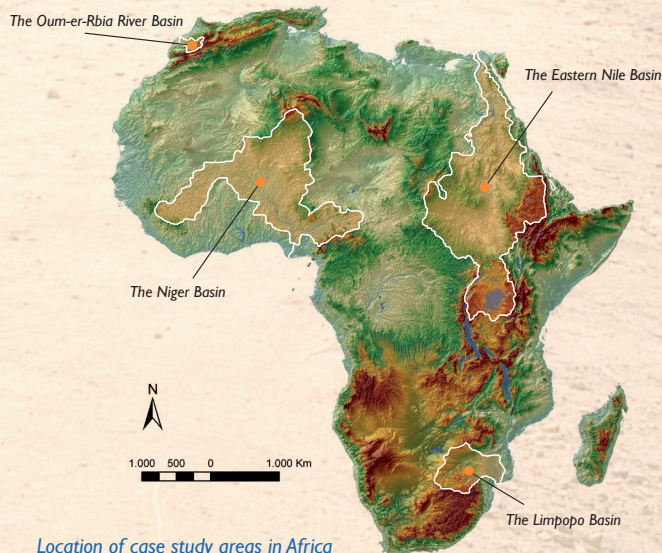## Case studies

- The Eastern Nile Basin (North & Eastern Africa), focussing on improved tools for the forecasting of water availability, the impact of climate change and community scale adaptation.
- The Limpopo Basin (Southern Africa), focussing on improving existing drought monitoring and forecasting capabilities, as well as institutions, policies, guidelines and procedures for management of the scarce water resources in the basin.
- The Oum-er-Rbia River Basin (Morocco, Northern Africa), focussing on improving capabilities in the forecasting of agricultural drought and establishing guidelines on adaptation in agricultural practices to reduce vulnerability.
- The Niger Basin (Western Africa), focussing on mid-term climate forecasting and strengthening preparedness to droughts to improve food security and human welfare.
- A pan-African case study, focussing on the development of a pre-operational drought forecasting system, and improving current drought and food security predictions across the continent.
- A case study focussing on the inter-comparison of approaches applied in the case studies of the DEWFORA project, and those applied in other EU projects, particularly in Southern Europe.

The Oum-er-Rbia River Basin

The Eastern Nile Basin

The Niger Basin

N

1.000 500   0   1.000 Km

The Limpopo Basin

Location of case study areas in Africa

Project Partners

Deltares (coordinator) | *Netherlands*

Council for Scientific and Industrial Research | *South Africa*

Dinder Center for Environmental Research | *Sudan*

European Centre for Medium-range Weather Forecasts | *Europe*

German Research Centre for Geosciences | *Germany*

Hydraulic Research Institute - Nile Basin Capacity Building Network for River Engineering | *Egypt*

Joint Research Centre | *Europe*

Mediterranean Agronomic Institute of Zaragoza | *Spain*

IGAD Climate Prediction and Applications Centre | *Kenya*

Nile Forecast Center | *Egypt*

Potsdam Institute for Climate Impact Research | *Germany*

Institut Agronomique et Vétérinaire Hassan II | *Morocco*

UNESCO-IHE Institute for Water Education | *Netherlands*

Universidad Politecnica de Madrid | *Spain*

University Eduardo Mondlane, Faculty of Engineering | *Mozambique*

University of Porto, Faculty of Engineering | *Portugal*

WR Nyabeze & Associates | *South Africa*

WaterNet Trust | *Botswana*

Wetlands International – Sahelian Sub Regional Office | *Mali*

Contact details

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www.dewfora.net

Improved Drought Early Warning and FORecasting

to strengthen preparedness and adaptation to droughts in Africa

DEWFORA

A 7th Framework Programme

Collaborative Research Project

COOPERATION

www.dewfora.net

Summary

Drought is one of the major natural hazards in many parts of the world, including Africa and some regions in Europe, and drought events have resulted in extensive damage to the environment and economy. Recent predictions on climate change suggest this situation may worsen, projecting an increased frequency and severity of drought in many of these areas. Effective drought risk management, including the provision of advance warning to drought, and the implementation of effective drought mitigation in response, however, offers the potential to reduce some of the adverse impacts. Preparedness and education can additionally increase resilience of affected societies, allowing them to cope better with drought and its impacts, and help break the disaster-response cycle.

The principal aim of DEWFORA is to develop a framework for the provision of early warning and response through drought impact mitigation for Africa. This framework will cover the whole chain from monitoring and vulnerability assessment, to forecasting, warning, response, and knowledge dissemination.

