



International Seminar on Long Lead Flood Forecast Technology for Disaster Management



Adviser
Ministry of Agriculture and
Ministry of Water Resources
Government of the People's Republic of Bangladesh
Message

Bangladesh has the dubious reputation of being one of the World's most disaster prone country. It suffers from cyclones, storm surges, drought, tornadoes, earthquakes, epidemics, tropical cyclones and floods. All these have telling prolonged effects on the lives and livelihoods of the people. Poverty reduction endeavors are stressed by these calamities. Climate change will increase the vulnerabilities further as the intensity and frequency of extreme climate events will multiply substantially.

Despite this we, the people of Bangladesh are known for our resilience and the ability to pick up the threads of our lives in the aftermath of a disaster. These features of our national life are some of our strength.

Since 1972, the Flood Forecasting and Warning Center (FFWC) of Bangladesh Water Development Board (BWDB), under the Ministry of Water Resources, is working to reduce flood vulnerability of people life and livelihood. The Center recently has strengthened its capacity with the state-of-the-art technology in "long lead flood forecasting". The implications are far reaching, because buying time upfront would help taking actions aimed at reducing losses.

This endeavor would not have been possible without the effective partnership with the SHOUHARDO Program of CARE Bangladesh and financial support from USAID. The Asian Disaster Preparedness Centre, Climate Forecast Application Network, Georgia Institute of Technology, FFWC of BWDB, Bangladesh Meteorological Department, Institute of Water Modeling and Centre for Environmental and Geographic Information Services are implementing this program.

It is laudable that these collaborative efforts have resulted in the development of a series of flood forecasting schemes, the institutional networking, the methodology for forecast application and the refinement of the flood forecasting and warning dissemination systems which will greatly benefit the country.

I welcome the international experts and participants to this International Seminar on Long Lead Flood Forecast Technology for Disaster Management. This would offer an opportunity for sharing of experience and expertise. Networking of experts from the region and from other areas would facilitate shaping of integration focused on friendship.

Dr. C. S. Karim
(Dr. C. S. Karim)



**EMBASSY OF THE
UNITED STATES OF AMERICA**
**Ambassador
US Embassy in Bangladesh**

Message

Accurate forecasting and early warning are keys for successful disaster preparedness and response that lead to a reduction in loss of lives, livelihoods and property. Bangladesh is already known for its disaster risk reduction progress; countries around the world are learning from Bangladesh's experiences. I am pleased that Bangladesh has added yet another success story to these accomplishments.

The Flood Forecast & Warning Center of the Bangladesh Government has advanced another step in increasing lead times for flood forecasting technology and local level expertise through its Climate Forecast Applications project supported by CARE Bangladesh, with funding provided by the United States Government through USAID. I am delighted that the American people and its scientists are part of this achievement.

I would like to thank the Ministry of Water Resources of Bangladesh for organizing an International Seminar entitled "Long Lead Flood Forecast Technology for Disaster Management" to facilitate the sharing of experience and learning. I would like to congratulate all participants and program partners in their efforts to improve flood forecasting. I believe the successful introduction of this system into Bangladesh will serve as a model for the development of flood forecasting and warning systems throughout the region.

James F. Moriarty
(James F. Moriarty)



USAID | BANGLADESH
**Mission Director
USAID Bangladesh.**

Message

In recent years, improved early warning systems and preparedness measures have helped reduce the number of lives lost to natural disasters in Bangladesh. Improved disaster preparation and mitigation measures and greater economic opportunities for the rural poor living in the disaster prone areas have been at the center of USAID's development assistance to Bangladesh for decades. USAID Bangladesh supports one of its largest food security programs globally through the SHOUHARDO program which is designed to improve food security, disaster mitigation and preparedness in the poorest and most disaster-prone areas, e.g., char, haor and coastal areas, of Bangladesh.

I am pleased that through USAID's support for SHOUHARDO, the Flood Forecast and Warning Center has increased its capacity for long lead flood forecasting for disaster management. USAID supports the development and transfer of flood forecast technology to Bangladeshi institutions and enhances their capacity to operationalize the forecast systems within Bangladesh. Advancements in long lead flood prediction promise further reduction of risks for vulnerable communities.

I would like to thank participants and organizers of the International Seminar for sharing the flood forecast technology with countries in the region to help them learn from each other and explore opportunities for cooperation. The strength of national systems depends on the strength of regional systems and relationships. The overwhelming level of collaboration, eagerness for exchange and goodwill exhibited by these countries are an excellent example to the rest of the world.

