contributing significantly to ensuring and improving food security, livelihoods and environmental sustainability. The Project Identification Form (PIF) under preparation merges the two concepts and makes a single project proposal for accessing Least Developed Country Fund (LDCF) funding.

### **1.3 Workshop purpose**

Recognizing the importance of fisheries and aquaculture to the nation, the Department of Fisheries (DOF), FAO and WorldFish (WF) are collaborating with stakeholders in the development of a project for the adaptation of fisheries and aquaculture to CC, in accordance with the outline provided in the Bangladesh NAPA. The eventual outcome from this collaboration will be the development of a project concept note, including priority outcomes and activities, in the form of a Global Environment Facility (GEF) PIF for eventual submission to the Special Climate Change Funds (SCCF) of the United Nations Framework Convention on Climate Change (UNFCCC) and other potential donors through the country's national focal point.

The workshop was intended to bring invited stakeholders together to support the process of development of the GEF PIF, and particularly:

- to review current knowledge of CC and fisheries/aquaculture in Bangladesh, with particular reference to adaptation;
- to create awareness about CC vulnerability of aquaculture- and fisheries-dependent livelihoods in Bangladesh;
- to identify priority issues to be addressed in the adaptation project for eventual submission to GEF through the national focal point; and
- to discuss and agree on the next steps and follow-up actions, including the development of a GEF PIF that can be submitted to LDCF funding in order to enable adaptation in the fisheries and aquaculture sector in line with national CC priorities.

## **2. WORKSHOP STRUCTURE**

### **2.1 Workshop agenda**

The workshop sessions were designed to create space for sharing and discussing various relevant CC-related issues related to fisheries and aquaculture in local, national and global perspectives, including impacts of CC on fisheries and aquaculture and ways to adapt to them while building the local and national capacity to combat CC-related threats to the sector. The workshop was broadly organized into three coherent sessions: (i) presentation session (opening session and technical session); (ii) group discussion session; and (iii) concluding session. In addition, the workshop also accommodated a short session on participants' expectations from the workshop through brainstorming.

As such, the workshop started with the agenda item on global and regional background information on CC and fisheries and aquaculture, CC impacts on fisheries and aquaculture in Bangladesh (national perspective), processes of accessing LDCF funds, PIF development processes and its relevance to Bangladesh NAPA and other relevant national documents, and future actions to access LDCF funding. The workshop schedule, including the detailed agenda items, is attached as Appendix 1.

### **2.2 Workshop participants**

The workshop intended to involve relevant focused stakeholders from both government and non-governmental entities, including key policy stakeholders, and accordingly invited the concerned individuals. A total of 60 participants attended this two-day-long workshop; these included representatives from government agencies: DOF and Department of Environment (DOE), university fisheries departments such as Bangladesh Agricultural University (BAU) and Dhaka University (DU), and research institutions

such as the Bangladesh Fisheries Research Institute (BFRI). Additional participants included people from non-governmental organizations (NGOs) working in coastal and haor<sup>3</sup> areas, such as the Bangladesh Center for Advanced Studies (BCAS), the International Union for Conservation of Nature (IUCN), Shushilon and the Center for Natural Resource Studies (CNRS).

In addition, representatives from two ongoing climate change adaptation (CCA) projects also attended the workshop. These projects are: (i) “Community-based adaptation to climate change through coastal afforestation (CBACC-CF)”, assisted by the United National Development Programme/Least Developed Country Fund (UNDP/LDCF), and being implemented in four coastal districts; and (ii) the project, supported by funds from the Climate Change Trust Fund (CCTF) – Government of Bangladesh, “Community-based adaptation in the ecologically critical areas through biodiversity conservation and social protection (CBA-ECA) in haor and coastal areas of Bangladesh. In addition, experts and senior professionals from FAO Bangladesh and Rome, UNDP Bangladesh, WF Bangladesh and WF headquarters also attended the workshop. A list of workshop participants is attached as Appendix 2.

### **2.3 Structure and expectation from the workshop**

Michael J. Phillips, Senior Scientist, WF headquarters, gave a presentation on the structure of the workshop and its expected outputs. Explaining that the workshop was a very important part of the process of developing this GEF project, he emphasized that this process would create opportunities to bring together experience and knowledge on CCA in fisheries in Bangladesh. A framework had already been developed that needed inputs from all the participants to improve the project document (PIF), and in this way a strong sense of ownership and participation would be developed. He also pointed out that FAO, in consultation with the partners present, would finalize the development of the PIF based on two fisheries/aquaculture project concepts identified in the Bangladesh NAPA. This draft would include the outcomes and the outputs required to achieve the goal of the project. The technical session would address knowledge on fisheries and aquaculture; with participants being divided into groups to work in more detail on some of the activities of the project, and with discussion the following day about subsequent work and what follow-up was needed. He explained that some very concrete activities needed to be addressed in CC. In order to best respond to the needs identified during this workshop, he then asked every participant to write down one expectation from the workshop on a card. The detailed expectations of the workshop participants are presented in Appendix 3.

## **3. HIGHLIGHTS OF THE PRESENTATION SESSION**

Following the introduction of the workshop participants, the presentation session started with Mr Nasiruddin M. Humayun, Director (Marine), DOF, serving as Chair, while Mr Shamsul Kibria, Joint Secretary, Ministry of Fisheries and Livestock (MOFL), and Mr Douglas Beare, WF headquarters were honoured as the Chief Guest and Special Guest, respectively. The session was facilitated by Mr Mohammad Hasan from FAO Rome. Following the opening session, the technical presentation sessions were organized, a task jointly facilitated by Kevin Kamp, WF and Massood Siddique, CNRS. Highlights of the presentations made in the opening and technical sessions follow; extended summaries of the presentations appear as Appendix 4.

The presentations fall under seven themes: (i) fisheries, CC and national strategies; (ii) CC scenarios and fisheries and aquaculture in Bangladesh; (iii) CC impacts on coastal aquaculture in Bangladesh; (iv) CC hotspots and fisheries in Bangladesh; (v) government initiatives in climate change and fisheries in Bangladesh; (vi) approaches to CC adaptation in fisheries and aquaculture in Bangladesh; and (vii) GEF/LDCF project cycle and time frame.

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<sup>3</sup> Haors are a local term for low-lying natural depressions on a floodplain. Haors are normally connected into the neighbouring river system but do not represent dead rivers.

### **3.1 Fisheries, climate change and national strategies**

FAO Bangladesh cited the priority actions to address the impacts of CC on fisheries that have been included in the Bangladesh NAPA and appreciated the NAPA-suggested investment on enhanced aquaculture and fisheries management in the northeastern deeply flooded haor basins and on saline-resilient aquaculture practices in the coastal zone impacted by SLR and salinity intrusion. The role of FAO, WF and DOF was explained in terms of the process of developing project documents to access the global funds on adaptation such as LDCF.

The FAO Aquaculture Branch (FIRA) elaborated on the causes and consequences of CC risks, vulnerability and impacts on socio-ecological systems, including CC impacts on fisheries and aquaculture. The need for enhanced awareness of impact pathways and vulnerabilities was stressed to better support adaptation potentials. It was stated that mitigation of greenhouse gases (GHGs) should also be part of the role of fisheries and aquaculture, and that bridging science and policy and coordinating and collaborating joint project development and information sharing were desirable actions. The NAPA mechanism for identifying fisheries priority actions and developing projects to address CC-related issues was considered an excellent model for other countries.

The draft PIF that was developed based on the NAPA and suggested CCA actions on fisheries and aquaculture was presented by a WF consultant. The project is proposed for GEF support. It has three components: national capacity building, awareness and skill development at the local and national levels, and local adaptive capacity building.

A special presentation was given by Dr Douglas Beare, Climate Change Advisor of WF on the topic “Climate change as one of the most important threats that mankind is now facing”. He revealed that Bangladesh, India and Madagascar are the three States in the world most vulnerable to CC impacts. High levels of poverty, the level of dependence on agriculture and the likely impacts from CC form the basis for this conclusion. The areas most at risk are the coastal saline zones of the Ganges Basin; these will bear the brunt of the impacts of cyclones, floods and SLR. He informed participants that WorldFish was working with a number of governments, including Bangladesh, and donors on a number of CC-related programmes in developing countries.

Mr Muhammad Shamsul Kibria, Joint Secretary, MOFL, appreciated the initiatives of FAO, DOF and WF in developing an LDCF project proposal. While noting the richness of the national fisheries resources, he cautioned that CC – in a variety of ways and impacts – was gradually leading towards the degradation of these rich fisheries and reducing the welfare of communities depending on aquatic resources for livelihood. He assured the workshop of Government of Bangladesh’s full cooperation on the initiatives.

In wrapping up the opening session, the Chair reiterated the importance of fisheries resources in Bangladesh and their contribution to people’s livelihoods and cited a number of severe threats to the sustainability of the fisheries sector, one tragic outcome that could result from them being the extinction of the national fish, the hilsa. He conceded that the national fisheries policies lacked focus on CC issues and emphasized the need to incorporate CC impacts on fisheries and to accord balanced priority to the inland and marine fisheries sectors.

