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# Flash Flood Guidance Gazette

Flash Flood Guidance (FFG) Gazette, a bi-annual newsletter bringing users of FFG products all the latest news – operational information, technical advances, case studies and education for the flash flood community.

## Flash Flood Guidance System Products to Support Agriculture

There is scarcity of agriculture-relevant spatially extensive soil water products worldwide. The operational Flash Flood Guidance System (FFGS) produces information that may contribute to closing this data gap. Soil water content is among the natural variables that are critical for determining agricultural productivity. It influences decisions regarding the planting time, the need and timing for irrigation, the timing of fertilization, etc. Current estimates of soil water products that are relevant to agricultural productivity decisions are used by a number of agencies worldwide, ranging from government agricultural departments and agricultural consortia to commodities investors. Soil water estimates with a resolution of order 100 km<sup>2</sup> or higher that use operational-quality models and data are not currently available in real time on a global scale, other than in the regions where flash flood guidance systems have been implemented.

Irrigation requirements at times when there are significant soil water deficits may be determined by expressing the FFGS soil water depth as a fraction of plant maximum allowable deficit. The latter is a function of the ratio of the soil water content to capacity in the upper and lower tension water elements of the Sacramento Soil Moisture Accounting Model (used in the FFGSs), and the maximum plant usable fraction of field capacity that depends on the plant type. Post processing of the FFGS soil water products using QGIS can produce irrigation-relevant information that is spatially extensive (see example in Figure). If there are observations of soil moisture available at certain sites, the historical FFGS-based soil water saturation fraction estimates for the basin that embeds the observation may be compared with the analogous estimates from the observations to produce error statistics. These statistics together with the real time QGIS



Figure 1. Basin estimates of the fraction of basin soil water field capacity in the South East Asia region based on the MRCFFG system soil water products.

maps of irrigation-relevant information mentioned earlier can inform decisions to irrigate. The Georgakakos and Carpenter (2006) manuscript is an example of the use of soil water estimates from distributed hydrologic models (such as implemented in the FFGSs) for irrigation decisions.

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### Reference

Georgakakos, K.P., and T.M. Carpenter, 2006: Potential value of operationally available and spatially distributed ensemble soil water estimates for agriculture. *Journal of Hydrology* 328, 177-191.

## South Africa Region Flash Flood Guidance System Stakeholder Workshops

Early warning systems (EWS) for hydrometeorological hazards are a vital infrastructure for our society. Their main objective is to empower communities to make decisions to ensure their safety and protection. Yet, an EWS is only as good as its weakest link. They can, and frequently do, fail for a number of reasons.

Communication is one of the most important links of the chain and failure to communicate correctly can lead to disastrous impacts, such as increased food insecurity and human and infrastructure losses. To this end pilot Stakeholder workshops funded by USAID/OFDA were conducted in Zambia and Malawi, two participating

countries of the South Africa Region Flash Flood Guidance (SARFFG) program. Zambia and Malawi identified the need to familiarize stakeholders with the SARFFG system and the capacities of the respective Meteorological Services. The objective of workshop activity was to work with the Ministry of Communications and Transport, Zambia Meteorological Department (MCTZMD) in Zambia and the Department of Climate Change and Meteorological Services (DCCMS) in Malawi to facilitate the exchange of information and develop collaborations between the organizations and stakeholders in each country.

### Enhancing Community's response to flash floods in Malawi

Mr. Charles Vayna from the Department of Climate Change and Meteorological Services (DCCMS) in Malawi hosted a workshop on Flash Flood Guidance from 8-12th Dec, 2014 with an aim of strengthening community's preparedness and response to flash floods in Malawi. The DCCMS is responsible for production of flash flood guidance and

warnings for the country. Dr. Rochelle Graham from HRC (San Diego) was the guest speaker at the meeting which was opened by the Director of

Climate Change and Meteorological Services, Mr. Jolamu Nkhokwe.

The workshop brought together stakeholders from various agencies including the Meteorological Department, Disaster Management and Mitigation Unit, Ministry of Defense, Department of Water Affairs, District Council members, the Media and various NGOs. The outcome of the workshop was that the stakeholders developed a flash flood guidance communication strategy and further stakeholder activities to be implemented in 2015. The workshop was funded by USAID/OFDA and assistance from UNDP.

**Contributor**  
**Charles Vanya,**  
**DCCMS Forecaster**



*Director of Climate Change and Meteorological Services,*

*Mr. Jolamu Nkhokwe*

Photo by Yobu Ezra Kachiwanda



**Stakeholder Meeting**  
**Malawi**

# Zambia's Flash Flood Guidance System Stakeholders Workshop

Mr. Victor Muyambo Bupe from Zambia Meteorological Department (ZMD), a partner in the South African Region Flash Flood Guidance (SARFFG) system, hosted a stakeholder workshop (3rd to 5th December, 2014) to discuss the practical aspects of managing flash floods in the region. ZMD recognized stakeholder participation is essential for each stage of the management, that is, preparedness for, response to and recovery from flash flood disasters. To this end ZMD requested participation of stakeholders in the development of a plan for short, medium, and long-term stakeholder activities towards preparedness for, response to and recovery from flash floods.

