Communicating forecasts to communities; making use of new opportunities

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The Asian Development Bank (ADB) is supporting the Royal Government of Cambodia (RGC) to improve the National Flood Forecasting Centre (NFFC) and to develop hydraulic design standard for flood protection. The project is implemented under the Greater Mekong Sub-Region (GMS) Flood and Drought Management and Mitigation Project.

This paper focusses on how modern communication planning and management is used to enhance the effectiveness of communication of flood and drought forecasts to the communities at risk as well as to the stakeholders involved in the process of flood and drought resilience, mitigation, preparedness and response.

The paper is shares details of the communication strategy developed under the ADB project to support the NFFC, but also makes use of literature and experience from other related regional projects.

Current system of disseminating flood and drought forecasts and early warnings in Cambodia

The Ministry of Water Resources and Meteorology (MOWRAM) is responsible for developing reliable drought and flood forecasts and ensuring that all institutions engaged in disaster preparedness are adequately informed to be able to undertake their roles and responsibilities. A schematic representation of forecast actions and timing is shown by Figure 1.0.

The Flood Forecasting and Research Office (FFRO) in the Department Hydrology and River Works Department (DHRW) prepares a daily flood forecast. A daily meteorological forecast is prepared by the Department of Meteorology (DOM). These forecasts are prepared on the basis of information collected from different measuring points and on data provided from several other meteorological data sources. The forecast is reviewed and approved by the Director of DHRW after which it will be sent to a range of organisations, including the Provincial Offices of Water Resources and Meteorology (PDWRAM). When there is a threat for significant flooding a 'flood warning' will be issued. In this case the flood warning details are sent to the Minister of MOWRAM and once approved will be sent by fax, email, or telephone to a range of (appr. 50) organisations. Formally, the flood forecast is sent to the National Committee for Disaster Management (NCDM) and from there the forecast is communicated through the "Disaster Management hierarchy". However, the flood forecast is not sent to other relevant offices such as the Ministry of Agriculture. The process, with an extra loop to seek approval from leadership on a case by case basis, could lead to long processing times between when the flood warning is available and when it is read and acted upon by relevant organisations and people in flood prone communities.

In addition to this direct communication, the forecast is available as a PDF on the DHRW-MOWRAM website. www.dhrw-cam.org/flood_bulletin.php. The weather forecast is available on the DOM site: www.cambodiameteo.com

