Global High-Level Panel on Water and Peace

Think-Tank Roundtable Report

March 2017

Data for Water, Peace and Security

This summary report has been prepared by the Geneva Water Hub as an input paper for the final Report to the Global High-Level Panel on Water and Peace.

The report provides a summary of a senior experts' Think Tank roundtable co-convened by the Geneva Water Hub and the World Meteorological Organization (WMO) on 20 March 2017 in Geneva. The analysis, results and recommendations in this paper represent the opinion of the participants and are not necessarily representative of the position of any of the organizations.

The Geneva Water Hub is developing a hydropolitics agenda to better address water-related conflicts and promote water as an instrument for peace (www.genevawaterhub.org) with support of the Swiss Agency for Development and Cooperation (SDC) and the University of Geneva.

The World Meteorological Organization is a specialized agency of the United Nations with 191 Member States and Territories (https://public.wmo.int/en). It is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the land and oceans, the weather and climate it produces and the resulting distribution of water resources.

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1. Introduction

The Geneva Water Hub (Secretariat of the Global High-Level Panel on Water and Peace (GHPWP)) and the UNESCO Chair on Hydropolitics at the University of Geneva jointly organized the roundtable event "Data for Water, Peace and Security". The event was organised in partnership with the World Meteorological Organization's (WMO) newly established Global Hydrometry Support Facility (WMO HydroHub) with the aim of defining policy recommendations for the GHPWP on the topic of water data for peace and security.

A wide range of initiatives worldwide deal with the production, exchange and interpretation of water data. National and international organizations, NGOs, the private sector and researchers provide numerous initiatives in building data sets and fostering a better understanding of hydrosystems and the modalities of how to use water resources.

At the same time, water monitoring suffers substantial weaknesses: lack of sustainability of many national hydrological measurement networks, weak knowledge on groundwater (representing about 80% of global freshwater reserves) and on water quality.

Considering that reliable data and information capturing environmental, social, economic and political situations is key for security, especially in transboundary catchments, these shortcomings need to be addressed. While a better understanding of environmental conditions is crucial, socio-political dimensions and economic growth also need to be taken into consideration when developing monitoring systems in order to ensure the linkages between water, peace and security. The roundtable therefore addressed the role of water data, explored existing water data initiatives, identified existing gaps and challenges and aimed at identifying synergies with peace and security policy development.

The report is structure in the same way as the event. It will begin with addressing the question of how water and related data can be used as a tool for the promotion of peace and security (Chapter 2). The following Chapter 3 introduces selected data and data monitoring initiatives, such as those around the monitoring of the Sustainable Development Goals (SDGs). The last chapter outlines recommendations for the Global High-level Panel on Water and Peace that were identified by the participants during three group discussions (Chapter 4).

2. Water data as a tool for peace and security

The first session of the roundtable event started with a presentation that outlined the instrument of participatory mapping, which can be used as an additional instrument to derive information from relevant stakeholders, beyond the traditional sources of data describing physical systems.

Data and information handling and distribution has changed dramatically over the last decades. Since the beginning of the Internet, the distribution of local and global water datasets has greatly improved as data can now be shared easily and many datasets are available across the globe. Yet these technical advances have not significantly influenced policy-decisions (outcome-dimension).

There is, therefore, a need for complementary methods that capture information beyond purely technical and engineering information sources and which include knowledge from different stakeholders. One way of deriving such information is through participatory methods such as "participatory mapping".

Participatory mapping combines the tools of cartography with participatory methods to represent the spatial knowledge of various stakeholders (such as local communities, civil society actors, research/academia or government representatives). It can be used in various contexts, including water conflict situations, to identify different positions and perceptions of stakeholders.

The presenter briefly introduced the method: the process starts by drawing the boundaries, actors etc. of the issue discussed on a plain map. This is followed by fact checking and finalized with a process of discussion during which stakeholders agree on certain priorities. Such participatory mapping can empower stakeholders by capturing their (diverging) perceptions and values in an easily understandable visual format. Additionally, these maps can be used to reach out and influence decision-makers.

Moving away from participatory mapping, the presentation concluded by drawing attention to issues that could become highly relevant in the near future. First, he argued that water related conflicts between countries would decrease in importance while disputes at the local level were likely to increase, including between business actors and local communities. In such cases, ownership of and trust in information would be of paramount importance to ensure that disputes are solved. Second, the significance of groundwater resources had not been adequately

addressed to date. More information and data on groundwater, including shared groundwater bodies is therefore required.