The meeting was opened by the Assistant Director of the Meteorological Department, Mr. Oversease Mwangase and included guest speaker Dr. Rochelle Graham from HRC (San Diego), other participants included Provincial Meteorological Officers (PMO), members of staff from some selected meteorological stations, Disaster Management and Mitigation Unit (DMMU), Ministry of Agriculture and Livestock (MAL) and Department of Water Affairs (DWA) and Mrs. Chibesa Pensulo who also made a presentation on the UNDP funded early warning project she was managing at Zambia Meteorological Department headquarters.

## Recommendations

- To hold another training that will also include manipulation of text data obtained from SARFFG with the GIS software. This would also help to customize the maps to our own legends.
- Extend awareness to other stakeholder who were not invited.
- To redesign a report template to make it simple for a layman to understand.

- To work with the DMMU's GIS specialist to produce flash flood risk profile maps.
- To sell the concept to senior management of collaborating institutions.



*Assistant Director of the Meteorological Department, Mr. Oversease Mwangase*

## Conclusion

The workshop was successfully conducted and participants showed a lot of interest in the products and look forward to having another meeting of same nature but with enough time to learn the SARFFG system.

**Contributor**  
Victor Muyambo Bupe  
ZMD Forecaster



**Stakeholder Meeting**  
Zambia

## Establishment of an End-To-End Early Warning System for Flash Floods in the Kankai River Basin in Nepal

The Nepal-based NGO, Practical Action, has a USAID/OFDA funded project to strengthen flood resilience of communities in the Kankai River basin of Nepal.

The week-long meetings held in Kathmandu on 11th -16th January, 2015, permitted Rishi Ram Sharma (DG) of the Department of Hydrology and

Meteorology (DHM), Dinanath Bhandari of Practical Action, Ranjan Shrestha of Real Time Solutions (RTS) (partner with Practical Action), Santosh Gyawali (USAID/Nepal), Michael Ernst and Joseph Miskov (USAID/OFDA) and Robert Jubach and Rochelle Graham (Hydrologic Research Center ) to assess the framework for collaboration on the establishment of an end-to-end early warning system for flash floods in the Kankai River Basin, using products produced from the South Asia Flash Flood Guidance (SAsia-FFG) system in development for the region.

The Kankai EWS program includes coordination with the DHM for integration of flash flood warning information obtained through application of the SAsia-FFG system. The SAsia-FFG system is currently being implemented in the South Asia region and Nepal is one of the countries included in the system. Using forecaster-specific products from the SAsia-FFG system, the DHM will provide various data and information in user-friendly formats directly to the local decision-makers. To accomplish this, training/capacity building on the background and operations of the SAsia-FFG system and in flash flood forecasting will be provided to the DHM forecasters.



Hydrologic Research Center discusses the South Asia flash flood guidance system with staff at the Department of Hydrology and Meteorology in Nepal

## Congratulations to DCCMS in Malawi

The Hydrologic Research Center would like to add their commendation to that of the Malawian Government's on the timeliness of the Department of Climate Change and Meteorological Services (DCCMS) flash flood warnings to communities seriously impacted by recent flash flood events (January, 2015). The DCCMS took the lead in issuing warnings of areas likely to be affected by flash floods using the SARFFG system and were able to warn communities and Stakeholders (see Figure). An example of the warnings is below:

*“Take note that we still have low FFG values marked RED in Northern Malawi today Sunday 25 January 2015. This translates to high risk of flash flooding if 0.01 to 30mm in the next 6 hours is attained in those areas. We expect the southern areas to pick the low FFG signal in the next 24 hours as a low pressure area deepens in the Mozambique Channel to enhance Congo air mass over most areas of Malawi. Monitoring of flash floods continues.”*