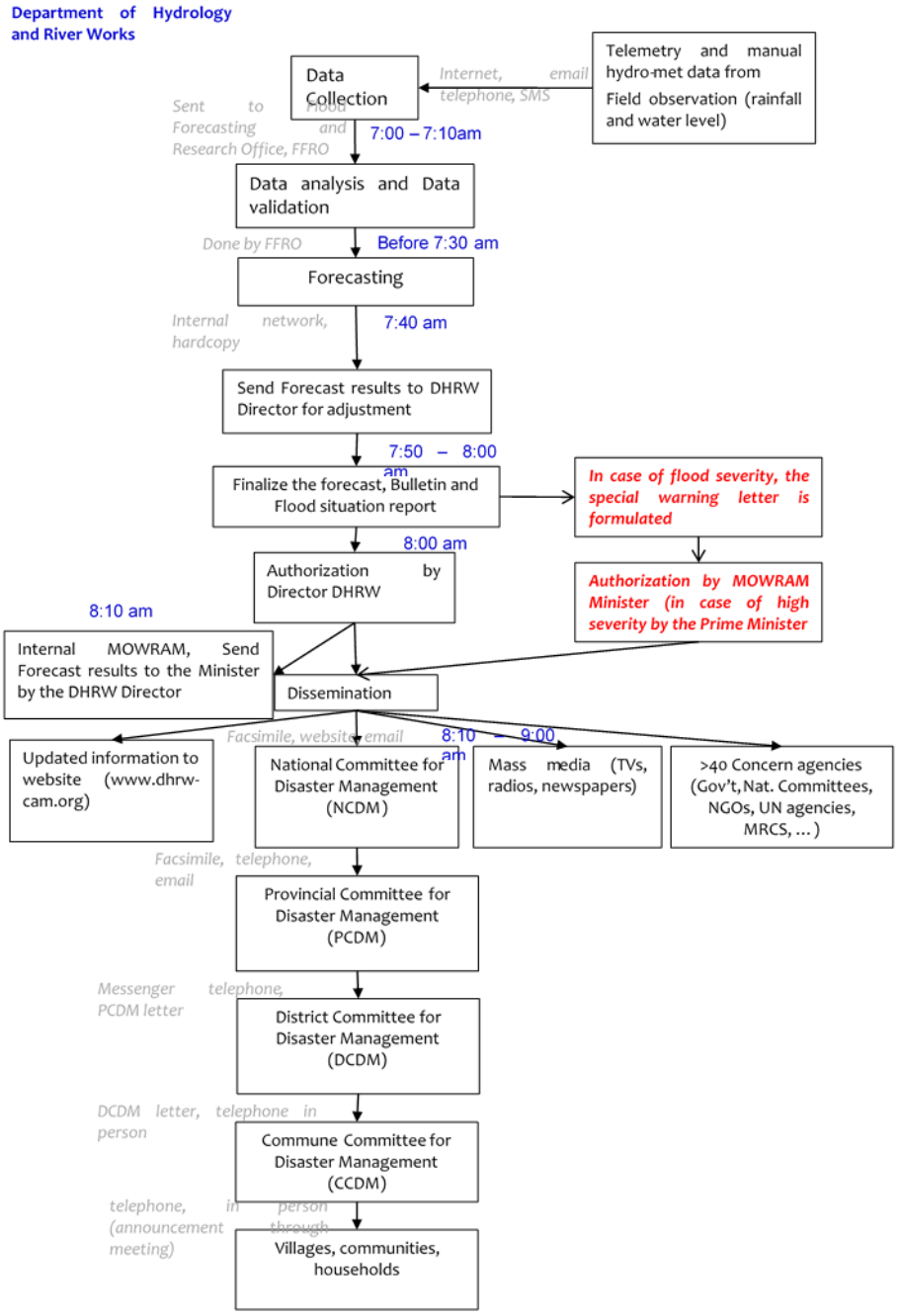

Figure 1.0 – Schematic of forecast responsibilities and actions

The forecast period for the meteorological forecasts is up to 3 days. The NFFC project will enable DHRW and DOM to generate now-cast, short range forecast (6 hrs-3 days), medium range (3-10 days) and extended and seasonal (>10 days) forecasts.

The response to the forecast or warning is the responsibility of a range organisations, both at the national level, such as NCDM, Ministry of Agriculture, Ministry of Land Management, Urban Management and Construction, and at the Provincial, District, Commune, and Village level. The engagement and responsiveness in this process varies by organisation.

The Provincial Department of Water Resources and Meteorology (PDWRAM) receives the forecast and formally informs the Provincial Governors Cabinet Office and Provincial NGO's, who will pass on

the information to the affected Districts by phone or fax. Since PDWRAM is responsible 'to plan and organize the programs of the Ministry at Provincial level", it is the likely place to localise and focus drought and flood forecast information to affected Districts and Communes.

Communication strategy for flood and drought forecast and early warning

MOWRAM/NFFC communication strategy is to ensure that an effective drought and flood warning service is provided. The strategy will ensure accurate and timely information is provided, on which partners and people in affected communities can make timely and better decisions to increase public safety and reduce loss of lives and property.

More specifically, the objectives of the flood and drought forecasting communication strategy are:

- ✓ To ensure that affected people receive timely and understandable forecasts to make timely and better decisions in order to reduce loss of lives and goods;
- ✓ To strengthen the engagement of institutional partners in preparing and disseminating reliable drought and flood forecasts as well as mitigation and response measures
- ✓ To enhance the understanding of drought and flood risks among all stakeholders and affected communities
- ✓ To establish regular communications between NFFC and its core clients/users of its forecasts, in order to initiate a process of continuous improvement on the relevance of the forecasts for its users.

The *target groups* and users of the forecasts are:

- ✓ Households in flood prone areas
- ✓ Leaders and other stakeholders at Commune and District level (such as Commune Disaster Management Committee, Businesses, District Committee for Disaster Management, District Disaster Management Officer, NGO's, Private sector organisations)
- ✓ Provincial level (Governor's Office, PDWRAM, PDMO, Provincial Committee for DM etc.)
- ✓ National level (NCDM, MoA, MoPW, Media, National NGO's, researchers and academics etc.)