The second presentation examined the role of spatial data for monitoring water resources and related aspects. It started by emphasizing that water is interrelated with many issues, including climate change, land cover change or soil degradation. Collecting data on water therefore requires collecting data on a broad number of other factors.

Spatial data and maps, which describe the location and shapes of water and related environmental features, are crucial for assessing the scope and cause of water problems and help to monitor them. For example, land cover changes caused by mining activities or deforestation can be well monitored through spatial information, as can factors related to climate change such as glacier retreat. Caused by increasing temperatures, this retreat often affects water availability as less ice may melt during dry seasons.

The third presentation introduced hydropolitical data. It focused on one specific initiative: the Transboundary Freshwater Disputes Database (TFDD).

During the presentation, it was stressed that hydropolitical datadescribes the intersection between politics at various levels (between regional and national governments) that govern water and water related data. The aim of collecting and analyzing hydropolitical data is to better understand when and why political actors cooperate over shared water resources – or do not. Such knowledge might then be used to nudge states towards cooperation.

In order to manage a transition from non-cooperation or dispute to water cooperation, water data and monitoring needs to be embedded in a broader strategic approach. At Oregon State University (where TFDD is based), this is attempted through a "Program in Water Conflict Management and Transformation" which complements the collection of water data with professional training, strategic global partnerships with other research institutions, and facilitation and mediation support for parties in conflict situations.

Three different datasets that are included in the TFDD were then explored into greater detail. The first is a spatial dataset containing information about international river basins that has been collected since 1999 (including information such as the geographical boundaries, the basin-country units, population size etc.). According to this dataset, the number of international river basins has continuously been growing and today includes a total of 310 basins.

Another database included in TFDD is the freshwaters treaty database which covers information on bilateral and multilateral water treaties around the world. It includes the treaties themselves and codes them along a number of criteria, including, for example, the signatories, the presence and type of dispute resolution mechanism, stakeholder participation, or water allocation or variability mechanisms.

Finally, the TFDD also includes the international water events database – a catalogue of interactions between basin states that are conflictual or cooperative. The database captures all types of cooperative and conflictive events from 1948 to 2008 and codes them along a 'basins at risk' scale (from major conflict/formal war to full cooperation/voluntary unification into one country). One of the major findings of this monitoring program was that most of the events between states around waters are of cooperative nature. Additionally, the project found that the likelihood and intensity of disputes rises as the rate of change within a basin exceeds the institutional capacity to absorb that change.

The presentation then showed that information from these different databases can be combined in various ways to generate new information. For example, by combining the spatial dataset with the international water events database, "basins at risk" (where the likelihood of disputes is relatively high) can be identified. Knowing about basins that are particularly prone to disputes can provide a useful tool for policy makers to determine the allocation of resources.

This example illustrates that integrating spatial and socio-political data can facilitate predictions, further the understanding of the interwoven nature of water and politics, and be used to encourage cooperation.

The presentation closed by outlining some of the challenges related to the management of hydropolitical data: First, data that needs to be connected is often measured at different scales. For example, the SDGs are usually measured at the country-level whereas water resources data is often collected at the basin-scale. Combining such data can prove to be very difficult. Another challenge relates to operationalization - certain issues that might influence cooperation are hard to measure at the global scale. Furthermore, there often is a tension between what is written down in an agreement and actual practice. This is related to the question of treaty implementation: To what degree are they implemented? How can issues like quality or effectiveness of cooperation be measured across different cases? And is it useful to use the same indicators for different cases?

In the subsequent discussion, the question was raised whether there were any attempts to combine the existing TFDD with other global datasets such as those focusing on groundwater. The answer revealed that, while this was considered to contain potential, there are currently not enough resources to follow-up such an attempt. However, this is on the future research agenda.

Furthermore, participants discussed the disconnection between data providers and data users. While there is generally an abundance of different types of water data available around the globe, there are many instances where existing data is not accessible. There are, for example, numerous instances where national governments are reluctant to publicize and share water data.

However, it was also acknowledged that there are still numerous data gaps which are unlikely to be addressed comprehensively in the near future. Therefore, participants argued that a paradigm shift was required. Instead of insisting to fill all data gaps, we should instead first focus on what we want to achieve with potential data and information and then subsequently address the most pressing knowledge gaps.