### **3.2 Climate change scenarios and fisheries and aquaculture in Bangladesh**

Climate change issues have a high level of uncertainty, and dealing with CCA means dealing with these uncertainties; hence, there are many models and scenarios. The NAPA-suggested possible adaptation measures are very broad and need some improvement. Critical CC and fisheries issues were described, including: the high dependence on the rainfall pattern in the upper catchment, and on SLR and salinity intrusion, which will affect coastal fisheries and aquaculture; rise in maximum temperature affecting normal rhythms in rainfall pattern; changes in rainfall pattern in the Meghalaya Highlands having negative impacts in lower riparian countries; the serious gap in knowledge and understanding of the influences of

CC factors; and the varying impacts of CC on a country's fisheries depending on geographical location and other circumstances. Bangladesh is highly vulnerable to CC stressors owing to its geography and topography. The vulnerability of the river systems to CC-related perturbations is imparted to the millions of poor people dependent on the waters for their livelihoods.

Climate change stressors will affect fish community structure and wetland ecology and thus have impacts on the distribution and operational aspects of fisheries, including disease occurrence and epidemics. A study by the IUCN has resulted in 54 fish species being declared as threatened species in the past ten years. This could increase if no initiative is undertaken to adapt to CC impacts.

A focused presentation on hilsa revealed that there are signs that the fish might have changed its migration route owing to CC impacts. However, the increasing degradation in the quality of river water could well be the other major influence on its migration pattern. A comprehensive study on CC and non-CC stressors on hilsa populations in the marine and estuarine waters was suggested.

### **3.3 Climate change impacts on coastal aquaculture in Bangladesh**

The impacts of CC on fisheries and aquaculture are now visible in Bangladesh; farmers have been witnessing the adverse impacts of climate variability and extremes on the coastal zones. Eight extreme weather events were described that had occurred between November 2007 and January 2012 and that had been CC-related and had severe impacts on aquaculture.

Fish farmers along the coasts are finding it increasingly difficult to cope with CC impacts such as increasing salinity. Adaptation mechanisms have included adjustments in cropping pattern evolved by the farmers based on their understanding of local changes in climatic parameters. This suggests that the proposed project should identify good practices developed by local people for future use and replication.

### **3.4 Climate change hotspots and fisheries in Bangladesh**

A group discussion tried to identify various CC-related threats in four CC hotspots of the country. The session identified key hazards in each CC hotspot and the anticipated impacts of these hazards on fisheries and fisheries-dependent communities. The results are presented in Appendix 4.

The issue of whether creeping salination of coastal and inland areas may present some opportunities was discussed. It was proposed that it may help in the aquaculture of shrimp, crab, mullet and seabass. On the other hand, it was pointed out that salination of inland areas has an adverse effect on freshwater fish farmers, rice farmers and freshwater fisheries. In addition, people in areas that are newly salinated are not prepared to adapt to saline-resilient production systems.

### **3.5 Government initiatives in climate change and fisheries in Bangladesh**

Recent government initiatives in fisheries management related to CCA include the restoration of Halda River natural carp breeding sites, establishment of fish sanctuaries, wetland habitat restoration, re-introduction of fish in degraded waterbodies, improvement of the quality of carp and shrimp seed and broodfish management, and expansion of cage and pen fish culture and small-scale aquaculture in floodplains. While these initiatives are aimed at increasing fish production, some are in line with fisheries adaptation to CC impacts. Through the Comprehensive Disaster Management Programme (CDMP), the DOF has recently planned to establish 13 CC-resilient villages in 13 subdistricts of the country. The DOF will work with the Department of Agriculture Extension and Directorate of Livestock in order to enhance the adaptive capacity of villagers to CC impacts through the taking up of improved crop, livestock and fishery practices and technologies that are climate resilient Improved fisheries policy and strategies that are climate smart are also urgently needed.

The Wetland Biodiversity Rehabilitation Project shared its experiences from a project assisted by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) aiming to increase wetland biodiversity within modified floodplains affected by flood control projects in the northern region. Useful lessons from the project include strategies in fisheries habitat restoration, community-led conservation actions, co-management structures, and livelihood diversification and enhancement.

### **3.6 Approaches to climate change adaptation in fisheries and aquaculture in Bangladesh**

Many useful opinions were offered, ranging from project orientation, management and monitoring to strategic approaches to policy support and guidance. The IUCN suggested that the proposed project should be in line with the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) of the Ministry of Environment and Forests MOEF that was approved in 2009. There is also need for central-level coordination among DOE, the Bangladesh Water Development Board (BWDB), DOF and the relevant stakeholders for better management of coastal polders. A social and legal issue would arise if shrimp were included, in that this would hamper agriculture and forestry, which suggests the need for strong coordination. A well-run CC monitoring system with a management information system (MIS) should be installed at the upazila (subdistrict) level. The blue carbon issue should be included in DOF efforts to address CC in fisheries adaptation.

A range of technical, strategic, and planning and policy suggestions was forwarded. These include: the inclusion of action-research components for haor-area aquaculture systems; an early warning system for farmers on drought and erratic rainfall; the management – jointly by the Fisheries and Forestry departments – and sustainable use for forestry, fishery and aquaculture of the Sundarbans mangrove forest; the need for sustainable shrimp farming practices in the coastal saline-prone areas; a good design of shrimp ghers for taking saline water from coastal rivers, so that people do not cut the BWDB embankments, which leaves them vulnerable to inundation; organization of shrimp farms into clusters; pumping saline water rather than using pipe culverts; developing quality broodstock of giant freshwater prawn; and incorporating a pollution and water-quality mapping component.

As ecosystem and environmental management activities have to be under the existing national legal framework, the DOE has an important role in CC-related projects. Results of previous projects of DOE and other government agencies could usefully inform the proposed project, particularly those on environmentally friendly wetland leasing systems and on biodiversity conservation in haor and coastal areas.

It was confirmed that the PIF adequately incorporates recommendations and guidelines of other relevant national policy documents such as the Sixth Five Year Plan, Bangladesh Country Investment Plans and the BCCSAP. It is aligned with the priorities of the United Nations Development Assistance Framework (UNDAF) and the FAO country planning document. The PIF components and outcomes cross-cut with four of the six themes of the BCCSAP. The project includes aquaculture and open-water fisheries adaptation management in the coastal zone and in haor basins. Fisheries management activities under the proposed LDCF project will adopt an “ecosystems-based adaptation” approach so that ecosystems and user communities will be brought under management in line with CCA.

The DOF proposed having more focus on CC impacts on marine fisheries ecosystems and species diversity, and incorporating information and communications technology-based fisheries and aquaculture technology dissemination systems for fishers and aquaculturists in remote settings.

### **3.7 GEF/LDCF project cycle and time frame**

An overview of the project development processes and the various steps needed to complete the project cycle was presented to improve stakeholders’ understanding of the project cycles of GEF/LDCF and the required time frame to complete the cycle to receive project funds. The subsequent discussion focused on the process that the proposed project would have to go through, the numerous requirements it would need to meet, and the length of time that the entire process would take before the project could be approved for implementation.



## 4. GROUP DISCUSSIONS AND RECOMMENDATIONS FOR THE PIF

### 4.2 Group discussion

#### 4.1.1 Discussion method

The participants were divided into three working groups to develop the three project components/outcomes as proposed in the draft PIF:

- Group 1 worked on project component 1: “Climate-resilient fisheries sector and relevant national capacity development”;
- Group 2 worked on project component 2: “Strengthening knowledge and awareness of fisheries/aquaculture- dependent communities facing the adverse impacts of climate change”;
- Group 3 worked on project component 3: “Enhancing local adaptive capacity to support climate-resilient fisheries/aquaculture management and alternative livelihoods in the face of climate change”.

The working-group members were briefed on the methodology and expected outcomes. The key task of the group members was to review the relevance of the proposed outcomes and outputs as set out in the draft PIF and suggest improvements in line with NAPA-recommended concepts as well as site-specific CC-related stressors and impacts on fisheries and aquaculture. Each group selected a group leader/facilitator and a presenter. Dr Doris Soto explained the topics and methods of group work. She mentioned that at the end of the project the hope was to have a measurable impact. To contribute to the impact, it would be necessary to have outcomes that are achieved by a set of outputs. The project could be very helpful in finding ways to improve practical adaptation. The outcomes would be the immediate beneficial changes. The activities would lead to the outputs. However, detailed activities were not required at this stage of the proposal, but if time permitted, activities would also be looked at. It was necessary to look at the way this had been designed, to understand the logic and to ask questions. There were three working groups, one for each project component: the first more related to fisheries policy and governance; the second about awareness raising, knowledge and preparedness; and the third about specific practical activities to enhance adaptation capacity through designing and implementing locally suitable adaptation technologies.

