

## **Groundwater and Climate in Africa – The Kampala Statement**

Noting that the first conference to discuss the impacts of development and climate change on groundwater resources, Groundwater and Climate in Africa, held in Kampala, Uganda, 24–27 June 2008 was attended by more than 300 water and climate scientists, water managers and policy makers from 23 countries in Africa and 14 countries from the rest of the world; and that the role of groundwater in improving livelihoods in Africa under conditions of rapid development and climate change is poorly understood; we, the participants, make the following observations and recommendations:

1.  Recognising that groundwater resources in Africa are broadly distributed, of generally good quality and resilient to climate variability, including extreme climate events; that rainfall and freshwater from rivers and lakes will become more variable and thus less reliable as a result of climate change; that groundwater is the daily source of drinking water for more than 75% of the population across Africa; and that rapid population growth and economic development will place considerable reliance upon groundwater in Africa to meet the Millennium Development Goal of halving the number of people without access to safe water and sanitation by 2015; we stress that dependence upon groundwater in Africa to meet domestic, agricultural and industrial water demands will intensify substantially over the next few decades and call upon the international community to support the African Groundwater Commission (AGWC) and allied initiatives for coordinating research and advisory activities related to African groundwater.
2.  Being aware that, on a continental scale, renewable groundwater resources in Africa are under-utilised and that groundwater can play a pivotal role in helping African farmers both increase food production and overcome the threat to food security posed by more variable rainfall as a result of climate change; we call upon African governments and donor agencies to support specific policies, research and development cooperation to overcome key obstacles such as the high costs of well construction and limited understanding of groundwater resources that currently restrict development of groundwater for irrigation in many parts of Africa.
3.  Recognising that major gaps exist in our knowledge of groundwater resources in Africa and that considerable uncertainty persists regarding the impact of climate change on groundwater resources and groundwater-dependent ecosystems in Africa; that demand for expertise in hydrogeology and climatology will rise with the inevitable increase in groundwater use in Africa; and that there is a need for African groundwater scientists, managers and policy makers to determine best practices and reduce inequities in capacity; we call for major investments in: (1) programmes of applied, interdisciplinary research in groundwater and climate, (2) training and capacity building in hydrogeology, climatology and allied fields in water policy and management, and (3) the development of national and regional institutions to assess climate change impacts on water resources including the expansion in opportunities for information exchanges among decision makers, managers and scientists.
4.  Recognising that sustainable use of renewable groundwater resources depends upon the quantity and quality of groundwater recharge; that substantial inter-annual variability exists in groundwater recharge in Africa and long lag times can occur between recharge events and aquifer replenishment; that the development of effective water management policies and planning of sustainable water development require sustained and accurate monitoring of climate conditions and water resources; and that groundwater and surface water resources are hydraulically connected in many areas, we urge African governments:

- (1) to support the initiation and expansion of climate and water monitoring activities, (2) to integrate groundwater into Water Resources Management Plans, and (3) to develop water policies at national and regional levels that strike a balance between renewable groundwater resources and demand for groundwater, and recognise both the role of groundwater storage and the importance of groundwater discharges to aquatic ecosystems and services they deliver.
5.  Being aware that valuable data generated through the construction of groundwater-based water supplies are often not recorded or are lost; and that these data can dramatically improve understanding of groundwater resources and facilitate more effective and efficient development of groundwater in the future through techniques such as groundwater mapping currently practised in several African countries; we strongly advocate for the establishment and promotion of: (1) policies to encourage and assist organisations involved in the development of groundwater to record and submit groundwater data; (2) electronic databases to facilitate the storage and retrieval of hydrological data; and (3) institutional frameworks to manage, share and use hydrological data.
  6.  Recognising that water users are the main beneficiaries of water services and the most affected by inadequate management of water resources, and that direct participation of water users in water resources management would: (1) enable rapid expansion of monitoring networks; (2) facilitate implementation of regulatory frameworks to protect the quantity and quality of groundwater resources; and (3) encourage the translation of scientific understanding into decision making and helping to align demand with the availability of groundwater, we call for a partnership between government, as developers, managers and regulators, and communities and other stakeholders including the private sector, as water users, in the monitoring and management of groundwater resources.
  7.  Recognising that understanding of the sustainability of intensive abstraction of groundwater for piped, town water supplies throughout Africa is very limited; that the capacity of shallow aquifers to contain faecal wastes and to supply safe water under increasing population densities in peri-urban and urban areas of Africa is unclear; that episodic deterioration in shallow groundwater quality from heavy rainfall events and the risk of epidemics of waterborne diseases are expected to increase as heavy rainfall events become more frequent as a result of climate change; and that prevention of groundwater contamination is less costly than remediation which is often neither feasible nor affordable; we strongly recommend that: (1) intensive abstraction of groundwater be closely monitored by users and regulators; (2) sustainable groundwater development policies for town water supplies be knowledge based; and (3) clear guidelines and regulations be developed to protect the quality of groundwater resources including the promotion and improvement of sanitation facilities through increased funding, sharing of best practice guides, and adoption of research recommendations.
  8.  Noting that management of Africa's transboundary aquifers requires a regional approach involving technical cooperation and joint monitoring among nations; and that drivers for interstate cooperation are required in order to avoid overexploitation, pollution, inefficient abstraction strategies and disputes over groundwater resources; that large volumes of groundwater in arid and semi-arid regions of Africa receive very little recharge in relation to on-going and planned abstraction; we call for an urgent strengthening of institutional structures at continental (e.g. AGWC) and regional scales, and the development of legal and institutional frameworks to enable sound governance and equitable sharing of transboundary groundwater resources.

#### **Conference Participants**

*Groundwater and Climate in Africa, 24–28 June 2008, Kampala, Uganda*