Participants suggested filling existing data gaps by first developing a joint common global methodology on the data that requires particular attention. This methodology could then provide the basis for data collection by various public and private actors. The SDGs, it was suggested, could provide a basis for such a joint methodology. However, the lack of capacity in many countries could provide an obstacle to collecting quality data. Providing a methodology would, therefore, need to go hand in hand with capacity building to ensure the quality and comparability of data.

3. Overview of existing data initiatives

The first presentation of this session introduced the integrated monitoring framework for SDG 6 ("Ensure availability and sustainable management of water and sanitation for all") which includes a total of 8 targets and 11 indicators. Different custodians are responsible for monitoring different targets and indicators.

The WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) is in charge of monitoring drinking water, sanitation and hygiene (SDG targets 6.1 and 6.2). For the new targets on water quality and wastewater treatment, water scarcity and water-use efficiency, integrated water resources management and water-related ecosystems (SDG targets 6.3 to 6.6), a new global monitoring initiative, GEMI – Integrated monitoring of water and sanitation related SDG targets – has been developed. Finally, the monitoring of the means of implementation by expanding cooperation, capacity building and strengthening participation (SDG targets 6.a and 6.b) is implemented by UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS).

The collection and data flow was briefly introduced: national statistical offices are responsible for the production and collection of data. From there, data is sent to various international agencies (in some cases via regional organizations) and finally to the statistical division of the UN, which records the information in the SDG indicator database.

GEMI was established in 2014 as an inter-agency initiative composed of various UN organizations with the aim of integrating and expanding monitoring efforts. It has since developed several global methodologies, tests these in different pilot countries and is now in the process of implementing these methodologies as a basis for SDG monitoring on SDG 6. Its principles of operation include:

- build and harmonize existing national monitoring efforts
- disaggregate data to ensure that "no one is left behind"
- implement and support monitoring methodologies progressively
- integrate work across sectors and institutions

The subsequent discussion first addressed the question of whether the separation into 17 SDGs and GEMI's focus on one specific SDG wouldn't create exactly the "silos" that the integrated nature of the SDG framework aims to overcome. In response, participants however argued that, considering the complexity of the SDGs and each individual goal, the tasks of monitoring required a degree of specialization. To address the problems of silo thinking and to promote more a more integrated approach, different clusters of SDGs will be evaluated together.

It was furthermore discussed how SDG 6.5's transboundary component ("Implement integrated water resources management at all levels, including through transboundary cooperation as appropriate") could be strengthened. At this stage, it is planned to monitor this component through assessing the percentage of transboundary basin areas with an operational arrangement for water cooperation. Although this was generally considered as too limited by the participants to capture the extent and quality of transboundary cooperation, no final position on a potential

recommendation for the HLPWP was formulated around this aspect. One key obstacle was seen in the limited prospect of success for any recommendation on expanding transboundary aspects in the SDGs monitoring process at the UN-level.

The next presentation introduced the newly established WMO Global Hydrometry Support Facility (WMO HydroHub), which is designed to build operational systems and capacity in hydrometry and water monitoring, expand the base of hydrological data and facilitate free and open data sharing[1].

The presentation started out with explaining how hydrometry data is dealt with at the WMO. The World Hydrological Cycle Observing System (WHYCOS) is one important capacity development programme that seeks to globally increase data production and collection including data rescue. It operates through regional HYCOS projects that aim at increasing the capacity of monitoring networks and ensuring the standardization and quality management of water data. For data processing and storage, the Meteorological, Climatological and Hydrological (MCH) Database Management System, an open and free software, is provided as a possible solution for the management of hydrological data in the project countries. To ensure data visibility and availability, the WMO Hydrological Observing System (WHOS) has been established. This online portal allows accessing near real-time and historical hydrological data freely and openly. Lastly, a number of different global data centers, including the Global Runoff Data Centre (GRDC), the International Groundwater Resources Assessment Centre (IGRAC) and the International Data Centre on Hydrology of Lakes and Reservoirs (HYDROLARE) actively support data sharing and data rescue efforts.

The presentation then highlighted that the hydrology community faces several challenges with regard to hydrometry. These include, amongst others, the low visibility and recognition of hydrological services at higher levels of national governments ; insufficient capacities of many monitoring networks (which are not sufficient to deliver the data necessary for monitoring SDG 6); lack of ability to present water data in a form that is digestible and usable by non-technical stakeholders.