#### 4.1.2 Key outcomes of the group discussions

Working groups 1 and 3 worked mostly on activities under each output, while working group 2 focused mainly on the logical sequence of outcomes and outputs and suggested changes accordingly. Detailed working group outcomes are presented in Appendix 3. The following are the key outcomes of the group discussions:

- **Coordination and engagement of the DOF** – The participants suggested making provisions for effective national-level coordination among the relevant governmental agencies, including NGOs and private sector entities working on fisheries and aquaculture adaptation to CC impacts. They suggested setting up a national CCA coordination unit, and that the DOF should have representation there to raise its voice to protect fisheries in the face of CC impacts. It was also noted that the fisheries sector was not properly addressed in many national CC documents. The participants emphasized that the Sundarbans should be protected in a comprehensive manner, as existing protection/management by the Forestry Department (FD) was not enough, and the DOF should be involved for fisheries management.
- **Climate change hotspots and relevant policies** – The working group members emphasized the need to recognize the entire coastal area as a CC hotspot and to develop a comprehensive policy for sustainable management of coastal resources, including fisheries and aquaculture. They also suggested improving the existing “Integrated Coastal Zone Policy” with the incorporation CC issues. The working group also suggested that although the “national shrimp policy” had already been designed, it had yet to be approved and should be revised in line with CCA.

- **Habitat restoration** – The participants emphasized the need for effective ecological management of wetlands, and noted that restoration and protection of coastal rivers and canals was urgently required, as most of these were being grabbed and converted by the influential shrimp farmers.
- **Early warning systems** – On the issue of developing an early warning system (EWS) for coastal fishers and aquaculturists under the project, working group 2 had a long discussion that concluded that many systems were already in place. Therefore, instead of developing a new EWS, they suggested assessing the effectiveness of existing systems before talking about putting new systems in place. This assessment could be done during the Project Preparation Grant (PPG) stage.
- **Application of technologies based on geographic information systems (GIS)** – the working group suggested the incorporation of a GIS-based manual and mapping systems to develop biodiversity management manuals/plans for the project sites, with emphasis on endangered fish species.
- **Matters related to capture fisheries** – the working group emphasized the need to re-establish the practice of “pile fishery” systems (fishing from some designated wetlands is done once every three years to protect the broodfish and allow small fish to grow larger) in the haor basin. In the past, this was a general practice and protected by law, but now nobody follows this conservation norm. The working group also suggested protecting the spawning grounds of diverse fish species that use different breeding grounds in large ecosystems such as the haor basins. In addition, the working group highlighted the need to restore swamp forests (flooded forests) in haor area wetlands, as this would create havens for fish and other aquatic biodiversity and make the capture fishery CC resilient. Conservation of fisheries and aquatic biodiversity through establishing wetland sanctuaries and other protected areas as has been demonstrated in Bangladesh through various projects should be mainstreamed through the proposed project.
- **Climate change volunteers** – the working group suggested training youths in project villages and developing them as CC volunteers at the local level. These CC volunteers would take part in project activities and would sensitize villagers to the need to take up CC-resilient technologies.
- **Collaborative research and management protocol on transboundary issues** – the working group stressed the need for joint research activities in shared resource systems and on issues such as marine fisheries, coastal aquaculture, Sundarbans mangrove forest management, transboundary river management, sharing of information on disaster risk reduction (DRR) programmes, and the strengthening of cooperation on cross-country emerging issues, such as in the sharing of success stories and technologies.
- **Gender-differentiated technologies in fisheries and aquaculture** – as women, children and older people will be hardest hit by CC impacts, the working group emphasized the need to develop gender-differentiated technologies in fisheries and aquaculture systems through direct participation of project villagers.
- **Outcomes and outputs in the draft PIF** – On the expected outcome, the working group suggested a reformulating of the outcome statement in way that it reflects “a changed condition” rather than a “restatement of the outputs”. The group suggested the following rewording: “Communities are continually adapting to changing climatic events so that incomes and nutrition make continual improvements ...”. On outputs, the working group also suggested some changes to make the statement clearer and more meaningful:
  - Output 2.1: In the statement, it suggested adding “analysis of knowledge gap” of the communities on CC perceptions and risk and vulnerability assessment.

- Output 2.3: The working group felt that the current statement focused largely on “adaptation technologies”, while ignoring the focus on people, and thus suggested a rewording of the statement with balanced focus on the technologies and the people for whom they will be developed, as it is the people who will apply the technologies in the real-world situation.
- Output 2.4: In considering the various EWSs currently being operated by different organizations, the working group suggested assessing the effectiveness of current EWSs for their impacts on aquaculture and fisheries sector stakeholders.

Overall, the working group suggested that the sequence of these outputs needed to be changed so that there would be a more natural progression of outputs, i.e. output 2.2 might come first, then knowledge and gaps identified, etc.

#### ***4.1.3 Recommendations for the PIF***

Dr Doris Soto made a general comment about the previous and current presentations and underlined that care should be taken to avoid overlaps between different outputs and that it was necessary to work on policies that would fit into each component. The workshop participants provided some valuable inputs, which will be used to improve the draft PIF. The following section summarizes their suggestions and recommendations with regard to the components of the PIF.

#### ***Component 1: Climate-resilient fisheries sector and relevant national capacity development***

##### **Policy and strategies-related:**

- Revise and update current fisheries policy (1998), jolmohal leasing policy (2009), coastal zone policy, national fisheries strategy, shrimp policy and other relevant policies and strategies with the inclusion of CC risks, vulnerability and adaptation.
- Focus policy for marine protected areas (MPA) on research and management of the Bay of Bengal (BOB) fisheries by a collaborative approach and inclusion of community-based fisheries management systems in the national policy focusing on CCA.
- Implement integrated coastal zone management policy (ICZMP) to mitigate the changing environmental aspects, with focus on fisheries and aquaculture in the coastal zone.
- Give proper representation to the DOF in the National Climate Change Unit (NCCU) to influence enabling fisheries CCA policy and strategy.
- Declare the Sundarbans mangrove forest a reserved fishery, restore all coastal rivers and canals from shrimp farmers, and end the leasing of waterbodies to shrimp farmers.
- Mainstream CC policies and strategies on fisheries and aquaculture at all levels.

##### **Management, operation and coordination:**

- Improve technical staff with proper CC academic background/training for the DOF, including creation of logistic facilities (namely, MIS [information and communications technology – ICT], vessel traffic management system [VTMS]) and improve mobility, access to deep sea, and sufficient law enforcement power with back-up legal and monetary supports.
- Establish a management plan for fisheries hotspots in line with CCA with budgetary provision for inland, marine and coastal waters.
- Establish and enable a CC unit at the DOF and equip DOF training centres with modules on CCA with ICT materials and logistics; identify indicators to monitor CC impacts on fisheries and aquaculture systems.
- Establish effective coordination among the different ministries (e.g. Ministry of Water Resources [MOWR], Ministry of Agriculture [MOA], Ministry of Food and Disaster Management [MOFDM]). Coordinate NGOs and others agencies working in fisheries and aquaculture with the DOF to facilitate climate-resilient fisheries and aquaculture development all over the country. Establish joint management of the water sector, mangrove forested wetlands and fish/shrimp

friendly coastal embankment operation and management with defined roles for the DOF, Ministry of Land (MOL), BWDB and FD.

**Adaptive research / study related:**

- Identify and address the coastal disaster and CC impacts on fisheries and aquaculture. There are differentiated impacts of CC on different ecoregions, and thus there is a need for separate technologies and arrangements for low-, medium- and high-salinity areas.
- Identify CC hotspots in Bangladesh relevant to fisheries and aquaculture, with assessment of specific impacts of CC on fisheries and aquaculture. Climate change fisheries hotspots should be endorsed by the policy stakeholders for climate-resilient management in such climatically sensitive areas.
- Conduct research on the differing effects of CC on fisheries and aquaculture in different regions of the country, as some areas are affected by waterlogging for six months, while other areas experience a shortage of water. Climate change may have severe effects on the hilsa fishery, which is very much linked with and influenced by seasonal changes in climatic factors.
- Assess changes in wetland ecology with monitoring of harmful algal blooms that may be due to changing climatic factors.
- Conduct adaptive research on climate-resilient fisheries and aquaculture management/technologies (e.g. mullet, milkfish, crabs, molluscs, and integrated rice–fish farming) in agro-ecologically constrained areas affected by CC impacts.

***Component 2: Strengthening knowledge and awareness of fisheries/aquaculture-dependent communities facing the adverse impacts of climate change***

**Awareness building:**

- Establish awareness-building campaigns in project areas and at the national level through organizing workshops, seminars; information, education and communication (IEC) materials preparation and audio-visual documentations (TV filler, short film, street/folk drama, etc.).
- Build the capacity of DOF officials and local communities through training, workshops, seminars, focus group discussions (FGDs), exposure visits, etc.
- Establish CC-resilient fisheries and aquaculture information centres (community centres) at each project subdistrict level.
- Implement regular forecasting of CC information to all stakeholders/communities through mobile phones and radio.

