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COMMENTARY

Building Transboundary Water Security

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In April 2016, amid the speeches and selfies as leaders signed the Paris Climate Change Agreement, the United Nations Secretary General and World Bank President announced a high-level panel on water, co-chaired by the presidents of Mauritius and Mexico with the prime ministers of Australia, Netherlands, Bangladesh, Jordan and other leaders as members.

This is hardly the first high-level panel that has been convened to address accelerating water challenges—and for good reason. Every day, 4,000 children die due to dirty water and poor sanitation across the globe. According to the World Health Organization, at least 1.8 billion people use drinking water contaminated with feces, 1.2 billion people lack access to clean water and more than 2.4 billion people lack access to adequate sanitation.[1] This human tragedy also brings huge economic costs, which underscores why, at the 2016 Davos World Economic Forum, water was ranked as one of the most urgent threats to the global economy.

But the timing of the announcement of the high-level panel is notable. Climate change is compounding these problems. The Intergovernmental Panel on Climate Change (IPCC) has repeatedly concluded that impacts to hydrological cycles are among the most immediate impacts of climate change. Some areas are becoming more exposed to extreme events resulting in longer drought or more severe flooding, compared to historical trends.[2]

Already this year, there have been street demonstrations in India around acute water shortages. In early May, California Governor Jerry Brown signed into law permanent water rationing, as western states face their fifth year of drought. According to a UC Davis study,[3] the drought cost California about USD 2.7 billion in 2015, including 10,100 fewer seasonal agriculture jobs and 21,000 indirect jobs. These impacts are expected to grow more acute—by 2025, half of the world's population will be living in water-stressed areas.

Water-related stresses risk leading to conflicts between countries. While a state-to-state water conflict is unlikely by 2025, water in shared international basins will be used as leverage, with water flows withheld as a kind of "weapon" in state-to-state conflicts. United States security intelligence[4] has warned that, by 2040, the availability of freshwater will not keep pace with rising demand,

[1] World Health Organization. (2015, June). Drinking-water. Retrieved from http://www.who.int/mediacentre/factsheets/fs391/en/

[2] See for example: http://www.ipcc.ch/ipccreports/tar/wg2/index.php?idp=164; http://ipcc.ch/pdf/technical-papers/climate-change-water-en.pdf; https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter13_FINAL.pdf

[3] Howitt, R., MacEwan, D., Medellín-Azuara, J., Lund, J., Sumner, D. (2015, August). *Economic analysis of the 2015 drought for California agriculture*. UC Davis Center for Watershed Sciences, ERA Economics, UC Agricultural Issues Center. Retrieved from https://watershed.ucdavis.edu/files/biblio/Final_Drought%20Report_08182015_Full_Report_WithAppendices.pdf

[4] Office of the Director of National Intelligence. (2012, February). *Global water security: US Intelligence community assessment*. ICA 2012-08. Retrieved from https://www.dni.gov/files/documents/Special%20Report_ICA%20Global%20Water%20Security.pdf

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putting at risk both food and energy security. The potential flashpoints include North Africa, the Middle East and South Asia.

In responding to these risks, the first focus should be on shared international water basins. Nearly 800 million people in 40 countries receive most of their daily water supplies from sources outside of their borders. Several countries—notably, Egypt, Pakistan, Bangladesh, Niger and others—receive more than 75 per cent of their water from sources outside their borders.[5] Worldwide, there are roughly 275 international or transboundary river basins, as well as some 300 major transboundary underground aquifers. Together, these supply the daily water needs of one third of the world's population.[6] In Africa, more than 90 per cent of all surface water comprises transboundary river basins. For example, the wider Congo basin is shared by 13 countries,[7] while the Zambezi River is shared by nine countries[8] and 11 countries share the Nile and Niger rivers.

Transboundary Approaches to Water Management

Transboundary watershed management has evolved over time, and each situation is unique so that solutions are best crafted from the basin up, not top-down. However, there are some agreed-upon approaches based on hard-earned lessons.

