Digital Transformation Challenges and Opportunities for West African River Basin Development Organisations

Detailed Program of the First Virtual Think Tank Roundtable

Thursday 2 July 2020, 14h00-16h30 (Dakar), 16h00-18h30 (Geneva)

1. Welcome by Representatives of the River Basin Organisations and of the Pôle eau de Dakar

Welcome by the Geneva Water Hub *François Münger, Geneva Water Hub* *(1400-1430 Dakar)*

Introduction: Water, Peace and the Digital Transformation *Christophe Bösch, GWH* *(1600-1630 Geneva)*

- The world needs to rethink its global approach to water – as a matter of survival (Panel on Water & Peace).
  - ✓ The unrealized potential of River Basin Development Organisations and their vital role post-covid-19.
- The pandemic is accelerating digital transformation, but growing opportunities created by the application of digital technologies are paralleled by stark abuses and unintended consequences.
  - ✓ Urgent need for improved digital cooperation to help achieve the SDGs (UN Panel on Digital Cooperation).
- Digital transformation is key to strengthening existing RBDOs and to creating innovative ones in new basins, leveraging the « network effect ». Example of *digital platform firms* (GAFA) that create added value by enabling users to share data and information across sectoral, geographical and political boundaries.
  - ✓ In a water sector highly fragmented all at levels, digitalisation can help integrate organisational siloes and promote a systems approach which recognizes the interconnectedness of water across sectors, between political entities, and across the urban-rural divide.
  - ✓ Digitalisation can thus foster the emergence of new models of territorial governance of water such as polycentric, decentralized or distributed systems to more effectively manage 21st century mega-risks and prevent systemic crises such as the ongoing pandemic, making water an instrument of peace.
- In fact, the mandate of the River Basin Development Organisations (notably in West Africa) has the attributes of digital platform, with water acting as a multi-actors connector and a catalyst of development. RBDOs could thus be a developmental ground for digitalisation, while managing its risks such as cybersecurity *(TVA example in next webinar).* For instance :
  - ✓ Digitalisation of river basin strategic/master plans and of their joint investment instruments, to make them adaptable (to political, climate or public health change or crises), and to reinforce cooperation by creating new opportunities for sharing and exchanging between stakeholders.
  - ✓ Multi-stakeholder investment and financing digital platforms – to better involve and bring together investors, the private sector and communities, to foster integrated solutions across sectors and across boundaries *(next webinar).*
  - ✓ New ways for RBDOs to inform, consult and include the general public – such as social networks – to promote local actor participation in the management and in the future of the river basin *(next webinar).*
  - ✓ Innovations in remote sensing and crowdsourcing coupled with digital transformation to transform management, financing, governance and diplomacy of (transboundary) water resources *(next session 4).*
  - ✓ Digital tools to facilitate integration in a basin: to reduce inequalities in water security, strengthen transparency and intersectoral (in particular the WEF nexus), territorial (urban-rural, upstream-downstream) and institutional (polycentrism, distribution and decentralization) linkages.

With support from

2. <u>Water Information Systems for River Basin Development Organisations: Potential of Digitalisation</u>

Paul Haener, International Office for Water / INBO (1430-1510 D, 1630-1710 G, including discussion)