**Local capacity building:**

- Train and orient local villagers (youth, both boys and girls) and engage them as CC volunteers in project areas.
- Assess the effectiveness of existing EWSs and design fisher-friendly EWSs for the coastal areas and as safety measures for sea-going fishers; take steps to minimize illegal, unreported and unregulated (IUU) fishing.
- Develop ICT-based fisheries and aquaculture technology dissemination systems for fishers and aquaculturists in remote settings in the face of CC impacts.
- Establish a campaign to create awareness about sea safety and training for modern harvesting technologies.

**Project area framework related:**

- Reformulate the outcome statement in way that it reflects “a changed condition” rather than a “restatement of the outputs”, with the following suggested rewording: “Communities are continually adapting to changing climatic events so that incomes and nutrition make continual improvements ...”.
- Output 2.1: In the statement, the suggestion is to add “analysis of knowledge gap” of the communities on CC perceptions and risk and vulnerability assessment.

- Output 2.3: It was mentioned that the current statement focuses largely on “adaptation technologies”, while ignoring the focus on people, and thus the suggestion is to reword the statement with balanced focus on technology and on the people for which the technologies will be developed, as it is the people who will apply the technologies in the real-world situation.
- Output 2.4: Noting the existence of various EWSs currently being operated by different organizations, the working group suggested that the effectiveness of current EWSs be assessed for their impacts on aquaculture- and fisheries-sector stakeholders.
- Overall, the working group suggested that the sequence of these outputs should be changed so that there would be a more natural progression of outputs: i.e. output 2.2 might come first, then knowledge and gaps identified, etc.

***Project component 3: Enhancing local adaptive capacity to support climate-resilient fisheries and aquaculture***

**Aquaculture-related:**

- Introduce short-cycled, saline-tolerant and hardy species culture technologies (tilapia, catfish, seabass, mullet, perch, pangas, crab fattening, etc.).
- Introduce cage and pen aquaculture in areas susceptible to increased flooding due to the impacts of CC and climate variability.
- Establish integrated aquaculture systems in areas where risk of CC is higher.

**Capture-fisheries-related:**

- Establish pile fisheries (fishing from some designated wetlands once every three years to protect the broodfish and allow small fish to grow larger).
- Restore swamp forests (flooded forests) in haor areas and degraded wetlands to create safe havens for fish and other aquatic biodiversity.
- Conserve and protect fisheries and aquatic biodiversity and breeding grounds by establishing wetland sanctuaries and protected areas.

**General suggestions:**

- Introduce climate-resilient alternative income generating activities (AIGAs) and establish a CC-resilient model village.
- Construct protection walls / cyclone shelters in fisher villages in marine and haor areas.
- Prepare guidelines for mainstreaming CC in collaboration with CDMP-II.
- Establish networks of fishers on CCA.
- Establish water purification systems for use after the occurrence of natural disasters.
- Develop CC-resilient fisheries modules for different agro-ecological zones of the country.
- Ensure environmental safeguard of fishers and aquaculturists living in remote settings.

**5. WORKSHOP CLOSING REMARKS**

William Collis, Director, WF South Asia, gave the closing remarks of the two-day-long workshop. Mr Collis opened his speech by saying that it was necessary to think about the difference between fisheries and aquaculture. He noted that aquaculture was a bit different in that it was probably going to have fewer problems with CC than agriculture. He stressed the need to think about how aquaculture was going to play a major role in CCA. He recognized that there would be problems, but felt that aquaculture had a better chance of riding through CC issues than agriculture. At the department, he believed it was necessary to promote this and be leaders in understanding the real role of aquaculture. He emphasized the need for coordination between different initiatives in Bangladesh relating to CCA, mentioning the support from the United States Agency for International Development (USAID), the World Bank, the European Union

(Member Organization), GEF and other donors. Mentioning the necessity for coordination and project management, he highlighted how FAO and WF could be useful in this regard in the fisheries sector and said that WF wanted to ensure that these things happened. Finally, he thanked all the participants for their high level of engagement, and opined that all parties could try to make this happen a bit quicker. He concluded by saying that in a year or two the results of the hard work in project development would be visible.

## Workshop agenda

DAY ONE: 29 August 2012				
Time (Hours)		ACTIVITY	OBJECTIVES	RESPONSIBLE
From	To			
<b>Session 1: Inaugural (0930 to 1130) Inaugural Session Moderator: Mohammad R. Hasan, FAO, Rome</b>				
09.00	09.30	Registration		Amay
09.30	09.40	Welcome address	Opportunity to start the workshop by acknowledging and welcoming all the participants to the workshop	Dominique Burgeon, FAOR, Bangladesh
09.40	09.55	CC impacts on fisheries and aquaculture; global perspective and adaptation funding opportunities	Set the tone for the importance in focusing on the impacts of CC on the fisheries and aquaculture sector and describing the main objectives of the workshop	Doris Soto, FAO, Rome
09.55	10.05	Introduction to GEF project proposal	Project components, outcomes, outputs	Mokhlesur Rahman
10.05	11.00	Guest speeches	Policy-makers/high officials will describe government stands regarding climate change issues in relation to aquaculture and fisheries-dependent livelihoods in Bangladesh	Joint Secretary, MoFL, Chief Guest Douglas Beare, WF Director, DOF (Marine), Chairperson
11.00	11.30	<b>Tea Break</b>		
<b>Session 2: Technical Session 1 (11.30 to 17.00) Session moderators: Kevin Kamp and Masood Siddique</b>				
11.30	11.50	Overview of the workshop process and expected outputs	Ensure that the participants understand what has happened to date, what will be happening during the workshop, the processes they will be involved in and the expected outputs and outcomes	Mike Phillips, WF
11.50	12.30	Overview of the GEF call for proposal and the current PIF	Provide the audience an overview of what the proposed GEF initiative was intended to do and an overview of how the PIF responds to these issues. Clearly describe the project components and expected results and outputs, outcomes	Mokhlesur Rahman
12.30	12.40	Current GoB efforts in addressing CC and fisheries	Provide an overview of government efforts and partnerships from which to build the GEF/FAO programme	Sainar Alam and Syed Ali Azher, DOF
12.40	13.10	CC scenarios for Bangladesh & other CC-related initiatives; e.g. DRR	Provide background information regarding CC in the country with special emphasis in the coastal zones (also should relate to the NAPA)	Abu M Kamal Uddin, UNDP
13.10	14.00	<b>Lunch and Prayer Break</b>		
14.00	14.15	Review of current actors and programmes on CC in the NE and SW	Identify current programmes to potentially link with, ensure there is complimentary work on similar agendas and partnership opportunities	Mokhlesur Rahman

14.15	14.45	All participants in plenary	Q & A session on previous presentations	Mokhlesur Rahman
14.45	15.00	CC hotspots	Facilitate the identification of areas for geographical intervention	Abu M. Kamal Uddin, UNDP and Masood Siddique, CNRS
15.00	17.00	Working groups to discuss project components	Allow participants to agree on main activities, outputs and outcomes for the three major components of the PIF	Doris Soto, Kevin Kamp, Masood Siddique and Mokhlesur Rahman
17.00		<b>Closing of Day 1 and Tea Break</b>		
<b>DAY TWO: 30 August 2012</b>				
<b>Session 3: Technical Session 2 (09.00 to 14.00) Session Moderator: Kevin Kamp, WF and Masood Siddique, CNRS</b>				
09.00	09.20	Review of day-one activities	Remind participants of the previous-day activities and outputs	Doris Soto and Mokhlesur Rahman
09.20	11.00	Plenary presentation and discussions	Provide opportunity for all participants to comment and agree on the content and outputs from small group discussion on components	Rapporteurs
11.00	11.30	<b>Tea Break</b>		
11.30	12.00	Wrap up discussions	Comments, questions and discussions on small group presentations	Doris Soto and Mokhlesur Rahman
12.00	13.00	Next steps and timelines	Present to the group the next steps envisioned for the development of the PIF and PPG. Time should be given to ensure there is a consensus on this.	Doris Soto and Mokhlesur Rahman
13.00	14.00	<b>Lunch and Prayer Break</b>		
<b>Session 4: Technical Session 3 (14.00 to 15.00) Session Moderator: Kevin Kamp, WF</b>				
14.00	15.00	General comments and suggestions	Ensure that there is ownership of the final product and processes Propose general recommendations and next steps in order to improve climate change adaptation, beyond the GEF project development	Kevin Kamp, Doris Soto and Mokhlesur Rahman
<b>Session 5: Closing Session (1500 to 1510)</b>				
15.00	15.10	Closing	Demonstrate appreciation for everyone's inputs	William Collis, WF
<b>Refreshments</b>				

Head of the Workshop Rapporteur Team: Melody Braun, CC Adviser, WF.