We know, for example, that legislation and treaties covering shared water basins have been instrumental in avoiding conflicts. Between 1820 and 2007, states have signed on to almost 450 agreements on international waters.[9] These agreements have evolved from the simple premise that political jurisdictions fail to mirror actual water basins, and hence legal instruments—like the eight-country Amazon Basin Cooperation Agreement or the Canada-US International Joint Commission—are necessary for effective water management and avoidance of conflict.

A key complement to transboundary treaties and legislation is physical analyses of the basins, land and water, and what these mean for the different countries. One example of such technical analyses is the transboundary diagnostics analysis (TDA), an essential part of the Global Environment Facility (GEF) international waters projects. The TDA provides all parties with a common science-based assessment of transboundary water issues, from the sources and consequences of upstream pollution to the impacts of climate change of hydrological cycles.[10]

Building on the science foundation, the Stockholm International Water Institute and others have focused on what is called a basket of benefits that can be gained from cooperation, as opposed to competition and conflict.[11]

Towards a New Generation of Transboundary Cooperation

A new generation of transboundary agreements is emerging that aim to integrate wider freshwater benefits, notably ecosystem functions. One of the most recent agreements involves one of the largest freshwater basins on the planet: the wider Mackenzie River basin. The Mackenzie River Basin Transboundary Waters Master Agreement (the Master agreement) was agreed among the governments of Alberta, Saskatchewan, British Columbia, Yukon Territory, Northwest Territories (NWT) and Canada. In addition, bilateral agreements have been negotiated, in which "both sides share their interests and work towards an agreement that satisfies common interests and balances opposing interests."[12] NWT and Yukon Territory signed the first bilateral water management agreement in 2002, and in 2015 NWT and Alberta, and NWT and British Columbia signed bilateral

[5] United Nations Development Programme. (2006). *Human Development Report 2006. Beyond scarcity: Power, poverty and the global water crisis*. Retrieved from http://www.undp.org/content/dam/undp/library/corporate/HDR/2006%20Global%20HDR/HDR-2006-Beyond%20scarcity-Power-poverty-and-the-global-water-crisis.pdf

[6] FAO Aquastat

[7] Angola, Burundi, Cameroon, Central African Republic, Congo, Democratic Republic of the Congo, Gabon, Malawi, Rwanda, Sudan, Uganda and Zambia

[8] Angola, Botswana, Democratic Republic of the Congo, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe.

[9] UN-Water. (2013). Transboundary Waters Infographic. Retrieved from http://www.unwater.org/fileadmin/user_upload/unwater_new/docs/transboundary_waters.pdf

[10] Lederman, C. (2010). *Transboundary diagnostic analysis*. Retrieved from http://iwlearn.net/publications/TDA

[11] Phillips, D.J.H., Allan, J.A., Claassen, M., Granit, J., Jägerskog, A., Kistin, E., Patrick, M., and Turton, A. (2008.) *The TWO analysis: Introducing a methodology for the transboundary waters opportunity analysis*. Report 23. Stockholm: SIWI.

[12] NWT Water Stewardship Projects. (n.d.). Transboundary water agreements. Retrieved from http://www.nwtwaterstewardship.ca/transboundary

water management agreements. There are also plans to negotiate bilateral water management agreements between NWT and Saskatchewan, and NWT and Nunavut.

Given the scale and multi-jurisdictional aspects of the river basin, these agreements are in many ways analogous to other international transboundary agreements. It has become more urgent to finalize the remaining bilateral agreements—and move towards full implementation of the agreements—due to increased upstream development, notably oil sands development in Northern Alberta as well as mining.

The NWT-Alberta and NWT-British Columbia agreements are historic in at least three ways:

> (1) Aboriginal and community representatives were full partners in negotiations from the beginning, resulting in recognizing, for example, the central importance of traditional knowledge in understanding the wider basin.
>
> (2) The agreements begin by recognizing the ecological integrity of that aquatic ecosystem.
>
> (3) It introduces water management practices that use water resources in a sustainable manner for present and future generations. It is supported by an ongoing, risk-based evaluation process that examines, for example, proposed new development activities that could affect the basin or its ecological integrity.

