Assessment of Transboundary Basins for Potential Hydro-political Tensions

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The problem: Formal arrangements governing transboundary river basins, in the form of international water treaties and river basin organizations, can be particularly instrumental in managing disputes among fellow riparians arising from the development of new water infrastructure. Moreover, the analysis of the history of past conflict and cooperation over water in transboundary basins suggests that some political, socioeconomic and physical circumstances could act as exacerbating factors and increase the risk of hydro-political tensions due to basin development in absence of institutional capacity. We present an integrated global-scale assessment of transboundary watersheds to identify regions more likely to experience hydro-political tensions over the next decade and beyond based upon environmental, political, and economic indicators.

Our Approach: Our study first maps the risk of potential hydro-political tensions that exists when basins may be ill-equipped to deal with transboundary disputes associated to the development of new water infrastructure. The calculation of the indicator is based on the estimation of the level of formal institutional capacity expressed by the presence or absence of relevant treaty provisions and river basins organizations, juxtaposed with the respective basin’s ongoing and planned development of water infrastructure in transboundary basins (Figure 1).

On a second stage, we consider also several factors that could exacerbate those hydropolitical tensions in the near future, including changes in terrestrial water storage obtained from NASA’s Gravity Recovery and Climate Experiment (GRACE) measurements, projected changes in water variability due to climate change, per capita gross national income, domestic and international armed conflicts, and recent history of disputes over transboundary waters (Figure 2).
The construction of new water-related infrastructure is on-going or planned in many basins worldwide. New water infrastructure is foreseen also in areas where instruments of international cooperation are still absent or limited in scope, e.g. in Southeast Asia, South Asia, Central America, the northern part of the South American continent, the southern Balkans as well as in different parts of Africa. Moreover, in Central and Eastern Africa, the Middle East, and Central, South and South-East Asia there is a concomitance of several political, environmental and socioeconomic factors that could exacerbate hydropolitical tensions. Our analysis integrates political, economic and environmental metrics and is part of the River Basins component of the United Nation’s Transboundary Waters Assessment Programme (TWAP, http://twap-rivers.org/).

Figure 2 – Relative risk of hydropolitical tensions exacerbated by socioeconomic, political and environmental factors.