## List of participants

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### Participants' expectations from the workshop

#### Aquaculture impacts

- Understand the effects of climate change (CC) on coastal aquaculture and possible mitigation measures
- Address the issue of impacts of saline water intrusion on shrimp farms in the coastal belt
- Design climate-resilient aquaculture measures for changing scenarios-related programme

#### Improved understanding of adaptation

- Get feedback and new ideas on CC
- As a developing country, what will be the strategies of Bangladesh to cope with CC, with special reference to fisheries and aquaculture
- Pave the road to initiate the process of dealing with fisheries in the changing climate
- Identify areas and adaptation options regarding fisheries and CC
- Identify the priority fisheries issues to be addressed in this project for adaptation to CC
- Identify the key effects of CC in Bangladesh and how to solve/reduce them
- Identify priority areas, including haor basins, for fisheries adaptation to CC
- Participants to be aware of CC scenarios for Bangladesh and better contribute to formulation of a fisheries adaptation project to CC
- Adaptation measure, with particular emphasis on effects of drought on fish production, growth and fecundity
- Recognize the importance of CC adaptation measures for fisheries and other resources

#### CC impact on fisheries

- The proposed project should address habitat restoration and conservation
- Restoration of indigenous fish species
- Adaptation techniques are being considered for open-water fisheries
- Develop strategy to save the native species
- Any special activity/work schedule to save hilsa from the impact of CC
- The project should consider the open-water fisheries sector along with closed-water fish culture, and must be in line with the latest government strategies and actions
- Reach a consensus to protect breeding areas important to freshwater fisheries, especially in the haor/bill areas
- Multi-sectoral stakeholders should act through coordination to protect the breeding and migration areas of hilsa and other fish, not only from CC impacts but also from the effects of embankment building in different areas like Barisal, Patuakhali, etc.

### Extended summaries of the presentations

#### *Fisheries, climate change and national strategies*

1. In his opening speech, Mr Dominique F. Burgeon, FAO Representative (FAOR) in Bangladesh, highlighted the activities of FAO in the fisheries and aquaculture sectors globally and in Bangladesh over the years. He then pointed out the CC impacts on the fisheries sector as whole, including the priority actions as suggested in the Bangladesh National Adaptation Programme of Action (NAPA), which was prepared and submitted to UNFCCC in 2005. He pointed out that CC has impacts on the livelihoods of people, particularly in sensitive areas, like coastal zones and haor areas. Improving the nutritional status of the poor is a key issue in Bangladesh. He mentioned that Bangladesh, the fifth-largest fish-farming country in the world, is faced with many challenges in this sector, and that the Government of Bangladesh has overcome many of them. Threats from CC now have new dimensions in the form destructive cyclones, drought and SLR that affect aquaculture and agriculture and thus also food security. Increases in salinity, SLR and water temperature reduce the oxygen content of the water, and so the fisheries are at risk. He appreciated the NAPA-suggested investment in fisheries NAPA concept no. 13: enhanced aquaculture and fisheries management in the northeastern deeply flooded haor basins, and concept no. 14: saline resilient aquaculture practices in the coastal zone impacted by SLR and salinity intrusion. The FAOR mentioned that WF, FAO and MOFL are working together, and that BSFF (Bangladesh Shrimp and Fish Foundation) is a private-sector agency that is also involved in this sector. He also clarified the role of FAO, WF and DOF in the process of developing required project documents to access the global funds on adaptation (i.e. LDCF). He mentioned that LDCF funds are important for adaptation, and this will contribute to the food sector, livelihoods, the environment, etc.
2. Dr Doris Soto, FAO headquarters, elaborated on the causes and consequences of CC risks, vulnerability and impacts on socio-ecological systems, including CC impacts on fisheries and aquaculture. She highlighted the various non-CC-related stressors to fisheries and how the CC stressors are further affecting fisheries and the livelihoods of people dependent on them across the globe. She gave some examples of fisheries and aquaculture technologies that can reduce the impacts of CC on fisheries. Emphasizing the need for awareness building, she highlighted that enhanced awareness of impact pathways and vulnerabilities can better support adaptation potentials. Apart from adaptation to CC, she also focused on understanding greenhouse gas (GHG) emissions from the aquaculture and fisheries sectors and suggested taking up mitigation measures; she thus focused on communicating and advocating for the sectors in global, regional and national CC discussions. To this end, making the bridge between science and policy and coordinating and collaborating (e.g. Partnership for Climate, Fisheries and Aquaculture [PaCFA], Seventeenth Session of the Conference of the Parties (COP17), joint project development, information sharing) are the appropriate actions. Finally, she appreciated Bangladesh's NAPA-identified fisheries priority actions and mentioned that FAO headquarters often showcases the Bangladesh NAPA to other countries wishing to develop projects on fisheries and aquaculture adaptation to CC impacts.
3. Mr Mokhlesur Rahman, National Consultant, WF, made a brief presentation on the draft PIF that was developed based on the NAPA and suggested CCA actions on fisheries and aquaculture, including feedback from the focal persons of DOF, WF and FAO. His presentation highlighted the GEF focal area framework for project development and PIF formats, including the project framework as per the GEF document. He briefly described the project components, outcomes and outputs, including their relevance to NAPA priority actions and the locations of the proposed project (i.e. the coastal zone and deeply flooded haor basins). While describing the PIF, he mentioned that there are three project components targeted on: (i) national capacity building on CCA in fisheries and aquaculture; (ii) awareness and skill development at the local and national levels on fisheries adaptation to CC; and (iii) local adaptive capacity building through implementation of various CC-resilient fisheries, aquaculture and livelihood technologies to be developed based on assessing local CC impacts on

fisheries and aquaculture and existing local contexts and potentials. He also mentioned the next steps of project development pathways, including the role of DOF, MOFL, the Ministry of Environment and Forests (MOEF) and FAO in accessing the LDCF funds.

4. Dr Douglas Beare, Climate Change Advisor, WF headquarters as Special Guest, made a brief speech entitled “Climate change as one of the most important threats that mankind is now facing”. Referring to a recent risk analysis, he said that Bangladesh, India and Madagascar were the three States in the world most vulnerable to CC impacts. High levels of poverty, the level of dependence on agriculture and the likely impacts from CC form the basis for this conclusion. He highlighted that, within Bangladesh and India, the areas most at risk are the coastal saline zones of the Ganges Basin such as the Khulna region, and that these are expected to be most affected due to their high exposure to cyclones, floods and SLR, and the impacts of these on the livelihoods of poor people, most of whom are dependent on fisheries. He then mentioned that Government of Bangladesh has been working in partnership with many organizations, including WF, to effectively address the serious issues of poverty, food security and nutrition, all of which are being negatively affected by CC today; and will be even more so in the future. The importance of CC is clearly recognized by WF because it affects its mission: to reduce poverty and hunger by improving fisheries and aquaculture. WorldFish is currently working with a number of governments and donors on a range of CC-related programmes in developing countries. Examples include:
  - climate smart management of aquatic farm ecosystem in coastal regions of Bangladesh;
  - integrating CC adaptation into aquaculture development planning in the Mekong Delta; and
  - gender inequality, a barrier to household CCA behaviour in fish cage aquaculture systems in Bangladesh.

Bangladesh has an NAPA indicating how communities can best adapt to impacts from CC. Adaptation is the only option now as CC cannot be stopped. He said WF looks forward to working closely with the Government of Bangladesh to improve livelihoods and the resilience of vulnerable communities in the face of CC impacts.

5. Mr Muhammad Shamsul Kibria, Joint Secretary, MOF, appreciated the initiative shown by FAO, DOF and WF in developing an LDCF project proposal. Highlighting the importance of fisheries in Bangladesh, he mentioned that Bangladesh is one of the world’s leading fish-producing countries with a total production of 3.12 million tonnes (2011) that contributes 4.43 percent to the national gross domestic product (GDP). While noting the richness of the national fisheries resources, he cautioned the participants that the recent phenomenon of CC is gradually leading towards the degradation of these rich fisheries. Referring to various national CC-related documents, he mentioned the occurrence of frequent and intense climate-related stressors in the form of severe flooding, cyclones and storm surges, erratic rainfall, increased riverine and coastal erosion, cold waves and droughts that are the manifestations of climate variability, and that the changes posed by these new threats contribute to existing stressors. Sea level is expected to rise and this will adversely affect the agriculture sector, including fisheries and aquaculture in the coastal areas of Bangladesh. Thereafter, various important economic activities, including crop production, shrimp farming and aquaculture, and livestock rearing will be seriously affected, increasing the vulnerability of the livelihoods of millions in poor communities in the coastal zone. He urged the participants to become involved in the workshop and provide valuable inputs towards finalizing the LDCF project proposal. He also assured them that the MOFL and DOF will extend their full cooperation in developing climate-resilient fisheries and aquaculture in Bangladesh. He concluded his speech by expressing his thanks to GEF, FAO, WF and all other concerned organizations that are working on this demand-driven, important development project.
6. Mr. Nasiruddin Humayun, Director (Marine), DOF, as Chairperson of the opening session, highlighted the importance of fisheries resources in Bangladesh and their contribution to people’s livelihoods. Apart from export earnings, sustainability of the fisheries sector has to be ensured for the continued livelihood benefits provided to the poor people involved in this sector. Climate change impacts on inland and coastal areas in the form of rises in temperature, water acidity, sea level and saline water

intrusion need urgent adaptation measures. Many marine species are at risk of extinction; “hilsa”, the national fish of Bangladesh, might have been affected due to CC stressors, as anomalies are now observed in its spawning behaviour. He underlined that national fisheries policies and strategies lack focus on CC issues and emphasized the urgent need for their improvement by incorporating CC impacts on fisheries and adaptation measures. He said that much work has been done on inland fisheries but the marine fisheries sector receives less priority; he thus urged FAO to support the sustainability of coastal and marine ecosystems and livelihoods. He appreciated the current efforts of FAO and WF in organizing the workshop towards developing the PIF and Project Preparation Grant (PPG) to access funds from LDCF to enhance adaptive capacity and facilitate developing climate-resilient fisheries in Bangladesh.

