

# Water Resources

## Objective

To improve the sustainable and integrated management of water resources by Member States through the use of isotope applications.

## Working Together to Meet Common Water Challenges

To address global water challenges, such as water shortage and quality, overexploitation and the impacts of climate change on water resources, Member States need precise information to enable them to make decisions about sustainable water resources management. In this connection, the Agency participated in the Fourth World Water Forum, held in Mexico City in March. The Forum, with a theme of 'Local Actions for a Global Challenge', was attended by ministers from over 80 countries, along with representatives from UN agencies and water programmes. One of the major conclusions of the meeting was that governments have the primary role in promoting improved access to safe drinking water and basic sanitation. It was agreed that this can be best accomplished through the active involvement of all stakeholders, particularly the poorest sections of society.

The Agency assisted the Nile Basin riparian countries in formulating a proposal for joint IAEA-UNDP/GEF funding to improve the understanding of groundwater in the Nile Basin and facilitate equitable sharing of water resources among the countries in that region. Representatives from Egypt, Ethiopia, Kenya, Sudan and the United Republic of Tanzania, as well as from the Eastern Nile Project and the Water Resources Planning Project of the Nile Basin Initiative, participated in this effort. A second proposal under this joint funding initiative was formulated in cooperation with counterparts from Ethiopia to undertake a nationwide assessment of groundwater resources. These proposals build upon an IAEA-UNDP/GEF funded project for the

management of the Nubian Aquifer in northern Africa, which held its first meeting in Tripoli, Libyan Arab Jamahiriya, in July 2006.

## Isotopic Applications for Addressing Key Water Management Issues

Groundwater dating techniques can be used by Member States to assess their groundwater resources. In 2006, the Agency developed a new helium-3 isotope detection technique that allows for more accurate dating by measuring helium-3 as a product of decaying tritium. The helium-3 system was successfully tested and will now allow Member States to date groundwater from a variety of sources.

Through the Agency's technical cooperation programme over 70 projects in water resources development and management were implemented in Africa, the Middle East, Asia and Latin America. Twelve training courses, workshops and seminars were conducted for developing Member States covering such topics as the assessment of water use and availability, isotope techniques for watershed management, and isotope methods for determining the age of groundwater.

One key objective of the Agency's water resources programme is to increase the contributions by Member State laboratories of analytical data to national and regional technical cooperation projects. To improve the quality of such data, Agency staff assisted laboratories in Egypt, El Salvador, Morocco, Pakistan and South Africa in harmonizing procedures for data handling and developing protocols for quality assurance and control.

In a CRP designed to build a broader knowledge base to improve sustainable management of river basins, research focused on the use of isotopes to improve the understanding of groundwater/river interactions, river water balance and human impacts on river discharge under present and future climate conditions. Seventeen research teams provided a

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## Improving project implementation using low cost, locally available sample bottles

Water samples for stable isotope and tritium analysis must be collected in bottles that do not allow evaporation or vapour exchange of water during shipping and storage prior to analysis. For over 40 years the Agency has provided high density polyethylene bottles for collecting water samples because appropriate bottles were not readily available in many countries. The procurement and shipment of these bottles was a significant expense for Member States, which also led to delays in project implementation.

To deal with this problem, a number of locally purchased bottle types from countries in Africa, Asia and Latin America were evaluated and selected for their suitability for collecting hydrological samples. Considerable savings are anticipated from this initiative.



set of novel isotope data in rivers and elaborated a rationale for the continuous collection of river isotope data in the Global Network of Isotopes in Rivers. Isotope based monitoring of river hydrology is a cost effective and scientifically sound alternative to the classical method based on measurements of river discharge.

A CRP was initiated on the geostatistical analysis of spatial isotope variability to map sources of water for hydrology, and on isotopic techniques for the assessment of hydrological processes in wetlands. These projects have the objectives of developing protocols for visualizing, integrating and mapping hydrological, hydro-chemical and isotope data, and of improving the understanding

of the role of wetlands in influencing water quality and the movement of pollutants from surface to groundwaters. Research groups from over 18 countries in Africa, Asia, Europe, and North and South America are participating in these investigations.

To facilitate the training and education of Member State scientists in the use of isotope techniques, an audiovisual package was produced on the collection of water samples for isotope analysis. This package will help to improve the quality of data collected in technical cooperation projects, build capacity for sample collection, and streamline training by reducing the need for basic level isotope hydrology courses. ■