Denise Rollins
(Denise Rollins)

FLOOD FORECAST TECHNOLOGY FOR DISASTER PREPAREDNESS IN BANGLADESH

Disaster Early Warning is widely accepted as a crucial component in disaster risk reduction. Bangladesh, to its credit, has already proven success in Cyclone Early Warning Systems which has potentially saved thousands of lives. It is my great privilege to now add to the capacity of Bangladesh by introducing the improved Flood Early Warning System. This has been an intensive development process, where through the CARE-SHOUHARDO Program, funded by USAID, an efficient and tested early warning system is now ready for use. This multi year program (2006-2009) was launched in March 2006 and had the following objectives:

- Forecast technology tested and transferred, and capacities developed to operationalize the forecast systems within Bangladesh;
- Sustainable end-to-end generation and application of flood information established through pilot projects at selected sites, showing measurable improvements;
- Flash flood forecast technology developed and tested on experimental basis for the north-east of Bangladesh.

This Flood Forecast Technology has developed a series of forecasting schemes to increase lead time of flood forecasting in Bangladesh. These schemes cover short (1-10 days), medium (20-25 days) and long term (1-4 months) time period forecasts. These schemes have been integrated into the existing model of the Flood Forecasting and Warning Centre (FFWC) and the Bangladesh Water Development Board (BWDB).

A Steering committee consisting of DMB/MFDM, DAE, FFWC, BMD, CEGIS, IWM, ADPC and CARE-SHOUHARDO Program was formed to facilitate the development of these flood forecasting schemes and their application.

Major outcomes:

- A short term (1-10 days) flood forecast system has been developed which allows time for emergency planning, which will minimize loss of lives, protect livelihood opportunities, and help in charting planting-harvesting patterns wherever necessary.
- Two new statistical schemes (a medium term 20-25 day flood forecast system; and a longer term seasonal flood forecast system) have also been developed and is now under test. This will provide a mid to long term ability for the affected communities, government, and development agencies to plan with considerable lead time to minimize the damage from such potential floods.
- At the same time, parallel to the development of these prediction systems, disaster volunteers and disaster management committee members of local government are being trained to be able to use the forecasts from these prediction systems to best mobilize communities to counteract and take pre-emptive action before the arrival of the flood.

It gives me great pleasure to now officially hand-over the Flood Early Warning System to the FFWC, thereby significantly enhancing their capacity to predict floods, such that action can be taken early on to minimize damage. Such a prediction model will have an enormous impact on the country, and significantly take forward SHOUHARDO's own goal which is to reduce the chronic and transitory food insecurity among 400,000 vulnerable households in the north and mid chars, haor and the coastal belt.

I would like to express my heartfelt gratitude to the scientists and organizers whose hard work has made this a reality, and to all the professionals attending this event which will further our common agenda of being best prepared for such emergencies.



**Faheem Y. Khan
Team Leader
SHOUHARDO Programme
CARE Bangladesh.**



**Country Director
CARE Bangladesh**

Message

CARE Bangladesh has a long history of working in partnership with government and communities in the area of local government capacity building and in disaster risk reduction. We are delighted that another landmark partnership with the Flood Forecast and Warning Center has been achieved by developing the Long Lead Flood Forecast Technology for Disaster Management. We are pleased that Ministry of Water Resources have taken initiative to share the technology with regional countries to learn from each other and to commit to exploring opportunities for cooperation.

Disasters can and do impact on development activities and can wipe out hard won gains at national, community and individual level. Through this technology developed, we will be able to reduce vulnerabilities of the poor and marginalized populations who are those most affected and impacted.

We wish to congratulate all the participants and organizing institutes of the Seminar and are looking forward to a prolific session of knowledge and experience sharing that contributes toward a poverty free Bangladesh.

Nick Southern
(Nick Southern)



Adviser
Ministry of Health and Family Welfare and
Ministry of Food & Disaster Management
Government of the People's Republic of Bangladesh

Message

Development of Flood Forecasting Technology is a continuing effort in which the Ministry of Water Resources has made steady progress. I am delighted to know that Bangladesh is able to issue flood forecast and warnings well ahead of the occurrences.

Bangladesh is facing flood almost every year. Thus flood management and the subsequent disaster management at the community level are necessary. Advanced and timely flood forecast will definitely enhance and strengthen the disaster management of the country. The initiative of Water Resources Ministry to achieve this long felt need will enable this Ministry and its agencies for better management of flood related disaster.

I wish all success of the international seminar on Long Lead Flood Forecast Technology in Dhaka with the hope that in-depth discussions followed by recommendations will assist the government and the people to face floods.