### ***Climate change scenarios and fisheries and aquaculture in Bangladesh***

7. Mr Abu Mustafa Kamal Uddin, CC Expert, UNDP, while talking about CC impacts on fisheries in Bangladesh, including NAPA priority actions, showed the geographical location of Bangladesh and said it is very important to understand the national context. He said CC becomes important when livelihoods are in trouble due to changes in climatic variables. Water is very important for fisheries habitat and wetland ecosystems; if CC brings changes in rainfall patterns, it will have an impact on fisheries. He mentioned that the scenario in Bangladesh not only depends on the rainfall inside the country, but also on the upper catchments, as 95 percent of the rainwater from outside drains through Bangladesh. Water comes from the Himalayas through two major river systems. There is 710 km of coastline affected by SLR, which is pushing the saline front inside the country, adversely affecting fisheries and aquaculture. Referring to CC-related reports and documents, he mentioned that the International Panel on Climate Change (IPCC) produces descriptive reports from almost 5 000 scientists around the world; the fourth assessment report was published in 2007. Referring to the findings of a recent special report on weather extremes entitled “Managing the risks of extreme events and disasters to advance climate change adaptation” (SREX), he showed CC impacts linked to fisheries: temperature increase, erratic rainfall, increase in number of dry days, intense heavy rains in a few days, water shortage, droughts, and salinity intrusion. The Bangladesh NAPA written in 2005 arrived at the same conclusion, which was based on reports from the climate change cell of the DOE and Bangladesh University of Engineering and Technology (BUET).

He said that the CC issues have a high level of uncertainty, and dealing with CC adaptation is dealing with these uncertainties; thus, there are many models and scenarios. In the SREX report, the confidence level for rainfall is low, but for temperature, it is high. It is necessary to consider the potential impacts of CC and plan accordingly. Modelling is an indicative science. He mentioned that if inundated area increased due to higher rainfall, the open-water fisheries might increase, while drought would affect fish breeding and growth due to changes in habitat conditions (qualitative and quantitative features). Referring to the IPCC reports (2007 assessment), the glaciers of the Ganges River origin points (Himalayan Mountains) will melt by 2035; What will happen to fisheries then? The main rivers will become seasonal, and the whole fish community in the lower riparian countries such as Bangladesh will be affected. If the water temperature rises, it will certainly have effects on fish. The oxygen content in water will decline, affecting the availability of plankton (fish food); many fish species may change their habitats, moving from shallower to deeper water and vice versa. Through this project, it will be possible to investigate some of these things; determine which areas will be affected, and how fisheries production and species diversity may be affected. Finally, the NAPA-suggested possible adaptation measures are very broad. He surmised that these suggestions probably came from some of the participants, and indicated that there was scope for improvement of these kinds of proposals. He then summarized some key CC and fisheries issues as follows:

- The total scenario in the fisheries sector is highly dependent on the rainfall pattern in the upper catchment, and on SLR and salinity intrusion, which will affect coastal fisheries and aquaculture.
- Maximum temperature is increasing in Bangladesh, affecting normal rhythms in rainfall pattern; changes in rainfall pattern in the Meghalaya have negative impacts in haor areas in Bangladesh (i.e. impacts on lower riparian areas of the country).

- There is a serious knowledge gap that should be bridged under this project through conducting adaptive research on CC and fisheries.
  - Impacts of CC on a country's fisheries vary depending on the geographical location of the country. Bangladesh is highly vulnerable to CC stressors, as the country is bounded by the sea on the south and by the Himalayan Mountains on the north. A huge volume of water drains through Bangladesh via the three major rivers. Although these river systems are the key suppliers of freshwater in Bangladesh, they originate from and flow through other countries. Lack of freshwater flows in the dry season from upstream areas and SLR and concomitant intrusion of salinity make the country and its fisheries and aquaculture sector more vulnerable to CC impacts. Moreover, the fact that millions of poor people are dependent on fisheries and agriculture for their livelihoods is another reason for CC vulnerability, as these two sectors are highly sensitive and exposed to CC-related perturbations.
8. Dr Sainar Alam, Deputy Director, DOF, emphasized that CC stressors will not only affect fish community structure, but will also have effects on wetland ecology and the distribution and operational aspects of fisheries, including disease occurrence and epidemics. Specific CC impacts include decrease in rainfall; SLR; frequent cyclonic events and loss of coastal aquaculture; siltation of waterbodies; alteration of fish habitats; destruction of Sundarbans mangroves and loss of mangrove-based fish breeding, nursery and feeding grounds; changes in fish breeding and migration patterns; loss of species; and increased occurrence of fish diseases. Citing the work of the IUCN, he mentioned that 54 fish species have been declared as threatened species in the past ten years, and speculated that if no initiative is undertaken to adapt to CC impacts, the list of threatened fish species will increase and some species will be lost forever from the territorial waters of Bangladesh. Above all, the CC stressors would affect the contribution of fisheries to the national economy and people's livelihoods and thus jeopardize the government's efforts towards poverty alleviation.
9. Ms Bilkis Tahmina, District Fisheries Officer (DFO), DOF, Noakhali, mentioned that hilsa – the national fish – might have changed its migration route due to CC impacts, and thus there are now fewer hilsa in coastal rivers. Apart from global warming, river water is becoming polluted, which might have negatively affected the migration of hilsa. She emphasized the urgent need to conduct comprehensive studies on CC and non-CC stressors on hilsa populations in the marine and estuarine waters of Bangladesh. There is a need for effective coordination between FAO, DOF, UNDP and the relevant government agencies and NGOs to combat CC impacts on hilsa fisheries.

### *Climate change impacts on coastal aquaculture in Bangladesh*

10. Mr Mokhlesur Rahman supplemented Mr Kamal's presentation on CC impacts on fisheries and aquaculture by saying that the impacts of CC on fisheries and aquaculture are now visible in Bangladesh. The climate variability and extremes have serious adverse impacts on aquaculture that the farmers are now witnessing in the coastal zone. He mentioned that higher temperatures, erratic and intense rainfall, cyclones and storm surges, pre- and post-monsoon droughts and cold spells have all started to affect the coastal fish and shrimp farms, with higher intensity and severity almost every year. Citing his experience gathered from coastal aquaculture farmers through conducting focus group discussion (FGD) sessions in the southwest of Bangladesh during the last five years (November 2007 – January 2012), he summarized the CC-related stressors that have impacted aquaculture as:
- November 2007: Supercyclone Sidr damaged over 80 percent of fish and shrimp ghers and disrupted fishing operations.
  - September 2008: Abnormal high tide induced coastal flooding, breached and overtopped coastal dykes and damaged many fish and shrimp ponds/ghers.
  - May 2009: Cyclone Aila damaged 80–100 percent of fish/shrimp ponds/ghers and affected fishing operations.
  - August 2009: Intense rain-based flooding impacted many fish/shrimp ponds/ghers.
  - October 2009: Post-monsoon drought heat stressed affected shrimp.

- April–June 2010: Pre-monsoon drought and associated high temperatures affected pond/gher ecology, and heat stress affected shrimp growth.
- August 2011: Intense heavy rain-based flooding for two weeks caused over 80 percent of ponds/ghers to be flooded and killed fish and shrimp due to sudden fluctuation of pond/gher ecology.
- January 2012: Cold spell with dense fog for ten days affected gher ecology, caused high disease susceptibility of fish/shrimp, inhibited fish/shrimp growth, caused high mortality of shrimp postlarvae and the loss of dyke crops.

11. Mr Mustafa Bakuluzzaman, from Shushilon (an NGO), said that on the coast, many fish farmers cannot cope with CC impacts on shrimp and white fish in ponds. How to cope with these? Day by day salinity is increasing. What are alternative options for the coastal area aquaculture systems? He also added that in Kaligonj Upazila of Satkhira District, farmers are practising new systems in their ponds/ghers: shrimps (March–August), then carps (September–November), followed by agriculture (December–March). This practice is indigenous, with the farmers starting out from their own understanding of local changes in climatic parameters. The project should identify some good practices from within the local people for future use and replication.

