GROUP ON EARTH OBSERVATIONS

GEOSS Joint Asia-Africa Water Cycle Symposium
Ito International Research Center, Ito Hall, University of Tokyo, Hongo Campus
25 – 27 November 2013

Draft Executive Summary

Background
The Asian Water Cycle Initiative (AWCI) and the African Water Cycle Coordination Initiative (AfWCCI) have evolved as regional water resource management activities of the Global Earth Observation System of Systems (GEOSS), being implemented by the intergovernmental partnership of the Group on Earth Observations (GEO). Both initiatives have recently started the next phase of implementation planning and a joint Symposium was held to build upon the commonalities of approach and promote an exchange of ideas. A major theme of the Symposium was addressing integrated water resource management (IWRM) in the context of climate change through principles of the GEOSS Water Cycle Integrator (WCI), which draws upon cross-SBA data and information to provide a holistic approach to IWRM. Other main themes of the Symposium deliberations included:

- Expected roles of Earth observations (EO) and data integration on water management and the Water-Energy-Food nexus in Asia and Africa;
- Capacities of the science communities and Earth observation sectors;
- Possible contributions of EO to monitoring progress toward Water Sustainable Development goals;
- River basin proposals of the 1st AfWCCI implementation plan in Africa; and Country proposals of the 2nd AWCI implementation plan in Asia.

GEO and GEOSS post-2015:
In anticipation of having its mandate renewed at the Geneva Ministerial Summit in January 2014, GEO and GEOSS will continue to address the 2002 World Summit on Sustainable Development calls for actions, in particular to provide EO data for informed decision making for society. Core functions of GEO post-2015 will include:

- Strengthening observation systems (space-based, airborne and particularly in-situ) and networks among observation systems;
- Advancing interoperability and integration of Earth observations;
- Promoting the GEOSS Data Sharing Principles;
- Building and sustaining an information system that provides access to the data and products of its Members and Participating Organizations;
- Developing capacity to collect and use Earth observations, and promoting regional GEOSS implementation;
- Supporting research and development of integrated applications of Earth observations; and
- Engaging with users and decision-makers.

GEOSS Capability and Needs of Stakeholders*:*
Climate change poses a fundamental threat for water resources, and once water-plentiful societies may change into water-stressed regions (e.g. Pakistan and Nepal). GEOSS stakeholders needing data and information about the water cycle range from scientists and researchers, to managers of not only water resources, but also managers of components within the agriculture, ecosystem, energy, transportation and tourism sectors. The importance of building a strong regional and global collaboration platform for tackling water resources issues under climate change is critical, as well as forging meaningful partnerships that actually address the issues scientifically and are backed by political resolve. Capacity building opportunities available due to such frameworks are another key component necessary for successful development and management of water resources. Approaches such as the WCI emphasize the importance of data integration, interdisciplinarity and transdisciplinarity for sustainable development of water and environmental resources - particularly as they pertain to the "Water-Food-Energy nexus" - while promoting disaster risk reduction. The WCI emphasizes the importance of data integration, interdisciplinarity and transdisciplinarity for sustainable development of water and environmental while promoting disaster risk reduction. The WCI has been implemented in projects ranging from dam operation optimization for hydro-

power generation and flood control, to rice production in Vietnam, Philippines and Indonesia. The core of the WCI is the Data Integration and Analysis System (DIAS), which has been developed by the University of Tokyo.

Official Development Assistance

Official Development Assistance (ODA) agencies respond to different types of requests. Some agencies work by agreement between the government of a recipient country and the agency, based on an official request for a specific resource management plan through diplomatic channels. Others look for pilot activities that fit development criteria and strategies, such as sustainable use of water, and emphasize an integrated approach in areas such as climate information, decision-making capacity, and adaptation finance. Still others require that Millennium Development Goals (MDGs) be addressed specifically. Usually, identification of common problems across a region or continent will then indicate the appropriate framework for collaboration. In all cases, it was acknowledged that discussions with end-users and stakeholders are critical to the success of any program. There is an urgent need to increase observation networks in order to cater to needs of climate service providers, especially in regions dominated by cryospheric processes.

