Geophysical Research Abstracts
Vol. 15, EGU2013-13210, 2013
EGU General Assembly 2013

Identifying needs for streamflow forecasting in the Incomati basin, Southern Africa

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Despite being widely recognised as an efficient tool in the operational management of water resources, rainfall and streamflow forecasts are currently not utilised in water management practice in the Incomati Basin in Southern Africa. Although, there have been initiatives for forecasting streamflow in the Sabie and Crocodile sub-basins, the outputs of these have found little use because of scepticism on the accuracy and reliability of the information, or the relevance of the information provided to the needs of the water managers. The process of improving these forecasts is underway, but as yet the actual needs of the forecasts are unclear and scope of the ongoing initiatives remains very limited.

In this study questionnaires and focused group interviews were used to establish the need, potential use, benefit and required accuracy of rainfall and streamflow forecasts in the Incomati Basin. Thirty five interviews were conducted with professionals engaged in water sector and detailed discussions were held with water institutions, including the Inkomati Catchment Management Agency (ICMA), Komati Basin Water Authority (KOBWA), South African Weather Service (SAWS), water managers, dam operators, water experts, farmers and other water users in the Basin.

Survey results show that about 97% of the respondents receive weather forecasts. In contrast to expectations, only 5% have access to the streamflow forecast. In the weather forecast, the most important variables were considered to be rainfall and temperature at daily and weekly time scales. Moreover, forecasts of global climatic indices such as El Niño or La Niña were neither received nor demanded. There was limited demand and/or awareness of flood and drought forecasts including the information on their linkages with global climatic indices. While the majority of respondents indicate the need and indeed use the weather forecast, the provision, communication and interpretation were in general found to be with too little detail and clarity. In some cases this was attributed to the short time and space allotted in media such as television and newspapers respectively.

Major uses of the weather forecast were made in personal planning i.e. travelling (29%) and dressing (23%). The usefulness in water sector was reported for water allocation (23%), farming (11%) and flood monitoring (9%), but was considered as a factor having minor influence on the actual decision making in operational water management mainly due to uncertainty of the weather forecast, difference in the time scale and institutional arrangements. In the incidences where streamflow forecasts were received (5% of the cases), its application in decision making was not carried out due to high uncertainty. Moreover, dam operators indicated weekly streamflow forecast as very important in releasing water for agriculture but this was not the format in which forecasts were available to them. Generally, users affirmed the accuracy and benefits of weather forecasts and had no major concerns on the impacts of wrong forecasts. However, respondents indicated the need to improve the accuracy and accessibility of the forecast. Likewise, water managers expressed the need for both rainfall and flow forecasts but indicated that they face hindrances due to financial and human resource constraints. This shows that there is a need to strengthen water related forecasts and the consequent uses in the basin. This can be done through collaboration among forecasting and water organisations such as the SAWS, Research Institutions and users like ICMA, KOBWA and farmers. Collaboration between the meteorology and water resources sectors is important to establish consistent forecast information. The forecasts themselves should be detailed and user specific to ensure these are indeed used and can answer to the needs of the users.