### *Climate change hotspots and fisheries in Bangladesh*

12. Mr Abu Mustafa Kamal Uddin, UNDP Bangladesh, elaborated on the features of CC hotspots in Bangladesh and facilitated a group discussion with the participants to identify various CC-related threats in four CC hotspots of the country. Some participants claimed that there may be more CC hotspots in Bangladesh, as the coastal zone can be divided into three distinct zones based on morphology, hydrodynamics, ecology and salinity, and there could be three CC hotspots in the coastal zone alone. However, this issue was discussed at length, and it was concluded that during the PPG stage detailed CC hotspots can be identified and agreed upon. The participants were divided into four groups, and each group worked on its respective CC hotspots: Barind tract (drought prone area), central floodplains (recurrent flooding), coastal zone/Sundarbans (SLR and salinity) and haor basin (deeply flooded basin). They worked out the key hazards in each CC hotspot and the anticipated impacts of CC hazards on fisheries and fisheries-dependent communities as presented below:

<b>Landscape</b>	<b>Hazards</b>	<b>Anticipated impacts</b>
Barind tract	Temperature increase  Intense heavy rainfall/flooding  Sedimentation	<ul style="list-style-type: none"> <li>• Warming pond water, high evaporation, lowering water level</li> <li>• Decreased fish breeding and feeding grounds/habitats</li> <li>• Change in fish spawning time, less recruitment, poor fish growth, species dispersion and loss of species diversity</li> <li>• Hatching rate decrease, higher mortality with deformed hatchlings</li> <li>• Inundation, water quality deterioration, disease outbreak</li> <li>• Erosion, reduction in wetland size, reduced feeding and growth areas</li> <li>• Ecosystem destruction</li> </ul>
Central floodplain	Flooding  Decreasing upstream water flow, drought  Sedimentation	<ul style="list-style-type: none"> <li>• Affected aquaculture infrastructure, siltation of ponds/canals</li> <li>• Change of fish migration routes (especially hilsa)</li> <li>• Premature breeding</li> <li>• Loss of habitats, barrier to fish migration, reduced culture period</li> <li>• Water pollution, loss of biodiversity, loss of aquatic vegetation</li> <li>• Loss of habitat due to siltation, water pollution</li> </ul>
Coastal/Sundarbans	Erratic rainfall, droughts, floods  River siltation,	<ul style="list-style-type: none"> <li>• Acidification of soil, higher soil and water salinity</li> <li>• Inundation, sedimentation and erosion, permanent water logging</li> <li>• Affected Sundarbans mangrove ecosystem, loss of mangrove and</li> </ul>



	cyclone, tidal surge salinity, SLR	coastal marine-based biodiversity, decreased fisheries productivity <ul style="list-style-type: none"> <li>• Failure of crops, including fish and other aquatic organisms</li> <li>• Loss of fish breeding/feeding/nursery grounds, higher mortality, lower fish catch, loss of income of poor people</li> <li>• Change of occupation and migration/displacement of people</li> </ul>
Haor	Flash flooding  Droughts and siltation	<ul style="list-style-type: none"> <li>• Increased water area, re-established channel connectivity facilitates fish migration (+)</li> <li>• Over-flooded breeding grounds (-)</li> <li>• Loss of wetland connectivity, loss of habitats, fish migration affected, species extinction and livelihoods of fishermen hampered</li> <li>• Loss of habitats and inter-channel connectivity, pollution, reduced fisheries productivity, reduced consumption and nutritional impacts</li> </ul>

13. Mr Profulla Sarker, DOF Khulna, asked a question to the house”: “Is saline water in the coast our enemy? It is a natural phenomenon that there would be salinity in the coastal area. Why not consider saline water as a resource, since it is a natural phenomenon? People can benefit by using saline water for shrimp aquaculture, mullet and seabass farming, crab fattening and so forth.” In response, Mr Mokhlesur Rahman and Dr Doris Soto, FAO, replied that the project is trying to address the increasing trend in the coastal zone – the salinity front is coming towards the north, invading freshwater areas and affecting fish and rice farmers and freshwater fish species in wetlands upstream, and this is largely due to CC-induced SLR, not natural coastal salinity. In areas that are newly saline, affected people are not aware of, or ready to change to, saline-resilient production systems. This project will build their capacity to adjust their production systems to changes in salinity concentration in soil and water. The project will do something to deal with the increasing salinity fronts in the coastal zone, not stopping them.

#### ***Government initiatives in climate change and fisheries in Bangladesh***

14. Dr Sainar Alam and Dr S.A. Azher, DOF made a joint presentation highlighting the importance of fisheries resources in Bangladesh, CC threats to fisheries, and government initiatives to address CC impacts on fisheries. Regarding recent government initiatives in fisheries management related to CCA, they mentioned the restoration of Halda River natural carp breeding sites, the establishment of fish sanctuaries, wetland habitat restoration, the re-introduction of fish in degraded waterbodies, improvement of the quality of carp and shrimp seed and broodfish management, the expansion of cage and pen fish culture, and small-scale aquaculture in floodplains. They also said that while all these initiatives are aimed at increasing fish production, some of them are in line with fisheries adaptation to CC impacts. They mentioned that the DOF has recently planned with the CDMP to establish 13 CC-resilient villages in 13 subdistricts of the country where the DOF will work jointly with the Department of Agriculture Extension and Directorate of Livestock in order to enhance the adaptive capacity of villagers to CC impacts through taking up of improved technologies that are climate resilient. They stressed the need for concerted efforts on fisheries adaptation to CC impacts and thus expressed the view that this proposed project would open up avenues for learning and capacity building within the fisheries sector to combat the adverse impacts of CC. Regarding the initiatives of the government to combat CC impacts on fisheries, they highlighted the need for improved fisheries policy and strategies that are climate smart, and they expressed the opinion that the DOF would be keen to improve national fisheries policy and strategy in line with CCA and national capacity building through this project. Dr Azher said that due to inadequacy of government funds, external support (both financial and technical) is required for the DOF to be CC resilient.

In response to a question raised by Douglas Beare (WF headquarters) on establishing CC-resilient villages by the DOF, Dr Azher mentioned that this is a CDMP-supported project where the agriculture, fisheries and livestock sectors will work together. Three government departments will work together in 13 villages in 13 upazilas of the country. Districts have already been selected from

five agro-ecological zones. In climate-resilient villages, staff jointly pay visits and make surveys on fisheries, livestock and agricultural issues. Local technologies will be introduced in 25 ponds and financial support provided to the farmers. Through consultation with the local stakeholders, local officials and villagers, the most suitable fisheries and aquaculture technologies will be determined for the project villages.

15. Mr Abul Hashem, Project Director, Wetland Biodiversity Rehabilitation Project (WBRP), DOF, shared his experiences with implementing a project assisted by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) aiming to increase wetland biodiversity within a modified floodplain affected by flood control projects in the northern region of Bangladesh. Saying that there was some good learning from the project in the areas of fisheries habitat restoration, community-led conservation actions, co-management structures, and livelihood diversification and enhancement, CC-resilient farming systems and other relevant interventions could be applied in the proposed project sites. He suggested taking up larger projects to address all CC-related impacts on fisheries and aquaculture in defined catchments or broader hydrological units.

### *Approaches to climate change adaptation in fisheries and aquaculture in Bangladesh*

16. Mr Shahed Mahmud, IUCN, suggested that the proposed project should not only be based on the NAPA priority concepts but should be in line with the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) of the MOEF that was approved in 2009. The BCCSAP is the government-approved document to undertake CC adaptation and mitigation interventions in Bangladesh. He emphasized the need for central-level coordination among DOE, the Bangladesh Water Development Board (BWDB), DOF and the relevant stakeholders for better management of coastal polders. Mentioning the social and legal aspects, he pointed out that if shrimp is included, it will hamper agriculture and forestry, and thus coordination is needed in order to achieve a win-win situation. A CC monitoring system with MIS should be placed at the upazila level, along with the required human resources. The blue carbon issue should be included in DOF efforts to address CC in fisheries adaptation.
17. Dr Ali Azher, District Fisheries Officer, DOF, mentioned his 17-year-long experience in the haor area and highlighted that some action-research components for haor-area aquaculture systems should be included in the project. He also suggested including activities such as restoration of silted up wetlands and river segments, reintroduction of threatened fish species, protection of spawning habitats, GIS-based mapping of critical fish habitats in the haor areas, and including a focus on protection of other aquatic species such as frogs, tortoises and other flora and fauna.
18. Prof. Prafullah Kumar Sarker, DOF, Khulna, mentioned that sudden drought, erratic rainfall issues due to CC need to be communicated to the farmers. There has to be collaboration between all the stakeholders to achieve the objectives of the project. The Sundarbans mangrove forest is the breeding ground and nursery grounds for a wide variety of freshwater and marine species, and thus collaboration between the DOF and the Forest Department (FD) is a necessity. The FD is alone in managing the Sundarbans – its forest and fisheries. The DOF should have access to improve fisheries management in all projects on the Sundarbans. All Sundarbans development projects should include a fisheries component, and the DOF should be involved in fisheries and aquaculture-related activities.
19. Rajkumar Biswas, DOF, emphasized the need for sustainability of shrimp farming in the coastal saline-prone areas and suggested developing improved cultivation technologies for shrimp and other coastal and marine species for sustainability of biodiversity, as well as community livelihoods. He emphasized the need for good design of shrimp ghers for taking saline water from coastal rivers, so that people do not cut the BWDB embankments and thus make them vulnerable to inundation. He suggested the use of cluster areas for shrimp farming and the bringing of saline waters through pumping rather than the use of pipe culverts that weaken the embankment. For the giant freshwater prawn (golda), he mentioned that there is scarcity of good quality broodstock, and thus farmers do

not achieve good outputs from golda farming. The project should work on finding good quality broodstock for hatchery production of golda postlarvae.

