

Introduction: Water and Security in Central Asia—Solving a Rubik’s Cube

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Examining the water and security linkages in Central Asia can feel a bit like trying to solve a Rubik’s Cube. As with the cube’s six faces, each covered by nine stickers of six different colours, the mosaic formed by the components of water and security in Central Asia can seem difficult to solve at a first glance. With a Rubik’s Cube, moving one face can easily bring disorder to all the other faces; just when you thought you were getting one face in order, you discover another face in disorder. In the case of water and security in Central Asia, there are many “faces”, including not only the Central Asian states but also the neighbouring countries, the US, China, and the EU; “stickers” such as policies, practices, causes, and impacts; and “colours” such as the different stakeholders, ranging from the micro and meso levels to the macro level. Understanding all these, or getting clarity on the nexus, can seem extremely challenging.

The Rubik’s Cube usually starts to find structure, and the different pieces find their places, when the solver adopts a systematic approach. Still, solving the whole cube takes time and perseverance. This is also the case with water and security in Central Asia, as demonstrated by the articles in this special issue. Even though none of the papers alone answers the question of what constitutes water and security in Central Asia, each of them gives thoughtful ideas and information on the complexity of the issue.

This special issue consists of 10 articles. The first five papers examine water and security in Central Asia from a macro-level perspective. Water and security are examined in relation to energy, food security, vulnerability, virtual water flows, and water-related agreements. This diversity of study angles demonstrates the vast number of variables and issues that can be understood as parts of water and security in Central Asia. For example, security can be understood as a purely politico-military issue or as the security of the supply of natural resources—or, as in many cases, a combination of both. The last five papers examine water and security from a meso- or micro-level perspective, including case studies from the Ferghana Valley, the Zerafshan River basin, the Aral Sea basin, the Ili River, and the Chu and Talas Rivers. These cases show that even though collaboration in

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Central Asia as a region has room for improvement, fruitful collaboration takes place at the smaller scales, often crossing national boundaries.

Stucki and Sojamo (2012) point out that Central Asia is relatively secure with respect to water and energy if one looks only at quantities of natural resources. Insecurity in the region's water and energy nexus is brought by factors related to institutional setting and the complex global political economy context.

Granit *et al.* (2012) examine water and energy resources from the food security perspective and conclude that there are major opportunities and demand in the region for the formation of a regional regime that can address cooperation coherently.

Varis and Kumm (2012) calculate a "river basin vulnerability index" for 6 major Central Asian river basins and compare these with 10 major river basins in Asia-Pacific. The authors reveal that in addition to the well-known Aral Sea catastrophe, several other basins in the Asia-Pacific are facing equal or more severe threats.

The concept of virtual water is questioned in today's research literature. Yet, it is still relatively widely applied when examining water resources in the global context because it allows taking into account water included in imported and exported products. Porkka *et al.* (2012) calculate the impact of virtual water trade on water scarcity in Central Asia and conclude that the problem in the region is not the quantity of water available but its uneven distribution and excessive local use. Those areas that are currently using too much of their water resources are also exporting large amounts of virtual water.

The macro-level paper by Rahaman (2012) examines the region's water management framework from a legal perspective. The author reveals that many of the regional agreements incorporate internationally recognized transboundary water resource management principles, but that there is room for improvement in many fronts, such as including Afghanistan as a party to these agreements and in other regional organizations.

Olsson *et al.* (2012) examine water quantity and quality issues within the Zerafshan basin that is shared by Tajikistan and Uzbekistan. The point of departure is the situation in which the upstream riparian (Tajikistan) can be considered a late developer of the river, while the downstream riparian (Uzbekistan) is an early developer. As the basin is already closed, any development of the river in Tajikistan will influence Uzbekistan, but not the other way round. This asymmetry brings challenges to the applicability of policy instruments such as the international water conventions, as this analysis clearly shows.

The paper by Yakubov (2012) finds that there are currently multiple approaches and modalities informing water (and especially irrigation-related) policies in most Central Asian countries. This has led to fragmented reform efforts and a lack of clarity on what works and what does not. Therefore, the author proposes a systematic categorization and sector-wide analysis of existing approaches to guide further policy making.

In Central Asia, administrative boundaries became national boundaries after the collapse of the Soviet Union. As a result, irrigation infrastructure historically built within one country became transboundary. Wegerich *et al.* (2012b) analyze cooperation at the province and district levels in the Ferghana Valley, which is shared by Kyrgyzstan, Tajikistan, and Uzbekistan. The authors conclude that despite the national borders, cooperation has to continue because of the existing water and electricity infrastructure which cuts across districts and provinces.

Wegerich *et al.* (2012a) also concentrate on the Ferghana Valley. In this paper, the authors question whether it is possible to introduce hydrological boundary management in the case of indigenously constructed (informal) irrigation systems. The conclusion is that a

careful assessment has to be made as to whether implementation according to hydrological boundary management is possible or even useful.

Libert and Lipponen (2012) summarize the findings of the regional assessment under the United Nations Economic Commission for Europe Water Convention, concluding that transboundary water cooperation in the region is difficult but that the balance between the use of water for hydropower and for irrigation leaves room for constructive collaboration. The paper goes further by presenting five case studies where grounds for transboundary collaboration are being built in practice.

Many of the papers in this special issue attempt to increase understanding of the nexus formed by water, energy, food, security, and vulnerability. Some of the papers conclude, however, that these issues are complex and that keeping track of the multiple connections and cause-effect relationships requires computerized approaches. Many of the papers call for more research and a systematized approach. All of the papers also provide recommendations for future research. Therefore, we believe that our Rubik's Cube is not yet solved. As with the Rubik's Cube, where there is no single solution, we believe that there are various ways to interpret and understand water and security interrelations in Central Asia. This heterogeneity is reflected in this special issue's papers, which were written by authors from a variety of disciplines and institutional backgrounds and which call on micro-, meso-, and macro-level approaches.

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