The content of an early warning and forecast communication in Cambodia will vary by audience. The proposed forecast will include:

- ✓ One seasonal forecasts per year describing at more global level what flooding and droughts will look like this year. This will help MoA planning their schemes and communication with farmers. The seasonal forecast will also be shared with flood prone basins
- ✓ Actual forecast information that is relevant, timely delivered, accurate and reliable, and meaningful for the users
- ✓ General information on principles of flood management and flood management policies in an understandable format for the users
- ✓ Information on risk awareness and understanding, to enhance the understanding of flood risks in one's own living environment. The audience for this information includes decision making agencies, households, and other partners in the 'disaster management community'

The nucleus/foundation of the communication system for flood forecasting and early warning is the **NFFC web-portal** where all relevant and up to date information on drought and flood forecasts is

found. The portal contains relevant information about the forecasting system and where possible links to model outputs and flood and drought information.

The other functionalities of the web-portal are Flood, Weather and Drought information, Web maps, NFFC info about organisation and resources. The NFFC resources will contain training materials, audio visual material, education materials, NFFC references, other relevant institutions. The web-portal is built with open source software and will be further developed and enhanced with content once the modellers are able to generate drought and flood forecasts.

It will also be possible to share relevant pages, maps or tables with Facebook, Twitter, LINE, and other social media communication media.

The web-portal is accessible to everyone with access to a computer. The design is adjusted to smartphones, since it is expected that growth in the use of smartphone compared to computers will increase rapidly in the region.

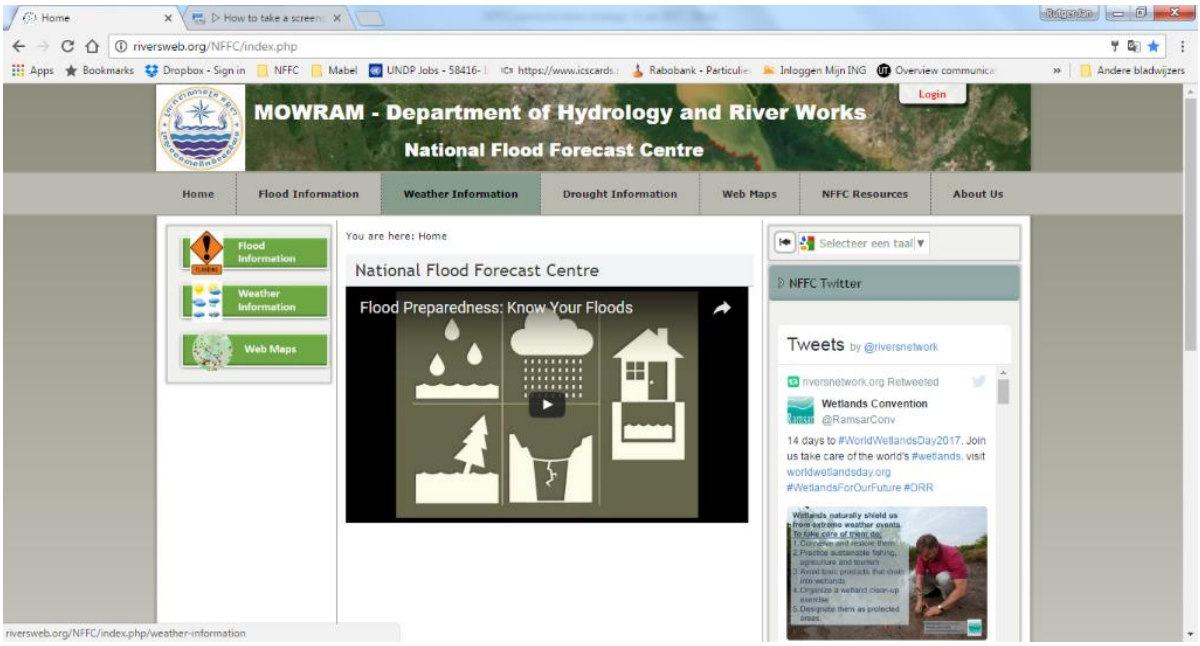

Figure 2: Screenshot of NFFC's Homepage on the web-portal (under construction by Eric Tilman, http://www.riversnetwork.org)

Research in Bangladesh showed that warnings received from multiple sources increase confidence as information could be cross checked, despite that the basic information often originates from only one source (Shah M.A.R., 2012). It was also found that the response was influenced mainly by the source(s) of warnings, the quality of information, visibility of floods, the personality of the recipient as well as the ability to bear the costs. Differences are found depending on whether the viewer lives in a high or low-flood prone area. In a study by M.C. Allaire, 2016, the effectiveness of online information and social media in enabling households to reduce disaster losses during the Bangkok 2011 flood was assessed. It showed that online information can enable effective disaster preparedness and reduce losses. 'social media enabled' households were able to reduce their losses by an average of 37% compared to 'non-social media enabled' households.