The Master agreement also establishes a Mackenzie River Basin Board to encourage ongoing assessment of water issues and promote sustainable water use.

Measuring Water-Related Ecological Integrity

IISD's work on transboundary basins is focused on two areas. The first is to create a common, robust and transparent scientific monitoring and assessment platform that tracks basin-wide hydrological and water quality trends against baseline information. The second is to identify ecosystem benefits (or interests) and ensure that these are kept front and centre in developing management options through reporting and engagement of stakeholders.

IISD's monitoring and research activities at the IISD Experimental Lakes Area, a research facility in the boreal eco-zone of Canada, demonstrates the importance and utility of watershed-level research and monitoring. Its work has been highly influential in the development of bi-national consensus and agreements (e.g., the Great Lakes Water Quality Agreement) over a number of contentious problems, such algal blooms, acid rain and mercury emissions, because of a strong watershed-level scientific approach linking cause and effect (i.e., science-based diagnostics). The research also identifies how management action would provide direct and indirect benefits to stakeholders.

While this science-based water-monitoring work is central, it is no longer enough: as the McKenzie River basin agreements underscore, broader approaches are necessary, from the inclusion of traditional knowledge at the outset of monitoring efforts, to creating common baselines to measure broader ecosystems.

One challenge is how to frame these values in a way that makes sense for policy-makers. Providing economic implications of watershed management, both in terms of financial risks averted and environmental benefits monetized, can often help make clear decisions.

In a review of seven transboundary basins across the world, (Roy et al. 2011) IISD underscored the benefit of taking into account water system uses that extend beyond traditional navigational or hydropower assessments, and move to incorporate multiple benefits, from carbon sequestration to forestry and wider ecosystem services. For example, basin-wide approaches have included measuring the role of forests in the Amazon basin in maintaining water flows, given how forests affect regional rainfall patterns. Similarly, downstream ecosystems of the Mekong basin, which are rich in biodiversity, have been designated as a UNESCO biosphere reserve. By measuring the values of these systems, new incentives can be crafted with communities to take into account wider upstream and downstream ecosystem benefits that have tangible economic values.

The Need to Mainstream Gender Analysis

Water assessments cannot be realistic without the gender perspective: gender analysis is essential to understanding the provision, management and conservation of the world's water resources.[13] Investing in gender mainstreaming in water programs is well justified, given that women are primary stakeholders in the water and sanitation sectors. Through reliable data, women's and girls' lives can become visible and counted.

UNESCO's Word Water Assessment Programme (WWAP)[14] is on the frontline in accomplishing this global monitoring challenge. It has defined a methodology for the collection of sex-disaggregated data, and a set of indicators to measure and monitor how women and men are contributing to water resource management.

Conclusion—Integration at the Center of the SDGs

With the universal adoption of the Sustainable Development Goals (SDGs), the need for comprehensive, integrated approaches is the challenge moving forward. For 20 years, approaches to integrated water resource management have been launched and then stranded within pre-existing silos. Now the integrated nature of the SDGs, their connections and interdependencies, requires us to take action in this direction.

Decisions will have to be taken under the uncertainty of a changing climate and through a complex grid of connected dots, each of them with facets of the economic, social and environmental dimensions. Challenges will include creating effective governmental and inter-sectoral mechanisms and consultation platforms, minimizing negative impacts resulting from target conflicts, establishing priority scales and, finally, balancing the multiple uses of water by addressing the conflicts at the nexus among water and food, energy and ecosystems.

[13] Seager, J. (2015). *Sex-disaggregated Indicators for water assessment, monitoring and reporting*. Gender and Water Series. WWAP. Paris: UNESCO. Retrieved from http://unesdoc.unesco.org/images/0023/002340/234082e.pdf
[14] www.unesco.org/water/wwap/

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