

South Africa / Afrique du Sud

(426)

UNITWIN/UNESCO Chairs Programme

Progress report

Period of activity: 2006-2007

UNESCO Chair on Geohydrology

Report established by: Professor Yongxin Xu, UNESCO Chairholder, Faculty of Natural Science, University of the Western Cape, South Africa

I. Activities

1. Education/Training/Research

There is a tremendous demand in Africa for education, training, and research partnering in the water-resources field. Much of this training is still presently done outside Africa. The Chair has demonstrated that it plays a crucial role for training and education in Africa with regards to these matters.

Education

The Chair is responsible for several courses over the last few years; namely through the following initiatives:

- A short course on simulation of groundwater interaction with surface water was held at UWC from 6 Oct to 8 Oct 2004. The course was attended by hydrologists and hydrogeologists from 12 countries in Africa.
- A short course on application of remote sensing for integrated water resource and ecosystem management (24 - 28 Oct 2005).
- The Groundwater Group at UWC has been selected to participate in the UNESCO network project entitled "The application of the remote sensing for integrated management of ecosystems and water resources in Africa." Duration of the initial phase is about 2 years. The first course was hosted in 2005.
- Remote sensing courses: Basic level by UWC and advanced level by ITC (20~25 Nov 2006).
- The initiation of UNEP and UNESCO project of assessment of pollution status and vulnerability of water supply aquifers of African cities led by Salif Diop and Emmanuel Naah.

Training

Similarly, several training sessions have taken place within the Chair's framework:

- A training session on parameter optimization for hydrological modelling by Dr. Mary Hill and Dr. Claire Tiedeman of USGS (11 - 14 October 2004).
- A training session on fractured rock aquifer assessment by Dr. Allen Shapiro of USGS (22 - 24 November 2004).
- Geochemical and reactive transport modelling at UWC (27 Nov ~ 1 Dec 2006).

Through this training, a strong network has been established within South Africa and throughout the rest of Africa. The South African universities that benefited from this training include: North, Northwest, Zululand and Fort Hare. Other African universities include those from West Africa, East Africa and Southern Africa. The Chair was also asked by the United States' National Groundwater Association to host its distinguished Darcy Lecture series in South Africa each year from now on.

2. Conferences and workshops

Conferences

Lately, the Chair participated in two conferences:

- An international conference on groundwater protection science and policies in Africa (28 - 30 Nov 2005).
- A session on Groundwater Resources Management and Protection in Africa at the 4th World Water Forum held in Mexico (16 - 22 March 2006).

Local and international workshops

The Chair also brought about two important workshops:

- A workshop on fractured rock aquifer assessment (TMG and Karoo) by Y. Xu (UWC) and G.J. van Tonder (UOVS) (4 - 6 July 2005).
- An International Workshop on Groundwater Protection for Africa, which was held at UWC from November 28 to December 1, 2005, as a result of the UNEP and UNESCO groundwater pollution assessment project. The workshop was very successful, generating good coverage in the December edition of Cape Argus. Most importantly, a "Message To Decision-makers" was produced regarding the unsustainable utilization of groundwater resources in Africa, which was successful in getting a formal hearing in 2006 at the 4th World Water Forum in Mexico and AMCOW (African Ministerial Council on Water) meeting in Kampala.

3. Information/Documentation activities

The Chair, together with the University of the Free State, has also edited a book entitled "Groundwater Pollution in Africa," which was published by Balkema.

In addition, five members of the Chair have participated in a joint field investigation on temporary wetlands in Save River Conservancy, in the eastern part of Zimbabwe. Leading partners include the University of Zimbabwe and the University of Leuven in Belgium.

II. Impact

Since inception of its scheme, the Chair has successfully accomplished its mandate in terms of phased objectives. A solid postgraduate programme is in place, producing a large number of graduates directed at various organizations. The Chair has been instrumental in transforming the former Environmental Sciences Programme into the Environment and Water Sciences Programme within the Department of Earth Sciences, hence consolidating water-related education and research efforts.

Research capabilities were steadily enhanced in recent years, which has allowed for the publication of many papers in journals, as well as for conferences and two books entitled "Groundwater recharge estimation in southern Africa" – in 2003 – and "Groundwater pollution in Africa" – in 2006.

