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

"Space systems: protecting and restoring water resources" (Graz, Austria, 13-16 September 2005)

REPORT BY THE CHAIRPERSONS

"Protecting and restoring water resources"
Chairpersons: R. Lawford (United States of America) and V. Singhroy (Canada)

The session consisted of two parts. The goal of the first part was to review the existing water resource management practices in different parts of the world. Two examples were provided: one from national water resource management in Honduras and the other from regional water resource management in the Caucasus. The second part of the session concentrated on the use of space technology in national and regional water resource management.

The following presentations were made during this session:

- Protecting and restoring water resources in the Americas, by O. Cosenza, Ministry of Agriculture, Honduras

- Protecting and restoring water resources in the Caucasus, by Z. Jincharadze, UNDP/SIDA Project "Reducing Trans-boundary Degradation of Kura-Aras", Georgia

- Space technology for integrated water resources management of the Lake Chad Basin: the pilot project implementation plan for Lake Chad basin, by G. Sambo, Lake Chad Basin Commission

- Space information for water and drought risk management, by K. Muminov, Space Research Centre, Academy of Sciences, Uzbekistan

- Space technology for water resources management in Morocco, by A. Er-Raji, Royal Centre for Remote Sensing, Morocco

- Remote sensing and Geographic Information Systems (GIS) integration in the model for river basin environment management in Northern Vietnam, by M. Tran, Institute of Geography, Academy of Natural Science and Biotechnology, Vietnam

- Scientific solutions for protecting and restoring water resources, by W. Garner, International Atomic Energy Agency

- Remote sensing in support of water resource management, by P. Saccon, Institute for Water Resource Management, Hydrology and Geophysics, Joanneum Research, Austria

Recommendations/conclusions

Based on the above presentations and the discussions that followed the presentations, the chairpersons and interested panel members and participants of the session made the following conclusions and recommendations:

1. Existing case studies on Honduras and Caucasus should include remote sensing and other space assets in the test sites to produce compelling examples of space applications.

2. Lake Chad Basin is at the early stage of planning to use space tools in mapping, monitoring and management.

3. There is a need to involve other important space agencies in the United Nations-supported water resources management programs, such as the Indian Space Research Organisation (ISRO), National Space Research and Development Agency (NASRDA), Japan Aerospace Exploration Agency (JAXA), China National Space Administration and Geo-Informatics and Space Technology Development Agency of Thailand.

4. A clear need was demonstrated to identify information and data requirements for efficient regional and national (integrated) water resource management. Such information and data should follow the following criteria:

- the data supplied must match the needs requirements of water resource managers;
- data must be made available in real-time for operational support
- hydrological models must have inputs that will lead to better results during extremes and other critical periods (e.g. low flows)
- not all applications of remote sensing data are being exploited (e.g. ground water exploration);
- more use of GIS and other multilayer platforms is needed to make full use of satellite data;
- the "Indian Model" is an effective way of communicating information based on remote sensing and GIS to the public;
- there is a need to ensure data are packaged in a convenient way for users;
- countries need to share their experience and successes;
- satellite data can provide effective imagery for communicating with policy makers and the skill of communicating such information should be developed

5. Space technology offers great opportunities for better communications. Opportunities provided by it in communicating field data to central offices and for communicating between remote sites need to be used more effectively.

6. Software packages should be developed to allow for the use of remote sensing data from desktop computer analysis systems.

7. Opportunities exist for better real-time information on various water-related parameters, such as soil moisture and weather.

8. Satellite data should be used to supplement gaps in networks due to lack of observing stations or gaps due to malfunctioning sites.

9. Satellite data should be used to define the vulnerabilities of water resource systems.

10. Space technologies should be used to map areas with water quantity and quality problems due to agriculture and industrialization.

11. Routine observations are needed to measure change and quantify trends.

12. Research is needed to overcome the limitations of satellite data, e.g., deriving soil moisture when vegetation is present.

13. Systems should be used to monitor how aquifers are being recharged.

14. Metrics should be established for the success of rehabilitation projects that can be measured from space and monitoring programs using satellite data should be put in place.

15. Pilot projects are needed to show the use of remote sensing data in monitoring the restoration of degraded aquatic habitats.

16. Satellites should be used to establish baseline conditions and inventory resources before change occurs.

17. An inventory of the satellite data and products (including resolution, accuracy, frequency, data sources) available for water resource management should be developed.

18. A broad capacity building initiative based on the general structure of tiger (but with stronger funding support) should be developed for all developing countries (preferably within the framework of GEOSS).

19. Remote sensing data should be used to develop global maps of baseline water resource availability and vulnerability. These maps could be used to determine the need for restoration programs, and in combination with forecast information, could trigger warning systems, the flood charter, etc.

20. Techniques for identifying groundwater resources through the application of geological mineral remote sensing exploration techniques should be developed.

21. Demonstration projects using remote sensing and isotope data in an integrated system for groundwater management should be undertaken.

22. Research is needed to develop analysis and modeling systems that utilize remote sensing data in integrated water resource management.

23. More research is needed on the practical application of LIDAR systems (e.g., for urban water management).

24. Priority needs to be given to applications of the “Indian Model” in other countries for involving the public in using products based on remote sensing.

25. These meetings, sponsored by UN/Austria/ESA on remote sensing on water management, are very valuable for generating ideas and contacts, especially for experts from the developing countries, and should be continued. However, a broader sponsor base could be considered (including NASA, JAXA, etc.).