Other channels that can be used in the communication system are:

- ✓ **Direct Voice Messaging system**, which is a system that was developed for NCDM by the NGO, People In Need and the Open Institute. The system "1294 EWS" is a call back system

requiring registration, with phone number, name and Commune. At the time of preparing this paper, more than 50.000 people were registered. In cooperation with NCDM, the NFFC forecasts could be distributed through this system. Currently other initiatives, such as "Smart Weather" are also launched, and more will follow.

- ✓ **Meetings** are a very effective way of sharing non-urgent data and analysis, such as seasonal forecasts. One seasonal forecast event should be organised at the national level and one with relevant officials of drought and flood prone Provinces. In Provinces which are likely to be flooded, similar meetings should be organised District officials within the province with.

	Household level	Commune/ District level	Provincial level	National level
NFFC website	■	■	■	■
direct voice messaging	■	■		
Facebook	■	■	■	■
LINE	■	■		
National TV	■	■	■	■
Provincial TV	■	■	■	
Internet News agencies	■	■	■	■
Meetings	■	■	■	■
Educational Package	■	■		
Posters	■	■		

- ✓ **Facebook** and other elements of the **social media platform**. In the future, a App could be developed which people could install and would combine all relevant information on Disaster Management
- ✓ **TV and Radio**, have weather bulletins who will automatically receive actual forecasts
- ✓ **Flood risks posters** at government offices, schools, hospitals and markets

Figure 3: Media matrix showing administrative reach

The implementation of the Communication strategy should follow the natural cycle of a monsoon driven system. The flood cycle can be divided into 4 to 5 phases. The normal phase occurs for five to six months where not much happens in terms of flooding. The national preparation phase is two to three months before the flood season, followed by the provincial preparation phase for flood prone provinces. During the flood phase all stakeholders are aware and alert and the early warning system is active to ensure that the affected population is reached. The post flood phase is important to assess and reflect on the effectiveness of the forecast and communication systems.

	Time	Focus
Normal situation	Dec-May	Risk awareness Understanding EWS
National Preparation	May	Prepare Seasonal Forecast Identify high risk Provinces National meeting with sectors National meeting with provinces
Provincial Preparation	June	Basin forecast Invite affected districts/Communes Provincial PCDM meeting
Flooding	July/Oct	National Stakeholders; Warning EWS1294 + Social Media
Post flooding	Nov-Dec	

Conclusions and challenges in enhancing effectiveness of early warning communication

Based on the experience of the NFFC project, we have been able to make significant progress in developing the system which will enhance the impact of flood and drought forecasts dissemination. However, there are issues which need to be addressed in order to further enhance the effectiveness of the system. During the NFFC project we reached a number of findings and we suggest that these findings are relevant for other countries in the region.

a. Most hydrological and meteorological modellers have a rather technical focus. Forecasters tend to focus on constantly improving the quality of the forecast, while we should not forget that a precise forecast, that is not heard or understood has no value.
b. Preparing reliable forecasts is a very complex and technical component of a much broader system. The broader system must enable and support early preparations and actions to build resiliency to reduce loss of lives and goods. It is very important to consider who will be the users of the forecasts and constantly try to enhance the effectiveness of communicating these forecasts to the users. The users are both the stakeholders in the disaster management system and the people who will finally be affected by a flood or drought.
c. Cooperation with all partners in the forecast-preparedness-response system is essential; sharing information and not seeing others as competitors, not only for reasons of efficiency but also to ensure effective impact. It means sharing forecasts with all interested parties, including government, civil society, and the private sector. All aim to use the data to contribute to a reduction in the loss of human life and their livelihood.
d. The growth in the use of social media on smart phones is beyond expectations. Smartphones continue to become cheaper and it makes sense for people, even those in poor households, to acquire. This means forecasts that were already available to the public via a web-portal, will now be proactively disseminated to all relevant households. As a consequence, households will receive data through different channels, which enhances the chance that the forecast will not only reach them but also have impact on making better decisions. If there are delays in the more traditional chain of information, people might know about a flood event before they are informed via official channels.
e. Meetings with relevant agencies to present the seasonal forecast and facilitate discussion is essential. Meetings establish two-way communication, which will lead to a better mutual understanding of each other's needs and possibilities. This will in the end make the forecasts more relevant and result in a more effective contribution for the reduction of human and economic loss.
f. In regions that lack sufficient monitoring networks, social media provides an inexpensive way to track flood progression and map affected areas, using people as an interim solution for improved early warning.

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