The VLIR Water project led by the Chair has secured its entry into a second phase of collaboration with Flemish universities for 5 years, starting in 2008. At present the Water team members consist of Prof. Y. Xu (Project leader), Prof. L. Rait (Plant Eco-physiology), Mr. T. Scheepers, Jaco Nel, and other colleagues and students at UWC. Academic support from four universities in Belgium also strengthens the Chair's capabilities in ecohydrology research through the VLIR - UWC Water project. The Water Project was rated first out of 6 projects under the VLIR - UWC programme. The concept of Water Centre has been accepted to be implemented in Phase II of the VLIR programme.

The Chair has also entered into another major regional collaboration with the University of Malawi, Botswana, and the University of Oslo, funded by the Norwegian Government.

In addition the Chair benefits from its large group of PhD & MSc students.

Finally, the Chair Centre is emerging as an international role-player in the global water community. Its staff is active in attending international meetings. Dr. Shafick Adams was invited as part of the South African delegation to the first Africa Regional meeting of the UNESCO IHP in Abidjan, Nigeria. In particular, the Chair, together with UNEP and UNESCO, was invited to host a regional session for the 4th World Water Forum held in Mexico City from March 16 to 21, 2006, on the management and protection of groundwater resources in Africa. More partnerships with critical institutions are being developed. The key partners that have signed MOU with the Chair to this day include DWAF, CSIR and UNEP.

III. Development prospects

In order to effectively exploit the synergy that already exists and coordinate efforts to facilitate cooperation with other institutions and funding bodies, there is currently a pressing need for an Institute for Water Studies at UWC. Up to now, good progress has been made towards the establishment of the proposed Institute with its proposal having been approved at the Faculty level. It is envisaged that final approval of the Institute will come through toward the end of the year 2007. This is a twofold process:

Phase I

The UNESCO Chair in Hydrogeology forms a natural nucleus for most water-related activities. The first phase is seen as a Virtual Institute for Water Studies, in which the Chair acts as an Institute director and benefits from teaching relief to fill the gap. The director is supported by an academic officer (currently in place) at a senior lecturer level, as well as by an assistant (also currently in place). The core staff would initially consist of members from the Earth Science, Biodiversity and Conservation Biology, Biotechnology, Mathematics and Physics departments.

This phase would enable the director to have sufficient time for proper coordination of the institute, fundraising, and recruitment. Having the Institute would supply the branding to ease coordination and fundraising activities. Considerable inputs to water studies at UWC have already been provided by the VLIR Water Project.

Teaching of the existing Environmental & Water Sciences Programme in the Earth Science Department will not be affected as relief for the Chair will be made available to the Department.

The creation of the Institute will allow the Chair to link itself more widely to the UNESCO - IHP programme. This engagement will become a win-win situation within the UNESCO framework. A proposal for a HELP project for the Berg River Basin has been prepared and is under discussion with the Department of Water Affairs and Forestry.

Phase 2

This phase would involve a physical structure and at least one permanent researcher/assistant director. This would facilitate both research and contract work.

The proposed institute based at UWC, with its complementary staff and postgraduate students would have the synergy and capability to undertake challenging research projects and service clients in a wide range of water issues. The Institute is uniquely equipped to combine groundwater, surface water, and environmental expertise to produce integrated solutions to complex problems of water resource -development and -management in Africa, including research and consultancy in:

- aquifer conceptualization, groundwater exploitation and development;
- integrated Water Resource Management, including socio-economic aspects;
- pollution studies, aquifer protection, and mine dewatering;
- groundwater interactions with surface water;
- determination of resource-directed measures, including groundwater reserve;
- soil erosion, transport, and deposition in rivers;
- geomorphic issues in urban rivers;
- environmental Impact Studies Ecohydrology;
- aquatic biology;
- remote sensing in support of water resources management;
- and development of user-friendly software for water resources management.

The Water Institute would be well prepared to become a Centre of Excellence for Water Science and Technology, presently developed throughout the African continent as a NEPAD initiative.

The establishment of the water institute at UWC would definitely facilitate output in development-focused water research and education at UWC, and hence contribute to the strategic role UNESCO is expected to play in meeting the UN MDGs by 2015. This would contribute to fulfilling the original promise of Prof. Kader Asmal – when he was still Minister of Water Affairs and Forestry – to the visiting Director-General of UNESCO, according to which a UNESCO Chair for “Water for Peace” would be established at UWC.