



9th World Water Forum – Dakar, Senegal

Integrated Management of the Water Cycle: Key to Security, Peace, Sustainable Development and Resilience to Climate Change

Exploring Options to Establish a Regional Innovation Hub at the Pôle Eau Dakar

Shared Working Document, March 2022

Introduction and Strategic Context

The Pôle Eau Dakar (Dakar Water Hub) is an initiative led by Senegal which aims to build a reference framework in Africa to catalyze cooperation, inclusive dialogue, governance and the development of innovative water solutions. The Pôle eau Dakar (www.pole-eau-dakar.org) also aims to contribute to the follow up of the recommendations of the 9th World Water Forum on the theme of water security for peace and development. It is centered around four strategic pillars:

- (1) Networking, multi-stakeholder and multi-thematic dialogue;
- (2) Promotion of cooperation and peace, multi-level approach;
- (3) Development of capacities, knowledge and innovations;
- (4) Reinforcement of mechanisms for dialogue and consultation to set up an integrated approach to the management of water resources at different scales.

In the wake of the 9th World Water Forum in Dakar, the ambition of the Pole eau Dakar is to capitalize on the results of the World Water Forum. Its mission is to promote the concerted development of skills and practices at the local and regional levels to drive an integrated management of water resources based on the strengthening of hydro-diplomacy and peace.

The water cycle is an essential element of the Earth system and its processes – natural and anthropogenic. The water cycle cannot be understood without taking into consideration the interactions between the different components of this system. It is therefore necessary to integrate the water, meteorology and climate aspects for integrated management of the water cycle as a key to building resilience to climate change. Following the WMO Extraordinary Congress¹ in October 2021 and the COP26 in November 2021, it is even more evident that integrated water management as well as adaptation and mitigation of the effects of climate change will not be possible without a transformation of the management of the water cycle that will transmit most of its effects, including droughts, floods, soil and biodiversity depletion.

¹ <https://public.wmo.int/en/media/press-release/wmo-overhauls-data-exchange-policy>

In Africa, and particularly in the Sahel region, the increase in extreme phenomena is reflected, depending on the region, in an increase in rainfall and runoff and/or periods of drought, as well as in their high degree of unpredictability and great interannual variability. These strong variations, coupled with demographic pressure and the lack of socio-economic opportunities, fuel local and territorial tensions and conflicts, leading to regional and global security and migratory impacts.

Mastering the water cycle and its natural and anthropogenic processes is therefore fundamental to water security for peace and development. In particular, land use management has a major role in local water availability and regional water flows. Consequently, the integrated observation of the earth system and the water cycle must be able to effectively support local, territorial and basin actors to jointly and equitably manage surface and groundwater, soils and ecosystems. For example, sustainable agro-sylvo-pastoral practices linked to small water retention infrastructures can thus contribute to resilience to climate change, food security and the strengthening of local economies.

Therefore, a scientific decompartmentalization of meteorology, climate and hydrology must support the harmonious, inclusive development of soil management, ecosystems and the use of natural resources in general, at the scale of the watershed. Water management must be supported by a better knowledge of natural phenomena and their evolution in the short, medium and long term. In particular, the monitoring of the components of the water cycle must be made more comprehensive, more sustainable and more effective, in the spirit of integrated observation of the Earth system. This new paradigm implies that it is necessary to be able to jointly measure quality and quantity, surface and groundwater, and to integrate water management with other sectors concerned with the hydrological cycle (e.g. land management and coastal areas, agriculture, energy, etc.).

This new approach will only be effective if the design and management of observations involves water management actors from the local to the basin scale, who could become co-responsible for monitoring. This would imply the creation of local and territorial skills for the design, construction and maintenance of measurement networks and the instruments that compose them. In addition, a new mechanism for collecting and integrating user requirements must be implemented.

Proposal for support to the Pôle eau Dakar (Dakar Water Hub) to develop its “innovation, knowledge and capacities” pillar in the wake of the 9th WWF

Following a series of round tables² co-organized in 2020/2021 by the Geneva Water Hub (GWH) and the Pôle eau Dakar with West African basin organizations including the Gambia and Senegal River Basin Development Organisations (OMVG and OMVS), the International Network of Basin organizations (INBO), the International Office for Water (IOWater), the World Meteorological Organization (WMO) and other partners, and following the meeting of these partners organized on January 31, 2022 by WMO with the GWH and EPFL Essential Tech, support activities for the Pôle eau Dakar will be explored with the aim of developing its strategic pillar “innovation, knowledge and capacities”, in the wake of the 9th World Water Forum.

These activities could include the development of new approaches and innovations in hydrometry for the integrated management of the water cycle at all levels in Africa and in particular in support of Transboundary Basin Organizations and their Member States, as well as to the innovative initiative of the Senegalese-Mauritanian Aquifer Basin (BASM) co-led by OMVS and OMVG and which was launched in Geneva in September 2021 through a Joint Ministerial Declaration during the 9th session of the Meeting of the Parties to the UNECE Water Convention.