- ***The webinar on water information systems will take place in two parts :***
  - ✓ ***A strategic overview and forward-looking exchange in this roundtable ;***
  - ✓ ***A more complete and interactive webinar in Sept. 2020, organised by the International Office for Water***
- The International Network of River Basin Organisations (INBO), the Secretariat of which is provided by the International Office for Water, has published in 2018 a Handbook on Water Information Systems with UNESCO-IHP, WMO and the Australian and French Governments. This manual highlights the importance of data management for effective, sustainable and integrated water resources management including planning, adaptation to climate change, flood management, protection of water and ecosystems, intersectoral, territorial and transboundary water management. It introduces the five main processes to be taken into account when implementing a Water Information System (WIS) and also presents the main challenges encountered and case studies. It underlines the importance of adapting to variable situations in RBDOs, analyzing the needs of water stakeholders and citizens, involving all public and non-public stakeholders, connecting local and national stakeholders, to overcome technical constraints and develop synergies.
- Water information systems coupled with the digital transition offer opportunities for RBDOs to improve the efficiency of the services they provide, to successfully manage the ecological and climate transition, to boost socio-economic development of their territories, to foster transparent governance systems, to leverage technical and financial data, and to promote public participation and inclusion. This opens up major opportunities for moving towards pooling, sharing and optimizing data, resources, services and spaces.
- But the data necessary for water resources management are often insufficient and, when they exist, they are difficult to exploit because they are produced and managed by various organizations working in different sectors with little coordination. Many systems and datasets exist, but in many cases professionals and policy makers still lack essential data and information; the plethora of data sources and the lack of traceability make it difficult to identify the most appropriate data and assess the quality of the information available.
- The world of information systems is constantly changing (cloud computing, service-oriented architectures, artificial intelligence, web services, Internet of things, open data, interoperability, big data, 3D visualization, social networks, etc.). Moreover, data sources are also expanding (satellite data, communicating objects, crowdsourcing, etc.) and the fields of application are evolving such as adaptation to climate change.
- All water management sectors can benefit from these innovations with a real positive return on investments: this requires adapting governance, procedures and tools at all levels to match needs, and developing skills and capacities for facilitating production and access to information useful for decision-making and public information.
- **Information system technologies of the 21st century therefore open the door to new approaches and solutions; the round table will discuss in particular:**
  - ✓ **How can basin organizations, in collaboration with the states concerned, adapt their organization of data management and take advantage of these new technologies to meet current and future challenges of water resources management?**
  - ✓ **How to exploit these new technologies to generate regularly updated information useful to decision-makers, for example in the form of new generation dashboards that can help a West African basin organization to manage 21st century challenges (possible small project to carry out following the webinar)**

BREAK *(1510-1515)*

3. <u>Earth Observation Systems, Hydrometry and its Innovations for River Basin Development Organisations</u>

World Meteorological Organisation / WMO (1515-1555 Dakar including discussion)

- In 2019, the World Meteorological Organisation (WMO) Congress made of 193 Member States has implemented a WMO Governance Reform Agenda entitled *« WMO for the 21st Century: Responsive and fit-for-purpose* » in order to better respond to the growing global demand for weather, climate and water expertise. WMO notably aims to increase private sector involvement and take advantage of technological advances to maximize its reach by improving Earth System monitoring[1] and multi-hazard early warning systems[2], strengthening cooperation, and informing and addressing global issues such as climate change. This reform will facilitate transdisciplinary developments. WMO Congress also defined eight objectives for operational hydrology in the areas of floods, droughts and water management. These objectives will be achieved by consolidating a value chain based on innovative projects, to better meet the needs of users and decision-makers. This approach will also allow WMO to strengthen its links and support to river basin organizations.
- With the support from the Geneva Water Hub, from several Permanent Missions to the UN and other Geneva-based international organisations, WMO launched in 2018 the Coalition for Water Data and Peace https://public.wmo.int/en/files/water-data-and-peace-event-2018.
- In the field of operational hydrology, WMO manages three recent and complementary programs that can contribute to the peace and 2030 Sustainable Development Agenda:
  - ✓ The Global Hydrometry Support Facility or WMO HydroHub (www.hydrohub.wmo.int) supported by the Swiss Agency for Development and Cooperation (SDC) and with which the GWH has established a solid collaboration, which offers an innovative approach to acquire, preserve and share hydrological data on a regular and sustainable basis and to facilitate the free and open exchange of data. WMO Hydrohub brings together several components including WHYCOS, WHOS and the Global Innovation Hub, which was inspired by recent innovations including the global initiative iMoMo (www.imomohub.org) also supported by the SDC with its applications in Africa and Central Asia.
  - ✓ The Global Hydrological Status & Outlook System (HydroSOS) that uses available water data and modeling results to create global reference information on the current and future status of freshwater systems.
  - ✓ The World Water Data Initiative supports countries in water-related policy development to improve access to and use of water data by decision-makers.