The project has been built to achieve four key targets:

- *Assessing existing capacities* in Africa in terms of drought monitoring, forecasting and warning, enhancing *drought monitoring* methods through *improved indicators* that integrate drought hazard and vulnerability in a risk based approach, and understanding the relationship between drought hazard and vulnerability in the current climate and how this will change as a result of *climate change*.
- *Improving performance* of methods used for *forecasting droughts* in Africa by implementing state-of-the-art in (seasonal) meteorological, hydrological and agricultural forecasting, and by adopting and adapting methods used in Europe, Australia and the US.
- *Improving early warning* of droughts through identification of appropriate *thresholds* for initiation of mitigation activities, and establishing mitigation and *adaptation strategies* to increase resilience to drought at seasonal and longer time scales.
- *Transferring knowledge developed* to practitioners and *building capacity* in Africa to ensure that the knowledge developed continues to be exploited beyond the project.

A driving concept in the DEWFORA project is to bring the state-of-the-art in drought forecasting and warning into the operational domain. The project will focus on a case-study approach, with the methods developed being applied in four basins of varying scale, distributed across different climate zones in Africa. Additionally, operational forecasting at the pan-African scale will be piloted to the pre-operational level, using recent advances in meteorological and hydrological modelling, as well as a case study that focuses on the inter-comparison of European and African approaches.

Scientific synergies and outreach

DEWFORA was launched in January 2011, and spans a 3-year period. Information and news from the project can be found on the project website (www.dewfora.net), which will include scientific publications, guidelines, and science-policy briefs. DEWFORA will target dissemination of the advances made (i) through a stakeholders platform that includes national and regional drought monitoring and forecasting agencies, and (ii) through capacity building programmes to help embed the knowledge gained in the community of African practitioners and researchers. The DEWFORA project will form a research cluster with several other independent EU research project, including AFROMAISON and EAU4FOOD that address related topics of water resources, agriculture and food security in Africa, as well as WASSERmed, CLIMB, and CLICO that focus on these topics predominantly within Southern Europe. Such collaboration is to the mutual benefit of these projects, as well as helping convey a uniform message to policy and decision makers.
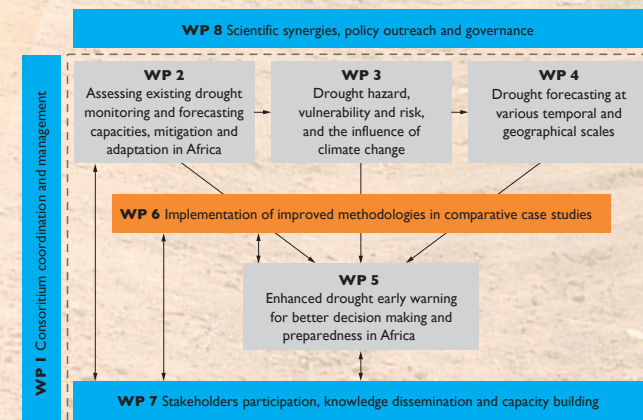
Project structure

The DEWFORA project is structured in eight work packages.

- **WP1** includes all activities related to the management of the consortium and communication with the European commission.
- **WP2** reviews the existing capacities in Africa for monitoring, forecasting and early warning of drought at local, regional and continental scales, as well as mitigation practices and adaptation strategies. A gap analysis is included to help identify constraints and opportunities for improvement.

- **WP3** assesses vulnerability to drought, and maps this vulnerability through newly developed drought indicators. The expected impacts of climate change on frequency of occurrence and persistence of droughts in Africa, and the impact on drought vulnerability will be assessed.
- **WP4** concentrates on drought forecasting from the meteorological, hydrological and agricultural perspectives. Appropriate methods for forecasting drought as expressed in the indicators developed at medium to seasonal time scales will be developed, and these will be made operational within a pilot drought forecasting system.
- **WP5** addresses the early warning of drought and the response to such warnings. Response will be assessed at the community, national and trans-boundary scales. Advances made in the previous work packages, as well as experience gained in the case studies will be consolidated to establish a framework and guidelines for effective drought early warning and response in Africa.
- **WP6** integrates the advances in drought monitoring, forecasting and warning resulting from WP 2 to 5 by applying the results in the different case studies. The methods developed will be tested and refined in order to ensure an efficient contribution to early warning and response. In addition, the prototype of a pan-African drought monitoring and forecasting system will be developed and a comparative review of European and African initiatives performed.
- **WP7** focuses on disseminating the knowledge gained, and ensures sustainable embedding of knowledge both with stakeholders and in water resources capacity building programmes. These goals will be achieved through mobilising existing knowledge networks in Africa, through interaction with stakeholders, and through workshops and training events.
- **WP8** is dedicated at establishing scientific synergies and exchange with related research projects in Europe and Africa, and outreach to policy networks in Africa and Europe.

WP 8 Scientific synergies, policy outreach and governance

WP 1 Consortium coordination and management

WP 2 Assessing existing drought monitoring and forecasting capacities, mitigation and adaptation in Africa

WP 3 Drought hazard, vulnerability and risk, and the influence of climate change

WP 4 Drought forecasting at various temporal and geographical scales

WP 6 Implementation of improved methodologies in comparative case studies

WP 5 Enhanced drought early warning for better decision making and preparedness in Africa

WP 7 Stakeholders participation, knowledge dissemination and capacity building

Components of the project and their interdependencies