20. Mr Riad, Governance Specialist, Integrated Protected Area Co-management Project (IPAC), mentioned water-pollution and water-quality mapping activities as relevant to fisheries and aquaculture. In drought years and in the dry season, when water is less, the concentration of pollutants in the water increases and may cause fish kills. In the central basin of Bangladesh, industrial pollution is a significant problem and CC indirectly affects this situation (owing to CC-induced low rainfall, pollution concentration in wetlands increases during the dry season). He suggested inclusion of water-quality mapping in this project.
21. Mr M. Khaled Hassan, Deputy Director (Planning), DOE, highlighted the fact that ecosystem and environmental management activities have to be under the existing national legal framework, and thus inclusion of DOE in environmental and CC-related projects is required. He suggested using the results of previously demonstrated activities under various projects implemented by DOE and other government agencies (namely, environment friendly wetland leasing systems – replication of learning from DOE from its project on wetland and biodiversity conservation in haor and coastal areas with support of UNDP, GEF and CCTF, Government of Bangladesh).
22. Mr Mokhlesur Rahman, WF Consultant, mentioned that the PIF is prepared in line with NAPA, but it adequately incorporates recommendations and guidelines of other relevant national policy documents, namely, the Sixth Five Year Plan, Bangladesh Country Investment Plans (CIPs), BCCSAP and so forth. The draft PIF is also aligned with the priorities of the United Nations Development Assistance Framework (UNDAF) and the FAO country planning document. He mentioned that the PIF components and outcomes cross-cut with four of the six themes of the BCCSAP. Responding to the suggestions and queries of Mr Abul Hashem and Dr Azher of DOF, he said that in considering the impacts of CC on fisheries as whole, the project included both aquaculture and open-water fisheries adaptation management in the coastal zone and in haor basins. The fisheries management activities under the proposed LDCF project will adopt an “ecosystem-based adaptation” approach, so that entire ecosystems including their habitats, biodiversity of flora and fauna, and the user communities, will be brought under management in line with CCA.
23. Mr Liaquat Ali, BCAS (Ex-Director-General, DOF), while describing the CC-related activities of his organization, mentioned that they worked in a study under a UNDP/ FAO/ Planning Commission project that has components on CC impact assessment and capacity building for adaptation in fisheries. Mr Ali also focused on the technical aspects of adaptation, including the need to put more focus on CC impacts on marine fisheries ecosystems and species diversity.
24. Mr Syed Arif Azad, Director-General, DOF, emphasized the difference between weather and climate and their variable effects on fisheries and aquaculture, and urged the sharing of knowledge and information between agencies and organizations. As an example, he mentioned that the IUCN has taken into consideration the identification of the potential indicators needed to assess the health of aquaculture; thus, it is do not necessary to undertake any further studies on this aspect, but rather to use their indicators as a baseline. He suggested not only taking up measures for adaptation for flora and fauna, but also adaptation for aquatic habitats/ecosystems. He also suggested incorporating ICT-based fisheries and aquaculture technology dissemination systems for fishers and aquaculturists in remote settings in the face of CC impacts. If ICT is on board, then sea-going fishers in the coastal area could obtain fair prices for their catch, as well as being able to contact their families. He recalled that the aquaculture and fisheries sector is the worst victim of CC compared with other sectors. He expressed satisfaction and thanked the FAO and WF representatives for taking up this initiative to access funds from the LDCF to develop CC-resilient fisheries management in Bangladesh.

*GEF/LDCF project cycle and timeframe*

25. Mr Kevin Kamp, WF Bangladesh, said there is lack of understanding among many people of the project cycles of GEF/LDCF and the required time frame to complete the cycle to receive project funds. He therefore felt it necessary to give the workshop participants and DOF staff an overview of the project development processes and the various steps needed to complete the project cycle. He asked Dr Doris Soto, FAO headquarters, to explain how long it would take see the funding for the programme and how to be sure that the funding will be forthcoming.
26. Dr Doris Soto, FAO headquarters, made a presentation on the GEF project cycle and mentioned that at this stage, the project concept is being prepared in collaboration with the country agencies, FAO and WF. The hope is that this PIF will be favourably assessed and accepted by the GEF Secretariat. Once this project concept note has been completed and is considered ready by the DOF and the environmental institutions, the next step will be for the country GEF focal point to endorse the PIF (the MOEF is the GEF focal point for Bangladesh). In order to reach this stage, the country will need to prioritize the fishery sector. There is more funding for LDCs, so there is a high chance that the funding will be forthcoming. Once this project has been presented to GEF, endorsement may take two more months (this includes the process of cleaning the PIF, including recommendations, going to the CC and GEF focal points, and endorsement by Bangladesh). Once the PIF is approved by the GEF Secretariat, the full project must be drafted, and GEF will provide the money necessary to do this (via a PPG). It will take 12–15 months to develop the full project. During the PPG phase, the details will be explained: where, what priorities, how much human and economic resources will be required for each activity, the amount of funds required to achieve the various outcomes, etc. This will take time and require a lot of meetings and workshops, and the participation of communities at different hierarchies. The local communities need to own the project, and they need to see the benefits for them. The process is also very educational and provides important capacity-building opportunities. The hope is that, after 14 months for PPG development, the full proposal will be presented to GEF, and then GEF will take about three months to approve the project. Then the real project will start. Thus, the real funding and the full project will not start until 15–24 months from now.
27. Mr Mokhlesur Rahman shared his experience in preparing a PPG for the UNDP/FD on “Community-based Adaptation to CC through Coastal Afforestation” in Bangladesh. He explained that compared with the PIF document, which is only about 20 pages, the PPG is robust, usually more than 100 pages in length and takes a longer time to prepare. The PPG contains detailed elaborations of the context, country ownership, baseline description, results framework, monitoring details, project management boards with terms of reference, a detailed activity-wise budget, stakeholders’ engagement plans, a detailed monitoring and evaluation plan, and strategic results frameworks, including all workshop reports, etc. During the course of developing the PPG, it is necessary to organize workshops with and obtain feedback from the local communities and district and national-level stakeholders and to obtain an endorsement letter from the GEF national focal point (MOEF). He reported that key problems faced in preparing the PPG were to obtain the dates of workshops from policy stakeholders (for the national workshops) and from the Deputy Commissioners (for the district-level workshops) and to obtain an endorsement letter from the GEF national focal point. It is suggested that the national focal point of GEF be contacted and engaged in PPG activities from time to time so that the focal point is aware of the PPG and his/her role in it. Based on his experience, he estimated 15–20 months as a reasonable time frame from start to PPG approval by the GEF Secretariat.

Group picture of the participants of the Stakeholder workshop on the GEF Climate Resilient Fisheries and Aquaculture Development Project in Bangladesh, 29–30 August 2012, Dhaka, Bangladesh (courtesy of Melody Braun)



The FAO Stakeholder Workshop on “GEF Climate Resilient Fisheries and Aquaculture Development Project in Bangladesh” was held in Dhaka, Bangladesh, 29–30 August 2012. The 60 workshop participants were policy-makers, professionals and practitioners. Presentations covered the understanding of climate change impacts and fisheries, adaptation for fisheries and aquaculture to the adverse impacts of climate change (CC) in the context of Bangladesh, and the process of Project Identification Form (PIF) development to access global funds for CC adaptation for the least-developed countries. A dozen presentations focused on: (i) CC impacts on fisheries and aquaculture; (ii) global perspective and adaptation funding opportunities; (iii) CC impacts on fisheries and aquaculture in Bangladesh; (iv) CC hotspots in Bangladesh and fisheries; (v) current efforts by government and other actors in addressing CC and fisheries; and (vi) Global Environment Facility (GEF) fisheries project proposal development (PIF) and next steps. Major recommendations of the workshop included improvement of fisheries-related national policies and strategies by incorporating CC issues, including capacity building of DOF and communities dependent on fisheries and aquaculture for their livelihoods. Based on the workshop recommendations, a PIF for the adaptation of Bangladesh fisheries and aquaculture to CC will be developed with three components: (i) climate-resilient fisheries sector and relevant national capacity development; (ii) strengthening knowledge and awareness of fisheries/aquaculture-dependent communities facing the adverse impacts of CC; and (iii) enhancing local adaptive capacity to support climate-resilient fisheries/aquaculture management and alternative livelihoods in the face of CC.

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