- **The round table could notably explore:**
  - **How to set up a mechanism to collect needs taking into account digitalization to help strengthen national and regional hydrometeorological services**
  - **What contributions WMO in its new organizational structure could make to West African RBDOs as well as to their member states to strengthen their hydrometric systems.**
  - **How to foster the emergence of a local private sector to support hydrometry developments in West Africa (possible small project to be carried out following the webinar)**

<u>Structure of the presentation and discussion:</u>

- A general introduction will set the framework for the discussion, which should focus on the needs of basin organizations and the possibilities for collaboration. Interactions will be established with the WMO team in charge of projects in the <u>Volta River Basin</u> in the fields of data collection, early warning systems and adaptation to climate change.

[1] Holistic Earth system approach: meteorology, climatology, hydrology, oceanography, seismology, volcanology, air quality, greenhouse gases and space weather

[2] Multi-hazard and impact based seamless services: weather, climate, water, aviation, marine, agriculture, urban, energy and health, etc.

4. Innovations in Remote Sensing, Crowdsourcing and the Digital Transformation

T. Siegfried (Advisor to WMO Hydrohub) and S. Ragettli, Hydrosolutions (1555-1630 D including discussion)

- Innovations in remote sensing and crowdsourcing coupled with digitalization will transform the management, governance, financing and diplomacy of water in particular in intersectoral and transboundary contexts.
- These technologies have the potential to provide more complete, current and accessible information on water supply and demand. Satellite imagery and other Earth observation tools provide new perspectives on water resources in parts of the world where conventional in-situ methods are neither feasible nor practical.
- For integrated water resources management, water level and volume resp. discharge observations in space and time are essential. To monitor lake surface area, optical remote sensing data has found wide application; several Landsat satellites (NASA) as well as the Sentinel-2 satellite (ESA) provide medium resolution imagery with global coverage. Radar missions, such as Sentinel-1 (ESA) allow to detect water surface without restrictions of atmospheric conditions such as cloud cover. Finally, laser altimetry from the ICESat-2 mission is another product that provides high spatial resolution data which allows to capture levels and their variations of even very small water bodies. In combination, level changes can be translated into volume changes and thus provide unprecedented insights into the water balance at local, national, transboundary and continental scales. The SWOT mission (NASA-CNES) planned end 2021/ beginning of 2022 will provide further relevant data in this regard with an unprecedented accuracy.
- Global planetary scale platforms like Google Earth Engine completely transform the capacities for the retrieval and analysis of remote sensing data. The enormous archive of open-source satellite data, including data from all Landsat Missions and the Sentinel 1 and 2 missions can be accessed at one's fingertips via an internet browser and powerful machine learning algorithms used for insight development - at no cost. All data queries, computations and analyses are carried out in the cloud. Thus, there is no need for an organization such as a river basin agency to have local heavy-duty and expensive computer infrastructure in place and to maintain this. Data analysis and retrieval can easily be packaged into a web-app which make this type of technology very interesting from the perspective of the water manager and planner. Initiatives like the recent Digital Earth Africa[3] (www.digitalearthafrica.org) help to easily map and assess environmental change dynamics all over Africa. All the diverse types of relevant data can easily be integrated into a modern Water Information System with a geospatial foundation at its core and thus easily inform all stakeholders on all relevant aspects in the best possible manner.

Structure of the presentation and discussion:

- Emphasis will be placed on innovations in remote sensing and crowdsourcing in contexts of data scarcity, which are relevant for river basin organizations, illustrated by examples in Mozambique, Central Asia and in the Sahel: Lake Wegnia in Mali, the Sourou transboundary basin between Mali and Burkina Faso.
  - ✓ Introduction with background on the complementarity of non-traditional data from data collection through local involvement and remote sensing to traditional in-situ monitoring.
  - ✓ Filling Data Gaps: Data collection through local community involvement
    - Example: iMoMo technology in Mozambique, discharge App
  - ✓ Closing Water Balances at Basin Scales: The Power of Remote Sensing
    - Lake and river water level and volume change monitoring; attribution analysis
    - Mapping of irrigated land and evapotranspiration with example in Central Asia
    - Water Balance Analysis with the assessment of uncertainties
  - ✓ **Conclusions, including challenges for operationalizing these new tools in river basin organisations, and developing the local private sector.**

[3] On June 15, 2020, the Digital Earth Africa platform announced that it now has operational analysis-ready Earth observation (EO) data over Africa, using free and open images captured by the European Space Agency's (ESA) Sentinel-2 satellites.