² <https://www.genevawaterhub.org/news/1st-virtual-think-tank-roundtable-digital-transformation-challenges-and-opportunities-west>

1. Proposed WMO support to the Pôle eau Dakar (Dakar Water Hub)::

- **WMO HydroHub³ innovation activities** will be explored in a way that supports the mission of Pôle Eau Dakar. These activities could be 1) *Innovation Calls* – identifying and operationalizing innovative solutions to the hydrometric challenges of National Meteorological and Hydrological Services (NMHSs) and/or 2) *Innovation Workshops* – bringing together NMHSs, universities, the private sector (providers of solutions) and others, and facilitate targeted interactions between them;
- The activities of the **World Water Data Initiative** and **HydroSOS** could be leveraged to ensure the construction of a value chain based on user needs and producing hydrological services;
- The activities of **CREWS** (Climate Risk and Early Warning Systems) and **HYCOS** (Hydrological Cycle Observing System) for the whole Continent could also be valued;
- Similarly, the activities of the **WMO Africa Region** could be linked with the Pôle eau Dakar;
- Finally, additional partners could be engaged. Common relations, such as **INBO, OMVS, OMVG, Lake Chad Basin Commission (LCBC) or UNESCO**, for example, could be made more effective with these joint discussions. WMO could help forge links with other African regions and could also strengthen collaboration with **UNEP** (for water quality monitoring issues) and the **Initiative for the Future of Great Rivers**, in order to integrate societal aspects such as health and culture.

2. Proposed support from EPFL Essential Tech⁴ to the Pôle eau Dakar:

- **Tailor-made technology transfer in the hydro-meteorological field with an emphasis on reducing conflicts related to water resources management.** For example, technologies could include the use of drones for river level monitoring or remote sensing for estimates of groundwater reserves.
- **Business model support** for scaling and sustainability of innovations
- **Entrepreneurship training** for technologies
- **Development of online courses** (MOOC) for requested WASH topics

3. Proposed support from IOWater / INBO to the Pôle eau Dakar:

IOWater / INBO confirms its interest in exploring possible contributions to the follow-up of the recommendations of the Forum and to 3 of the 4 strategic pillars of the Pôle eau Dakar, namely: (1) Networking, multi-stakeholder and multi-thematic dialogue; (3) Development of capacities, knowledge and innovations; (4) Reinforcement of mechanisms for dialogue and consultation to set up an integrated approach to the management of water resources at different scales.

IOWater / INBO could in particular promote the actions of the Pôle eau Dakar while seeking, when relevant, a coherence of actions, in particular with those of the African Network of Basin Organizations (ANBO) and WMO (memorandum of understanding with WMO in preparation), and contribute:

- **IWRM support actions** (planning, programs of measures, etc.)

³ The Global Hydrometry Support Facility (WMO Hydrohub, <https://hydrohub.wmo.int>) was established in 2017 with support from the Swiss Agency for Development and Cooperation (SDC) to enhance water monitoring systems by bringing together a wide range of stakeholders from different sectors, providing them with technical advice and support for sustainable operations, catalyzing innovative technologies and approaches.

⁴ EPFL Essential Tech is a Center of the Swiss Federal Institute of Technology in Lausanne (EPFL). Its mission is to harness science and technology to drive sustainable development, support humanitarian action and foster peace. <https://essentialtech.center/>

- **Support actions for the shared and integrated management of multi-theme data at the regional/national/local level:** possibilities for promoting and replicating the current project⁵ with the OMVG (Gambia River Development Agency), with support from GWH and SDC
- **Capacity building**, remote sensing applications, etc.

4. Proposed Geneva Water Hub support to Pôle eau Dakar :

The GWH will support this initiative as part of its mission to help prevent water-related conflicts at an early stage and to promote water as an instrument of peace and cooperation, and in continuation of its ongoing support to Pôle Eau Dakar which includes:

- **The establishment of the Global Observatory for Water and Peace** for the Africa region, a key recommendation of the Global High Level Panel for Water and Peace.
- **Mapping the risks of water-related conflicts at the national and regional level**, which will provide a vision of vulnerable or at-risk areas in order to allow better prevention and management of conflicts.
- **A series of webinars and MOOCs** on relevant themes as well as an **Atlas of major scientific questions on water** which will be a laboratory of ideas, particularly on territorial water governance from the local/community scale to transboundary basins.

Proposed Next Steps

This approach should make it possible to explore concrete actions to sustainably improve knowledge of water and consolidate a network combining universities and innovative start-ups in the field of water monitoring, allowing the development and maintenance of local solutions.

In a first step, the Pôle eau Dakar (with the support of WMO, local, national and regional partners, GWH, INBO/IOWater, EPFL EssentialTech and other potential partners) would contribute in a think tank format to the design of new participatory observation and management approaches that are decompartmentalized and interoperable, with Transboundary Basin Organizations and their Member States.

This innovative concept could contribute to developing a new generation HYCOS for the basins of the Senegal and Gambia rivers, the Senegalese-Mauritanian aquifer basin (SMAB) and then beyond for the entire Sahelian region. Eventually, the Pôle eau Dakar would be ideally placed to host a regional or even continental innovation hub in connection with the WMO Hydrohub, Dakar already being a breeding ground for start-ups in the relevant fields.

A call for action at the 9th World Water Forum in Dakar for mobilizing resources and financing

This document also acts as a call to action at the 9th World Water Forum in Dakar for mobilizing resources and financing. Fundraising will be necessary for the implementation of the aforementioned activities. We seek to interact with public, private and civil society partners to develop the concept and then implement this innovative initiative.

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⁵ See OMVG web portal of activities under development : <https://www.aquacoope.org/gwh/fr/>