

**United Nations/Austria/European Space Agency Symposium on
Space Applications for Sustainable Development to Support the Plan of Implementation
of the World Summit on Sustainable Development**

**“Water for the World: Space Solutions for Water Management”
(Graz, Austria, 13-16 September 2004)**

REPORT BY THE CHAIRPERSON

“Water Resources Management in Africa”

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1. Challenges

In Africa, there are two main challenges for water resources management :

- 1) information sharing;
- 2) problem of assessment.

2. Water Management initiatives

In order to meet World Summit on Sustainable Development objectives, the European Space Agency in conjunction with UNESCO and many partners in Africa launched TIGER Initiative on Water Resources Management through better use of Earth Observation techniques.

Within this initiative, there are three types of TIGER projects:

- i) ESA projects: AQUIFER (ESA); GLOBWETLAND (ESA); GMFS (ESA); WRM (UNESCO); WAMIS (CSIR/SAC); Nakambé (UN/ESA); TIGER AO, etc.
- ii) Response to ESA TIGER AO (these projects provide free ERS/ENVISAT data, the call for applications closes on 30 September 2004);
- iii) Projects of TIGER partners (Canada Radarsat call, UNESCO actions, NOAA, OOSA (Graz Symposium)).

Currently, thematic priorities are wetland monitoring, food security, epidemiology, groundwater resources management. There are three types of stakeholders: users, providers and sustainers (development agencies). TIGER is presently collecting information on the needs to identify possible solutions.

3. Contributions of remote sensing (RS) data to water resource management

Various examples were mentioned that combined optical, radar and other information and that were useful to cover most related aspects of water resources management, from science to operational applications, including education, training and capacity building.

The UN-ESA Course follow-up Programme is a clear case of successful international cooperation, through which a major environmental issue is tackled by an integrated team from four different institutions. This team covers most related aspects, from science to operational

applications, including education, training and capacity building. This project is an excellent implementation case not only of the UNISPACE III and WSSD recommendations but also of the TIGER initiative launched by ESA.

3.1. Use of remote sensing in flood monitoring

The use of Remote Sensing for Wetlands Characterization, Flood Forecasting and Water Resources Monitoring in Nakambe Basin in Burkina Faso was demonstrated by AGRHYMET Regional Centre and National Hydrological Service of Burkina. The results achieved consist of: (1) definition of criteria for identifying, characterizing and mapping surface water bodies; (2) definition of methodologies for spatial assessment and forecasting of floods; (3) setting up of an information system on water resources dynamics in Burkina Faso; (4) strengthening National Hydrologic Service capacity in integrating space applications.

The methodologies developed during this first phase are expected to be applied later in all Sahelian countries.

On the other hand, the use of space technology was also demonstrated by Royal Centre for Remote Sensing (CRTS) for successful floods monitoring which occurred in 2002 in Muhammedia and Berrechid cities (Morocco).

3.2. Use of remote sensing for Lakes/Watershed Management

The use of remote sensing to monitor lakes and watershed has been demonstrated by Lake Chad Basin Commission. RS was used to ensure integrated land and shared water resources management.

The problems in the basin are related to poor management, absence of effective system for monitoring the quantity, absence of a strong legal framework, weak coordination, weak economic situation in member states and weak stakeholders. At the same time a large portion of economic activity of the basin is related to water. It is agriculture, fishing and animal husbandry.

Through the application of remote sensing the commission was able to establish the fact that the lake shrunk 10 times from its original size in the last 40 years.

On the other hand, River Niger Basin Authority highlighted problems of space-based equipment on integrated water resources management in River Niger Basin.

The use of remote sensing technology in the basin has not yielded the desired results, so far, because of numerous technical, environmental and socio-economic problems.

In another case, space technology derived information has been demonstrated by CRTS for ground water exploration. The way used is based on remote sensing derived parameters and some decision-criteria in order to identify potential water drilling sites. Space information was also used in drought risk management by means of global vegetation change detection.

4. Recommendations

1. Countries and concerned institutions for WRM should:

- coordinate and share information among themselves;
- enhance sustainable transboundary water resources planning and development;
- provide decision-makers with understandable information.

2. UN and Space Agencies should:

- strengthen capacity of developing countries for remote sensing utilisation;
- enable developing countries to benefit from space technology.

3. UN and Donors should:

- upgrade equipment and capacity of remote sensing users in developing countries;
- bring projects to the grassroots level.