Global threats to human water security and river biodiversity

Freshwater resources of the planet are more and more stressed by human activities, and human-induced climate change will further worsen water security at all levels. The article “Global threats to human water security and river biodiversity” by C. J. Vörösmarty, et al., recently published in Nature, brings for the first time a global analysis of water security both from human and biodiversity perspectives simultaneously utilising a spatial accounting framework...

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A suite of 23 different stressors, expressed as 23 geospatial drivers organized under four themes (catchment disturbance, pollution, water resources development and biotic factors), using relative weights, provided the basis to derive cumulative threat indices that can be displayed by maps of incident threats to human water security and to biodiversity.

The authors found that nearly 80% of the world’s population is exposed to high levels of threat to water security. They showed on a global scale that water security increases with higher gross domestic product as do threats to biodiversity. Massive investment in water technology enables rich nations to offset high stressor levels by treating symptoms of their underlying causes, while less wealthy nations remain more vulnerable to the stresses. Lack of similar precautionary investment in biodiversity resulted in classification that habitats associated with 65% of continental discharge are moderately to highly threaten.

This paper also demonstrated the controlling role of hydrology in determining the spatial distribution of environmental impacts. The work presented in this article contributed to our understanding of links between biodiversity and human well being and of importance of biodiversity for the provision of many ecological services. The authors also underscore that water infrastructure can cause serious degradation of freshwater biological diversity - the quiet crisis that seems to be ignored.

The GEF supported some pilot analytical work in a few targeted basins described in the article, e.g. the Nile basin presented in the paper and worked with authors to discuss concepts useful in the analyses. The lead author, Dr. Vörösmarty is currently taking part in a GEF funded project for designing a global transboundary waters assessment programme. The project is developing the algorithms, datasets, gaps needing to be filled, and methodologies to conduct a defensible baseline assessment for not only the 273 transboundary surface basins on the planet but also almost 300 transboundary groundwater aquifers, 64 shared Large Marine Ecosystems, and all of the world's open oceans.

Application of this methodology would provide GEF with a real understanding of water status and recent as well as future threats to the individual 273 shared rivers basins on our planet. A consortium of organizations and UN agencies with access to other data and a wide range of analytical capabilities is needed to conduct the first comprehensive assessment of all transboundary water basins on our planet.

The article brought out very serious water implications for developed and developing world based on generous assumptions. Authors highlighted the real challenge for GEF in International Waters - the analyses have to be at different scales among multiple stressors in transboundary basins in order to get to the root cause of the problem instead of treating the symptoms the way rich countries do.

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