



Hydropolitics: Transboundary River Basins and Political Tensions

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Note: *This contribution is a shorter version of the article “Assessment of Transboundary River Basins for Potential Hydro-political Tensions” by De Stefano et al. 2017.*

The impacts of new dams and diversions are felt across borders, and the development of new water infrastructure can increase political tensions in transboundary river basins. International water treaties and river basin organizations serve as a framework to potentially deescalate hydro-political tensions across borders.

The availability of freshwater in the right quantity and quality at the right times for dependent systems is required for human security, environmental security, and economic growth. As populations and economies have grown, water has become scarcer and more variable in certain locations, leading to concerns over how water may lead to conflict. Though violent conflicts over water occur more often at the local level, disputes over water are also possible at the international level, particularly as impacts of water use spill across international borders.

Dams and other water infrastructure help manage water variability—providing water in times of drought and dampening the effects of floods. With these benefits come ecological impacts as large-scale water infrastructure effects the hydrologic function of the basin in which they are built. This includes altering the timing and/or magnitude of flows, altering aquatic migratory patterns, and

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preventing sediments from moving downstream. Thus, the construction of large-scale water infrastructure such as dams and water diversions can become significant sources of tension between countries sharing a river basin.

The significance of new dams and water diversions is increasing across the world as many countries have begun construction on large infrastructure projects in internationally shared river basins. This is evident in places such as the Nile Basin, where the Ethiopian government's construction of the Grand Ethiopian Renaissance Dam has been occurring without an agreement with downstream Egypt, and the news of its construction has been met with [violent protests and strong rhetoric](#) from Egyptian politicians. Water diversions are not the only factor potentially creating tension between countries over shared waters. Other factors including high population growth, urbanization, increasing water pollution, over-abstraction of groundwater, climate change and water-related disasters [can contribute to tensions](#).

Building institutional capacity (treaties and river basin organizations) is a crucial factor in decreasing the likelihood of conflict over shared waters – particularly if the agreements contain mechanisms that reduce uncertainty *and* increase flexibility in water management. [Past research](#) suggests that a basin will be more resilient to conflict if a basin has international mechanisms able to manage effects of rapid or extreme physical or institutional change. However, the mere presence of institutions does not necessarily indicate that a basin is resilient, nor does it indicate that water-related conflict will be absent.

Countries can exploit treaties since they are not easily enforceable. Treaties can also be structured in a way that exploits (or worsens) already-existing inequities between countries. Treaties can not only solidify power imbalances,

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but can also lock out public participation or even become a source of conflict themselves. This can lead to a lack of participating by some countries.

Previous studies in analyzing potential future conflict in river basins at a global scale have identified basins at future risk through predictive and forecasting methods, treaty analysis, and climate change. [Our recent study](#) aims to contribute to those types of analyses through examining multiple issues – stressors on political relationships due to the development of dams and water diversions, how treaties/river basin organizations can mitigate these stresses, and external socio-environmental factors that could exacerbate these tensions in the near future. We integrate these multi-faceted data to map the risk of potential tensions regarding water and politics in transboundary basins across the globe.

Findings

We found several basins to be vulnerable to tensions over water, particularly in Southeast Asia, South Asia, Central America, the northern part of the South American continent, the southern Balkans as well as different parts of Africa (Table 1). New dams and diversions is ongoing or planned in at least 57 basins worldwide. The new dams are highly concentrated in very few geographic areas, including regions in Nepal, Brazil, and India. Most international river basins were found to have a moderate risk of tensions over water (see Figure 1). Twenty-two basins were classified as having a very high risk, and 14 basins were classified as having a high risk of tensions. Many basins of higher risk are concentrated in Sub-Saharan Africa and in Central and Southeast Asia. These basins at higher risk are experiencing a combination of factors lending them vulnerable to conflict, including high rates of dam development, limited, weak,

or nonexistent treaty coverage, high water variability, and low gross national income per capita.

| Basin | Riparian Countries | Continent |
|---------------|---|------------------|
| Bei Jiang/Hsi | China, Vietnam | Asia |
| Benito/Ntem | Cameroon, Gabon, Equatorial Guinea | Africa |
| Ca/Song-Koi | Laos, Vietnam | Asia |
| Chiriqui | Costa Rica, Panama | North America |
| Drin | Albania, Macedonia, Montenegro, Serbia | Europe |
| Irrawaddy | China, India, Myanmar | Asia |
| Krka | Bosnia and Herzegovina, Croatia | Europe |
| Lake Turkana | Ethiopia, Kenya, South Sudan, Uganda | Africa |
| Ma | Laos, Vietnam | Asia |

| | | |
|---------------|--|---------------|
| Mira | Colombia, Ecuador | South America |
| Mono | Benin, Togo | Africa |
| Neretva | Bosnia-Herzegovina, Croatia | Europe |
| Ogooue | Cameroon, Congo, Gabon, Equatorial Guinea | Africa |
| Red/Song Hong | China, Laos, Vietnam | Asia |
| Sabi | Mozambique, Zimbabwe | Africa |
| Saigon | Cambodia, Vietnam | Asia |
| Salween | China, Myanmar, Thailand | Asia |
| Sanaga | Central African Republic, Cameroon, Nigeria | Africa |
| San Juan | Costa Rica, Nicaragua | North America |
| Tarim | Afghanistan, China, Kazakhstan, Kyrgyzstan, Turkmenistan, disputed territories | Asia |

| | | |
|---------|--|--------|
| Thukela | Lesotho, South Africa | Africa |
| Vardar | Bulgaria, Greece, Macedonia, Serbia | Europe |

Table 1. Basins at very high risk of political tension.

Figure 1. Number of Basin Country Units (a portion of a riparian country's land area that is within a certain transboundary river basin) experiencing varying levels of hydropolitical tension and exacerbating factors.

Concluding remarks

The indicator-based analysis (Figure 1) uses a combination of environmental, political, and economic metrics, including high or increased climate-driven water variability, presence of armed conflicts, and low gross national income per capita, to identify vulnerability and resilience to tensions brought forth by water resources development in international watersheds at a global scale. The development of new dams and water diversions is very unevenly distributed.

Certain basins will be much more impacted than others. Most of the new water infrastructure is in upstream portions of river basins, with many dams being built in emerging or developing economies that require increased hydropower and water regulation to sustain their economic development. Many of these areas still lack well-developed instruments and institutions that would contribute towards transboundary cooperation.

The ability to understand when (and where) these variables combine to potentially create conflict is critical to managing and transforming future

conflict in transboundary basins. Understanding where conflict might occur can contribute towards guiding policy interventions, focusing capacity-building efforts where needed, and actualizing worldwide initiatives of integrated water resources management. This includes achieving the United Nations' Sustainable Development Goal Target 6.5 ("By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.").

Image credit: [Mustadeq Sadeq/Wikimedia](#).

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