At the same time, there have been many technological developments over the last decades which provide new opportunities. Technological breakthroughs in, for example, energy storage, robotics or mobile internet can be used for improving the collection and dissemination of hydrological data. For instance, smart phones today have enormous computing power and continuous connectivity which allows for real-time transmission of data and information.

Based on these challenges and opportunities, the idea for the establishment of the HydroHub was born. The HydroHub aims to support the regional HYCOS projects by delivering technical assistance and enabling more innovative approaches to hydrometry. The following components comprise the HydroHub: the Global Innovation Hub which will focus on innovative technical solutions for water monitoring and the development of new approaches to hydrometry; the World Hydrological Cycle Observing Programme (WHYCOS); the WMO Hydrological Observing System (WHOS), which is the premier online portal to near real-time and historical hydrological data made freely and openly available by National Hydrological Services around the world; and the Help Desk, which will provide an online support resource for interested stakeholders.

The WMO HydroHub's governance comprises, the Advisory Council, which will provide general guidance on the concept, objectives, expected benefits/costs, operational issues, its future development and its components; and the Innovation Committee, appointed by the Advisory Council, which will provide assistance in driving and strengthening innovation, and ensure a strategic and consolidated view on relevant innovation activities.

In sum, the overall objectives of the HydroHub include bridging the gaps between the observation needs and the appropriate innovative technologies; developing new ways of using data for decision-making; and integrating innovation into more traditional measure instruments (e.g. citizen information systems).

The presentation was followed by questions on how to leverage new technologies to get relevant data in fragile countries (where there is usually a lack of it). While there was no definitive answer to the question at this stage, examples including the Innovative Technologies for Monitoring, Modelling and Managing Water (iMOMO) approach and the WMO HydroHub - that specifically looks into this - were highlighted as potential solutions.

The last presentation presented the experience of the International Network of Basin Organizations (INBO) on data management. INBO has been established as a non-governmental organization with the support of the French

[1] More detailed information on the HydroHub is available at https://public.wmo.int/en/projects/hydrohub

government. Its origins go back to the 1990s when the government of France tried organizing access to data within a very fragmented institutional landscape of water data custodians.

Today, INBO is active in more than 60 countries. In all of them, different public and private actors are involved in the production of water data, often without any coordination and harmonization. INBO tries to support these countries to pursue a more integrated approach of water management, along the principles of Integrated Water Resources Management (IWRM).

The presentation highlighted the various uses for water data in information management, including sectoral water management (e.g. drinking water supply and irrigation); integrated water sector planning (from local to transboundary level); climate change adaptation (e.g. flood management); reporting (e.g. for the SDGs) or specific decision taking (e.g. in emergency situations). Organizing the access to water data and information is, therefore, a universal challenge faced by all countries.

The realities of water management show that fragmentation at the vertical level (data produced at various organizations at the local, regional and national level) and horizontal level (different sectors such as hydropower, irrigation or water supply and sanitation) make it extremely difficult to find, access and combine existing data in order to produce useful information.

In order to address these challenges, INBO promotes a collaborative approach of data management through the establishment of networks and ensuring interoperability between different systems. INBO supports partner countries by establishing networks of data exchange between actors, developing national reference frameworks (joint methodologies), and supporting the organization of data flows between providers and users of data (which requires very case specific approaches).

The presentation then introduced the example of the iMoMo project in the Chu Talas Basin in Central Asia[2]. The river basin is shared between Kyrgyzstan (upstream) and Kazakhstan (downstream). Both countries use the basin's water resources for extensive agricultural production. Water management in the basin is characterized by lack of (real-time) data availability and absence of data exchange between the countries, both of which have contributed to increasing disputes over the shared water resources.

In a first step, INBO supported national data producers in the production and harmonization of data. Based on this work and the expressed interest of both countries to exchange hydrological data, INBO also facilitated the process of data exchange[3]. It supported the establishment of a web mapping tool for data sharing and an automatically generated hydrological bulletin for the Chu River.

The presentation finished by outlining some of the key factors of success in the project:

- The regular exchange of data and information is essential for establishing good cooperation between countries.
- Political willingness is fundamental and requires information on the return of investments of actions related to water data management.
- It is important to include data/information aspects into framework agreements and regulations related to transboundary and national water resource management.
- When developing the capacities to produce metadata, to exchange comparable data and to interconnect the partner information systems (interoperability), it is important to use a common language (concepts/referential dataset) and common procedures.
- It is important to reinforce human resources capacities in terms of data management and valorization.