Courtesy of Yobu Ezra Kachiwanda

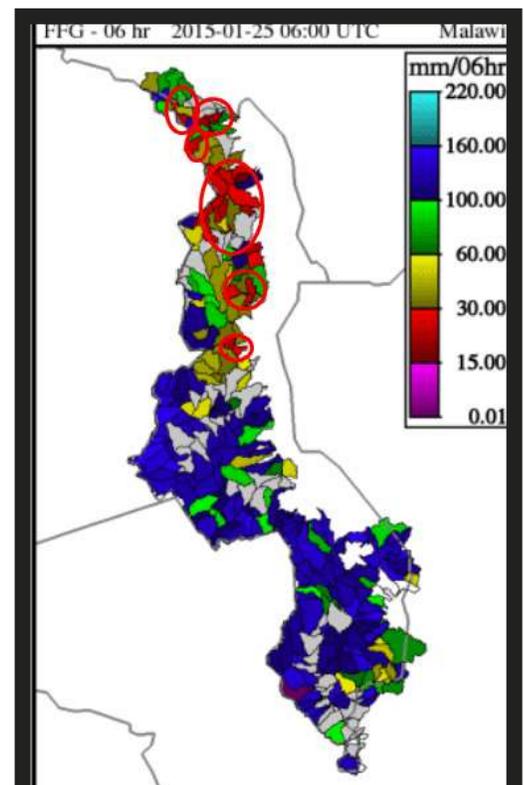
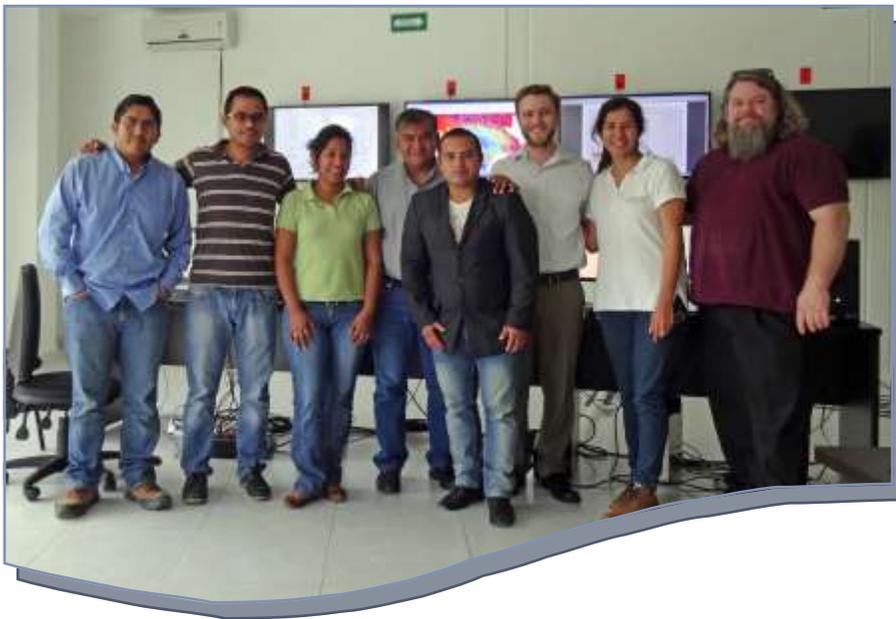


Figure 2. Flash Flood Guidance Product illustrating areas of concern for flash flooding in Malawi



MMFFG System training participants, from left to right: Enrique, Mario, Rubi, Jaime, Francisco, Cris, Claudia Elizabeth and Jason.

Hydrologic Research Center (HRC) IT staff members have recently completed the onsite installation and operational maintenance training of the Mexico Mozotal Flash Flood Guidance (MMFFG) system. Mr. Cris Spencer and Mr. Jason Sperflage from the Hydrologic Research Center (HRC) traveled to Comisión Nacional del Agua (CONAGUA) offices in Tuxtla Gutierrez, Chiapas, Mexico on the 18th to 24th of January, 2015 to install the system.

During the first two days on site, CONAGUA and HRC Staff focused primarily on the software installation, configuration and testing and collaborated to address the real-time data provisions. The MMFFG operational training with CONAGUA Staff began on the third day and lasted throughout the remainder of the week. Training sessions were attended by CONAGUA staff; Claudia Elizabeth Cervantes Jaimes, Rubi Mendez Gutierrez, Carlos Andres Dominguez Montero, Yendi Alvarez Chacon, Jorge Enrique Hernandez Carrillo, Jaime Hernandez Sanchez, Mario Alberto Franco Apolonio, Fancisco Javier Antonio

Castellanos.

Operational systems maintenance training for the MMFFG System focused on:

- System Design and Processing Overview
- Operational Systems Management
- System Interface and data Products
- Parametric and Configuration Adjustment
- Data Archives and Backup Management
- Processing intervention and Data Reprocessing

The CONAGUA staff actively engaged throughout all aspects of the training sessions and provided productive discussion along with their questions.

The eager teamwork and generous hospitality that was extended to HRC Staff during their visit was deeply appreciated. Our sincere gratitude and thanks go out to all of those who contributed so much of their time and effort to help ensure the success of the trip and the comfort of our efforts.

Contributors Jason Sperflage and Cris Spencer  
Hydrologic Research Center