Shaukat Ali
(Dr. A M M Shaukat Ali)



Additional Secretary
Ministry of Water Resources
Government of the People's Republic of Bangladesh

Message

It is indeed a great pleasure to know that Bangladesh Water Development Board has achieved state-of-art technology to provide long lead flood forecasting technique to minimize flood related hazard in Bangladesh. I appreciate their effort and thank them for inventing a modern useful technology that benefits affected people to reduce vulnerability. I welcome all in this International seminar on Long Lead Flood Forecast Technology being held in Dhaka.

It is the mandate of the Ministry of Water Resources to take measures for the flood impact mitigation in the country. I believe that this long lead flood forecast will definitely help in more dependable disaster preparedness in Bangladesh. I observe that Disaster Management Bureau is very much proactive in using of this information. I urge for a quick dissemination of the flood forecast warning to the community level.

It is well known that huge volume of water coming from the upstream catchments is the main cause of flood in our country. I feel that data from the upstream country through Joint Rivers Commission (JRC) will further enhance the flood forecasting activities in the country. In addition to Bangladesh Water Development Board's initiatives, CEGIS and IWM may also extend their technical expertise for better dissemination and model updating in this regard.

I wish all the success of this international seminar.

Badrul Alam Tarafdar
(Badrul Alam Tarafdar)



**Director General
Bangladesh Water Development Board**

Message

On this occasion of the International Seminar on Long Lead Flood Forecasting Technology for Disaster Management, I congratulate all my colleagues of Bangladesh Water Development Board.

Bangladesh is a flood prone country. In every year flood causes huge loss of lives and properties. In 1975, Bangladesh Water Development Board introduced the Flood Forecasting system for the first time. Since then gradually it developed the technology and today we are able to issue a meaningful forecast to the nation with a lead-time of 3 days. Due to this forecast the flood management of the country has become somewhat easier. I believe in future we will be able to issue better deterministic forecast for the flood. In this connection I hope, the concerned government and non-government agencies and the media will extend their co-operation for the dissemination of the flood warning to the doors of the communities. I hope all the experts will discuss the issues in depth and come up with a set of recommendations for our way forward.

I wish every success of the seminar.

Allah Hafez

Hossain Shahid Mozaddad Faruque
(Hossain Shahid Mozaddad Faruque)



A New Dimension of Flood Forecast Technology in Bangladesh.

The flood forecasting system in Bangladesh has so far achieved only 72 hours lead-time forecast of rise/fall of the levels of water in various rivers of the country during the monsoon season. This three days lead time is not sufficient to take proactive decisions for disaster preparedness. In his research, Dr. Peter Webster in USA with his associates in Georgia Institute of Technology (GATECH) has shown that more lead time for the flood forecasting in Ganges and Brahmaputra is possible using the rain estimate from satellite data. The Asian Disaster Preparedness Centre (ADPC) Bangkok, Thailand has been identifying broader forecast application opportunities and seeking ways to institutionalize the technology in Bangladesh. For Bangladesh the project was titled "Climate Forecast Application in Bangladesh (CFAB)". The first phase (2003-04) of the Climate Forecast Applications in Bangladesh (CFAB) project was engaged in research aimed at increasing the lead-time of flood forecasting in Bangladesh.

To further strengthen the above efforts, SHOUHARDO Programme of CARE Bangladesh funded by USAID have supported the second phase (2006-2009) project of CFAB for development of three-tier (1-4 months; 20-25 days and 1-10 days forecasts) forecast technology and has transferred them to Bangladesh institutions such as BMD and FFWC.

Depending on the cloud depth and corresponding temperature rain may be detected by the satellite. This way over the entire basin the rain is estimated in 0.5x0.5 degree grids and accumulated rain is translated into total discharge and then into river stages for the boundary estimation information henceforth may facilitate the disaster managers for the flood preparedness and mitigation.

The Flood Forecasting and Warning Centre (FFWC), under BWDB, utilized experimental hydrological forecasts provided by CFAB in preparing short range flood forecasts during the 2008 monsoon and disseminated to the community.

Over the past four years of its implementation, project performance has been evaluated and based on the evaluation results, Government of Bangladesh (GoB) has endorsed the continuance for improving climate/flood forecast technology and transferring it to Bangladesh institutions (BMD and FFWC). As CFAB project need to be continued, Climate Forecast Application Network (CFAN), Georgia, USA has agreed to further develop the climate/flood forecast technology and transfer to Bangladesh institutions. The Source Code for the model already has been allocated for Bangladesh by the GATECH in August 2008 and from 2009 the model will be fully operational.

Md. Sazedul Karim Chowdhury
Project Director,
Processing & Flood Forecasting Circle
Bangladesh Water Development Board