The value of cooperation for sustainable development in transboundary river basins

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Can cooperation across sectors and countries help to achieve sustainable

development? How do stakeholders in the Indus and Zambezi basins envision the future and how can they make that future a reality? IIASA researchers looked into these questions as part of a large-scale initiative with international partners.

In November 2016, IIASA partnered with the Global Environment Facility (GEF), and the United Nations Industrial Development Organization (UNIDO) to establish the Integrated Solutions for Water, Energy, and Land (ISWEL) project. The overarching goal was to develop tools and build capacity to support the sustainable management of water, energy, and land by means of a truly integrated nexus approach. Although the project took a global approach, it specifically looked into two large transboundary basins facing multiple developments and environmental challenges: The Zambezi and the Indus.

"Development challenges in transboundary river basins are by nature more complex due to the different or even conflicting development requirements among the different sectors and countries. The ISWEL project provided a systematic view and potential solutions to support these regions in sustainable and cooperative development," explains Ting Tang, a researcher with the IIASA Water Security Research Group in the Biodiversity and Natural Resources Program who was actively involved with the project.

While a lot of research has been done to address sectoral challenges, until now there was limited understanding on how, for instance, future energy and food development plans could impact water resources in transboundary basins like the Indus and the Zambezi, or how these sectoral development plans could end up competing for the same scarce water resources. A unique feature of the work done under the auspices of the ISWEL project was that it endeavored to bring together different types of knowledge to create research and recommendations that is fit for purpose. In this regard, the team used advanced, state of the art

modeling tools in combination with participatory approaches to discern the type of questions that are most relevant to each region, while also integrating local knowledge and expertise. Overall, the project demonstrated that cooperation is the most cost-effective pathway to materialize sustainable development and that the interest and desire of stakeholders to collaborate can overcome existing barriers, whether these are political or of any other nature.

Looking at the Indus Basin specifically, the researchers found that in the absence of ambitious investments, future water demand will exceed the available water resources by 2050 and put the system at risk of collapse. Joint water, food, and energy investments can however help to meet the basin's sustainable development agenda by 2050 without increasing water demand. Pursuing a sustainable development pathway in the region, will require significant annual investments up to 2050, which would be 13% more than what would be required for continuing along a business-as-usual pathway. Importantly, overall investment costs could be reduced by up to 9% if riparian countries decided to cooperate and develop joint sustainable investments through strategies like the promotion of internal trade and the allocation of energy and food production to the regions with the largest comparative advantages. These strategies will not only reduce the financial burden on participating Indus Basin countries, but will also deliver the greatest social and environmental benefits.

In the Zambezi Basin, population growth and socioeconomic development will similarly increase demand for water, food, and energy, thus putting pressure on the region's natural resources. Because demands are highly concentrated in middle and downstream areas, the development pathway riparian countries decide to follow could cause water stress and competition for available water resources. In this regard, sectoral and transboundary cooperation between basin countries, coupled with innovation can help manage water-energy-land tradeoffs and

support sustainable development. The researchers further point out that the most effective means of increasing agricultural productivity and lifting farmers out of poverty should include a combination of irrigation investments, supporting programs to reduce the cost of farm inputs and increased crop diversification, as well as promoting wider access to local and international markets. In addition, investments in hydropower and irrigation will deliver positive returns, but the development of the Zambezi basin will also rely on ambitious investments in access to piped drinking water and sanitation. As in the case of the Indus Basin, the project's findings show that investing in a sustainable development pathway will not compromise economic returns but will instead deliver large social and environmental benefits.

"Few initiatives I have participated in have included multi-sectoral and transboundary approaches with such detail and with such a high level of stakeholder cooperation as the ISWEL project," notes Edward Byers, a researcher with the Integrated Assessment and Climate Change Research Group in the Energy, Climate, and Environment Program. "The tools and results we developed should bring enhanced understanding to transboundary resource management and highlight the importance of long term sustainable planning informed by good science."

"The size and the complexity of development challenges throughout the world is increasing and we need to move away from silo approaches and start looking at the problems from a systems perspective, integrating knowledge and priorities from different sectors, actors, and countries to find joint and sustainable pathways. This project partly fulfilled some of these needs by developing tools that can support finding solutions to complex problems while at the same time supporting the development of local capacities in those regions that are in dire need of expanding such integrated approaches," concludes ISWEL Project Manager Barbara Willaarts, who was involved in the development and implementation of the project's stakeholder engagement strategy.

The ISWEL project concluded in December 2020, and has resulted in a rich body of research and insights that have been published in numerous journals over the last few years. In addition, the project's outputs include visualization tools such as the ISWEL Nexus Basins Scenario Explorer, which facilitates understanding of the economic, societal and environmental implications of different development pathways in the two basins; the Global Hotspots Explorer, which can be used to identify multisectoral risks and populations' exposure under different global warming scenarios; as well as guidelines for researchers and practitioners on the co-development of sustainability pathways. The team's recommendations for stakeholders and policymakers have now also been summarized in easy to use policy briefs respectively focusing on the Zambezi and the Indus Basins.

More information: Cooperation and joint investments are key to sustainable development in the Indus basin: iiasa.ac.at/web/home/resources … licyBriefs/pb28.html

Sustainable development pathways to water, food, and energy security in the Zambezi basin: iiasa.ac.at/web/home/resources … licyBriefs/pb27.html

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