DEWFORA news

Issue 5/ 2013

Towards the end of the journey!

Dear Reader,

Welcome to this fifth issue of the DEWFORA newsletter.

DEWFORA is about improving drought early warning and forecasting to strengthen preparedness and adaptation to droughts in Africa.

As we draw to the end of the DEWFORA project, it is good to reflect on the objective of addressing existing capabilities for drought monitoring in Africa and developing improved drought indicators that consider the wider domain of water use and water users and their dependence on variable water resources..

This issue of the newsletter comes in timely, as the final results of the DEWFORA project will be disseminated to a broad group of end users, stakeholders and scientists. Reports on key results coming from two of the case study river basins are presented. Of interest is the testing of drought indicators at Pan African level. Finally the importance of translating science into policy is emphasized and shall be particularly achieved through a workshop that focuses on a round-table discussion with key policy makers from the different basins in the case studies.

Until our next newsletter, please visit our website regularly to keep track of project's progress and new and interesting results available for you to use in your research for example.

J.M Kileshye - Onema & T. Tsiko (Waternet)

Picture Showing drying water point

Latest news from the Basins

Improved drought early warning and forecasting: insights from the Limpopo basin

Many regions in Africa are drought prone and exemplify the challenges in advancing drought forecasting, early warning and mitigation for societies with differing vulnerability.

The Limpopo basin is one of the basins which experiences frequent dry spells during the peak rainfall months and regular droughts. Poverty is widespread and people are extremely vulnerable to the effects of drought on crop failure on both household food security and household income.

In this regard, the Limpopo basin case study was a pilot for the application of DEWFORA's drought early warning framework, particularly focusing on improving existing drought monitoring and forecasting capabilities, institutions, policies, guidelines and procedures for management of the scarce water resources in the basin.

Results from the case study indicated that there are limitations in existing infrastructure including drought forecasting systems, advanced models and software. Inadequate financial, technical and human resources compromise the resilience of communities to cope with drought.

The major limitation in terms of monitoring drought in the basin includes poor data quality which is a problem because of missing data or an inadequate length of record. The high cost of data limits their application in drought monitoring, preparedness, mitigation and response. Moreover, information delivered through early warning systems is often too technical and detailed, limiting its use by decision makers.

On the whole, drought impact assessment methodologies should be standardized and made widely available in order to formulate regionally appropriate mitigation and response programs.

Testing approaches for drought mitigation and preparedness strategies in the Oum-er-Rbia basin

The objective of the Oum er-Rbia case study is to test different approaches that can improve drought mitigation and preparedness strategies in the region.

To reach this goal, three different analyses were performed: The implementation and skill assessment of medium range to seasonal forecasts, a test on statistical drought agricultural forecasts, and a drought vulnerability assessment at the rural commune level.

Results indicate that, both daily and medium-range forecasts appear not to be able to predict rainfall amount, but seemed to show better skills in forecasting dry periods. An efficient drought early warning system would allow farmers to evaluate more accurately their production options and insurance companies to anticipate payments to farmers.

A statistical-dynamical approach to estimate durum wheat yield over the Oum er-Rbia basin was outlined. Different low level circulation fields were used as predictors using a principal component regression to test the predictability of seasonal crop yields in the region. Both deterministic and stochastic approaches hold a good potential for yield predictions over the mountains and coastal areas. Particularly, with a two months lead-time, high and low yield are well discriminated for both areas. On the other hand a very low predictability was identified over the basin plains.

The drought vulnerability study aimed to assess and map agricultural drought vulnerability at the rural commune level in the Oum er-Rbia basin in order to assist and guide drought management authorities in the development of efficient mitigation actions, tailored to the needs and specificities of each rural community.

The drought vulnerability map that was derived shows that, most of the parts of the Oum er Rbia basin are highly vulnerable to drought.

Latest Results & news from the Basins

Testing of drought indicators at Pan-African level

One of the case studies of the DEWFORA project is a Pan-African study focusing on the development of a pre-operational drought forecasting system, and improving current drought and food security predictions across the continents.

To this end, a study investigating the potential of implementing different drought indicators to improve drought monitoring capabilities at continental scale was carried out.

Several global datasets based on reanalysis, gridded observation, and remote sensing data were tested. At regional level the capabilities of each indicator and dataset on five regions on the African continent
(Oum-er-Rbia, Eastern Nile, Niger, Limpopo and the Great Horn of Africa) were compared.