In the subsequent discussion, participants inquired whether the exchange of data in the Chu Talas had actually had tangible results and led to any changes in the behaviour of key political actors. The response underlined that such changes in political behaviour require longer-term involvement and that, in the coming phases of the project, greater emphasis would be put on demonstrating the benefits of cooperation, however data exchange in Chu Talas Basin is a

[2] iMoMo is an approach that the Swiss Agency for Development and Cooperation – Global Program Water Initiatives (SDC-GPWIs) has been promoting since 2012. Also the iMoMo pilot project in the Chu Talas basin has been funded by SDC –GPWI.

[3] In 2000 both countries signed an agreement on co-financing of key infrastructures in the basin and in 2006 they created the Kyrgyz-Kazakh Interstate Commission on the Chu Talas Basin.

first relevant step forward in term of cooperation and good governance. It is therefore planned to include activities on water balancing and identifying key indicators for water saving.

The discussion then addressed the question of the (financial) sustainability of INBO activities in the Chu Talas Basin. INBO aims to ensure that data management processes are entirely implemented by national/local actors from the very beginning of a project. Moreover, the aim is to avoid the creation of additional work load and to rely on open-source systems which do not require expensive licensing.

Although the project currently focuses on water quantity data, this focus could be expanded to include water quality, if there were any need expressed by the partners. However, aspects of water quality are a sensitive issue and both countries have so far been reluctant to share such data.

It was concluded that the Chu Talas River Basin case could potentially be used as an example of good practice for data management and exchange to be included in the final report for the HLPWP.

4. Recommendations: how to overcome the challenges?

The last session aimed at identifying ideas and recommendations on how to address the deficiencies of available data/information and their use for promoting peace and security. For this purpose, participants were divided into three groups and asked to discuss the following set of questions:

1. **Innovation and technology**: How can innovations/technology be leveraged to address the challenges identified?
2. **Financing**: How can we ensure efficient and sustainable funding? What financing mechanisms can be used?
3. **Communication**: How do we get water data at the top of the national agenda? How do we translate technical outcomes in a way digestible to policy and decision makers? How should the water data message be formulated? Who needs to be part of the discussion? Who could help?

Based on the recommendations made by the different groups, **six recommendations are identified to be considered by the High-Level Panel on Water and Peace**:

1. **Existing mechanisms of water data monitoring (such as WMO's WHYCOS, UN Water's GEMI and GLAAS) should be further developed, including non-traditional data sources.**

   New technologies (such as smartphones or crowd-sourcing for example) should be explored.

2. **Avoid duplication of activities and promote synergies.**

   Coherent and long-term investment is needed regarding hydrological datasets. This long-term perspective should ensure a sustainable functioning of data platforms, regular updates and quality of data provided. Establishing a strong global data system and monitoring mechanism on the basis of work done so far would be relevant. Moreover, existing databases administered by different UN agencies could be brought together into a coherent system. In this regard, the work led by UN Water seems particularly relevant.

3. **Given the crucial importance of aquifers for water supply and the lack of related knowledge, long-term investments should focus on a better understanding of groundwater.**

   Knowledge around groundwater and aquifers representing 80 per cent of global freshwater reserves should be improved as a matter of priority.

4. **Promote interdisciplinary education and training on data**

   Interdisciplinary training should allow improving capacities to better understand and interpret technical data and to translate it for other stakeholders, including policy makers.

5. **Increase awareness of the value of data.**

   Outlining and quantifying the benefits and/or costs of inaction can support this. Good examples that outline the benefits that can be obtained from good data and data management should be communicated. "Leverage events" could also be used to demonstrate the practical importance of data: use that kind of events in order to put data on the agenda (e.g. demonstrate flood control versus impacts of flood events).

6. **It seems relevant and necessary to integrate environmental and socio-political data.**

   This integration would contribute to better understand and prevent water related conflicts. It would allow a better understanding of asymmetries among different countries and sectors of activity within river basins. Methodologies should be developed in order to develop tools that allow monitoring risks of conflicts. The idea of an early warning system could be developed as part of a research agenda.

5. Participants

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4	Mr.	Christian	Bréthaut	Geneva Water Hub / UNESCO Chair in hydropolitics
5	Mr.	Youssef	Filali-Meknassi	UNESCO
6	Mr.	Paul	Haener	International Network Basin Organizations
7	Mr.	Pierre	Lacroix	UNEP-GRID / University of Geneva
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