Water Cycle Observations and Integrated Water Resources Management

One unique feature of water – its continuous recycling – is being disturbed by human activities through increasing industrialization and water demands for agriculture as well as domestic use. Some countries are facing annual water demands that exceed natural availability of water resources. "Sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs,"[1] and symposia such as this one are viewed as important to bring constructive recommendations to policy makers and researchers for the promotion of sustainable development of water resources. Establishment of local water committees or Communities of Practice serving as a forum for consultation among all stakeholders and for communication with higher level entities has contributed to rationalization of water use. In addition, strategic frameworks that focus on restructuring of water management entities to assure their efficient and stable functioning through all levels of governance, from the local and city levels to the state, need to be developed. Other suggestions included:

- integrating education, research and capacity development in a sustainable approach to IWRM (GEO can provide valuable support to this strategy by providing global to local connectivity, designs for monitoring systems, information on data repositories and their use, and supporting continuity through pilot projects);
- GEO and GEOSS can play a key role in bringing together science and research to develop practical applications in IWRM and build capacity, especially at the basin level;
- resolving data gaps resulting from insufficient in-situ networks, sparse observations of the cryosphere, and limited access to satellite data and unavailability of representative data sets;
- forming a small working group to explore ways to interact with the UN and development agencies to raise the profile of *in-situ* observations;
- making maximum use of data portals, such as the CEOS Water portal, for discovery and access of satellite, in-situ, and model output data.

Contributions by Earth Observation & Science Communities

Science/research communities were invited to inform the Symposium of their activities and explore potential avenues for collaboration with the AWCI and AfWCCI. Examples included:

- NASA's Applied Sciences Program (ASP).
- NOAA's Collaboration Opportunities for the Application of Earth Observations from Space in Water Activities; flashflood guidance systems and supports GEONETCast as a means of disseminating environmental datasets and information for regions of the world lacking internet.
- JAXA's Satellite Monitoring for Environmental Studies (JASMES) and Space Application For Environment (SAFE) programs.
- The South African National Space Agency (SANSA) online catalogue for search, visualization and ordering of EO data and information for the water cycle.

[1] World Commission on Environment and Development, 1987

- The GEOSS Water Strategy Report (produced by the Integrated Global Water Cycle Observations [IGWCO] Community of Practice).
- The GEOSS Common Infrastructure (GCI) and Discovery and Access Broker (DAB).
- The Japan Meteorological Agency (JMA) "JRA-55" reanalysis of global atmospheric and water cycle variables.
- The International Center for Water Hazard and Risk Management (ICHARM) Integrated Flood Analysis System (IFAS).
- The Global Energy and Water Exchanges Project (GEWEX) Regional Hydroclimate Projects (RHPs).
- The Swiss Federal Institute of Aquatic Science and Technology (EAWAG) Groundwater Assessment Platform (GAP).

Discussion for Implementation Planning

Main points with respect to the best way to advance the goals of the AWCI and AfWCCI:

- Project Design Matrix (PDM) proposals should be aligned with national priorities (e.g. food security, flood management), and obtain the support of the government to have a chance of success; consortia must be developed before approaching ODAs.
- To ensure commitment and sustainability, and attainment of a critical mass in terms of human resources to be successful, projects must go through "mandatory" institutions, at the national level.
- Different national departments and/or ministries follow climate change and impacts, making coordination among them difficult. Also, since funding agencies have their own sets of criteria and interests; it is not possible to generalize a process for funding.
- It is important to get national institutions commitments to collect *in-situ* data, since government support is essential for rehabilitation of networks. In the WMO's World Hydrological Cycle Observing System (WHYCOS), the plan has been to obtain signed MOUs with participating countries to commit to supplying data. In addition, the MOUs, wherever possible, have indicated that improving networks should be included as part of the package.
- PDM focus should be on Earth observations (EOs), emphasizing that new technology will help combat deficiencies of in-*situ* networks, and will be aligned with responding to climate change.
- Climate change is the appropriate framework for collaboration; important to start with a more global perspective, what is happening on the large scale, and then examine impacts at the local scale.
- Frameworks already exist in Africa; establishing links with international research organizations should be the first phase of any project to help local research institutions.
- An exchange between space agencies and ODAs would be very useful, for advancing mutual understanding and perspectives.
- International cooperation is essential to achieving SDGs, and working together on applications and demonstrating how to apply new technology to solve real problems in the river basins would go a long ways towards boosting cooperation.
- A 2-pronged approach might be helpful: at a higher level, showing how the PDMs address the SDGs, and at a lower lever, providing concrete examples of can be accomplished.
- Important to sensitize governments and administrations of the issues being addressed.
- From a technological perspective, a main issue is how to effectively engage additional researchers in finding solutions. Any viable solutions need to make use of technologies that are locally possible and feasible.
- There are still instances where governments and departments sequester data and will not share them, and the data sharing principals of GEOSS need to be reinforced.
- Reliance on national research institutions is key for any long-term strategies in resolving water management issues.
- A basic need is the capability for users to communicate efficiently with servers containing data. Making use of smartphones as a tool should be explored, and applications developed using open standards.
- Specific fora should be created whereby members within a given basin can communicate and collaborate as they seek to address the problems they are trying to solve within that basin.
- Universities can contribute to issues of infrastructure in the areas of: 1) capacity building and training; and 2) research into the scientific information needed for water and food security, and water and energy

security, as both water and economic prosperity are very important to national policies. Universities can also play a role in dissemination comprehensive knowledge.
- Connect with the private sector through the provision of river basin data so that applications may be developed, (e.g. smartphone), with data exchange arranged as a stimulus.

Towards Implementation

General comments:
- PDMs need to be packaged in terms of comprehensive projects with all necessary elements, budgets, and implementation strategies in such a way that there is something concrete to share with donors.
- Scientific aspect and operational aspects of the PDMs need to be considered to provide tools for decision makers (identify key partners at scientific, research institution, and operational agency levels, for each basin).
- Differentiate the needs of basins and donors, and match accordingly (from among several agencies).
- Encourage discussion with stake-holders, especially with governments (primary stake-holders for scientists).
- Foster regional cooperation to help exchange best-practices and promote the transition from science to operational phases, and assist in knowledge sharing and global collaboration.
- Leverage existing capacities and planned assets and resources, making use of appropriate national and international policies and institutional arrangements.
- Encourage closer cooperation with global water-related UN initiatives, such as UN-Water and the Global Water System Project (GWSP).
- Focus on SDGs and providing a means to monitor progress towards them is key, since SDGs are important to the international community. It is possible to achieve water security and disaster risk reduction in all countries world wide, and thus water issues should take center stage in SDG discussions.

Africa:
- Put in place a core networking platform, perhaps under AfriGEOSS, to strengthen coordination, engage other initiatives, and bring together relevant stakeholders, institutions and agencies across Africa that are involved in GEO and other Earth observation activities (e.g. SERVIR, AMESD, TIGER).
- Identify challenges, gaps and opportunities for African contributions to GEO and GEOSS.
- Make stronger linkage with African Union Commission, through initiatives such as Monitoring of Environment and Security (MESA).
- Set up a dialogue with the African Ministers' Council on Water (AMCOW) to obtain buy-in from member states and governments, to give the AfWCCI the political umbrella needed to move forward with activities.
- Key message: River Basin Authorities (in cooperation with individual basin member countries) should take ownership of PDMs and responsibility for their implementation.

Next steps:
- Another round of compilation of the PDMs after tuning and revising by adding overall vision and scope, and regional strategies.
- PDMs circulated as widely as possible in order to raise awareness, and interact with possible collaborators and supporters.
- Demonstrate unique niche projects fill while supporting other initiatives through value-added outputs, and thus move towards fulfilling high-level goals such as the SDGs.
- Orient proposals towards national governments where ministries of foreign affairs could take responsibility to move the proposals forward and support submission to donors such as JICA and AfDB.
- Entities such as GEO, UNU and others can be used as a platform to negotiate with donors for each PDM.
- Communicate with embassies, which can be an effective way to promote support for the PDMs.
- Sharing research and operational experiences and joint capacity building programmes by means of large-scale and high-level global, international frameworks, in order to foster collaboration and raise visibility.