Datasets	resolution	period	Source	delay
ERA INTERIM	0.5°x0.5°	1979-present	ECMWF Reanalysis	½ month
TRMM 3B-43 v.6 (v.7 when available)	0.25°x0.25	1998-present	RSE (combination 3B-42, CAMS and/or GPCC)	1/2 months
GPCC v.5 (Combined)	0.5°x0.5° (1°x1°)	1901-2010 (-present)	In-situ data	1 month
GPCP v.2.2	2.5°x2.5°	1979-2010	RSE (merged from microwave, infrared and sounder data and precipitation gauge analyses (GPCC).	irregular
CMAP	2.5°x2.5°	1979-2009	RSE (GPI, OPI,S SM/I scattering, SSM/I emission and MSU + NCEP/NCAR Reanalysis)	irregular

The study evaluated the ability of the different datasets and derived indicators in representing drought conditions at continental level, by analysing its intensity, duration and spatial extent.

A comparison of the annual cycle and monthly precipitation time series using the different datasets shows a general agreement in the timing of the precipitation peaks, including in the Great Horn of Africa area that has two rainy seasons. The main differences are observed thus in the ability to represent the magnitude of the wet seasons and extremes.

Definition of SPI classes	
SPI ≤ -2	Extremely dry
-2 < SPI ≤ -1.5	Severely dry
-1.5 < SPI ≤ -1	Moderately dry
-1 < SPI ≤ 1	Near normal
1 < SPI ≤ 1.5	Moderately wet
1.5 < SPI ≤ 2	Severely wet
SPI ≥ 2	Extremely wet

Moreover, for the areas that are under drought, all the datasets agree with the time of drought onset and recovery although this agreement varies with the threshold selected to define the drought conditions, and there are sometimes disagreements on the area affected.

The comparative analysis between TRMM, ERAI, GPCP and GPCC datasets suggests that it is feasible to use TRMM time series for reliable drought monitoring over Africa. The main advantage of this dataset is mainly due to its high spatial resolution. However, higher discrepancies in SPI estimations are shown in mountainous areas and in areas with low in situ station density.

All the drought indicators analysed at continental level showed a good agreement in North West and Southern Africa, while a low agreement was observed in Central Africa.. A good agreement is also observed between SPI-3 TRMM and SPI-3 ERAI in east Africa. The low agreement of the indicators over Central Africa reflects the high uncertainty present in the precipitation datasets.

The comparison between different SPI estimations suggest that the main sources of error are due to the uncertainties in the datasets (lack of ground information, estimation algorithms, parameterization of the convection, etc.) rather than the estimation of the distribution parameters.

Finally, the integrated use of two different sources of information in the Horn of Africa, meteorological and remote sensing derived vegetation indices, shows great potential to synergistically monitor drought events.

Events and Announcements

DEWFORA deadlines

Submission of management report and financial statements to coordinator, 20 January 2014.

Submission of financial report when complete by coordinator, 10 February 2014.

Submission of management report when complete by coordinator, 15 February 2014.

Others

Waternet/WARFSA/GWPSA Symposium 29 October to 2 November 2013, Dar es Salaam, Tanzania.

IWA Water Loss Conference, 30 March to 2 April 2014, Vienna, Austria.

2014 World Water Week, 31 August to 5 September 2014, Stockholm, Sweden.

WASH Conference, 24 too 28 March 2014,Brisbane, Australia.

Discover the DEWFORA consortium: for each issue of the Newsletter two partners will be presented

Partners Profile 9:

UNESCO-IHE Institute for Water Education

UNESCO-IHE Institute for Water Education is the largest international postgraduate water education facility in the world and is based in Delft, the Netherlands. The Institute confers fully accredited MSc degrees, and PhD degrees in collaboration with partners in the Netherlands. Over 14,500 water professionals from more than 160 mainly developing countries and countries in transition were educated at the Institute.

Its role in DEWFORA is to develop methods to downscale and adapt existing continental-scale hydrological model to specific river basins with specific data availability and specific drought conditions and focus areas.

More info: www.unesco-ihe.org

Partners Profile 10:

The Technical University of Madrid or Universidad Politécnica de Madrid is situated in Madrid, Spain. It was found in 1971. About 36000 students are enrolled with this University.

In DEWFORA, UPM will develop a framework to assess drought risks in Africa under current and climate change induced meteorological and hydrological conditions, by combining methods to asses drought hazard and drought vulnerability.

More info: www.upm.es

SADC Building capacity for Water Resources Management in Southern Africa

WATERnet

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