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The Wicked Problem of Dam Governance in Central Asia: Current Trade-Offs, Future Challenges, Prospects for Cooperation

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Abstract

The opposing interests between riparian states, the geopolitical significance of the region, and the uncertainty about future developments turn transboundary water governance in Central Asia into a 'wicked problem'. The issue of dam construction plays an important role in this discussion, which revolves around the water-energy-food nexus. In the Aral Sea basin, downstream countries depend heavily on upstream countries for irrigated agriculture, and are weary of upstream countries' plans for hydropower development. Considerable challenges lie ahead in terms of climate change, increasing water demand and geopolitical developments. Despite the wicked governance issue in Central Asia, there are prospects for future cooperation. This article identifies the prospects.

Keywords: Central Asia; dams; governance; trade-offs; cooperation; transboundary; water.

1. Introduction

For the last decades, water management is considered as a source of conflict in Central Asia. Five independent Central Asian republics (Uzbekistan, Kazakhstan, Turkmenistan, Tajikistan and Kyrgyzstan) are located in the Aral Sea basin, fed by the two large transboundary rivers of Central Asia, the Amudarya and Syrdarya. Historically these rivers formed one of the largest and oldest irrigated areas in the world (O'Hara, 2000), home to "highly developed cultures as well as extensive and sophisticated water exploitation over millennia" (Varis & Kummu, 2012).

Dams in the region play an important role in regulating the flow of transboundary watercourses. Economic development of the countries is linked to the dams. Generally, the arguments for the construction of large dams revolve around the need to develop regional cooperation, create additional jobs, expand industrial activity or enlarge export

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capability. Irrigated agriculture and hydro-energy are two critical sectors linked to dams in the case of Central Asia. They are vital for the national economies. The water management infrastructure of Central Asia consists of many reservoirs, dams, irrigation systems, pumping stations and canals, most of them dating from Soviet times, including the highest dam in the world, the Nurek Dam, and one of the longest canals in the world, the Karakum Canal.

The planning, construction and operation of dams takes place within a complex decision-making setting, involving national interests, bilateral relations, international law and geopolitical struggles – a phenomenon we will refer to as dam governance. Dam governance is emerging as a new study area related to water governance and the governance of large infrastructure (Slinger et al., 2011). Dam governance in Central Asia faces the challenge that water management infrastructure has been constructed and operated with the aim of optimizing regional water management and economic activities during Soviet times. After the collapse of the Soviet Union, different parts of this integrated water management infrastructure ended up under the jurisdiction of different independent Central Asian states. Dam governance in Central Asia is therefore to a large extent a matter of transboundary water governance.

2. Historical background

During the Soviet Union time most of the hydro-infrastructure of the Aral basin (Amudarya and Syrdarya rivers) was governed from Moscow by one centralized administration. Economic and natural resources were allocated among republics with subsidies for fixed costs from the central authority (Libert & Lipponen, 2012; Rahaman, 2012a; Zakhirova, 2013). Infrastructure in the upstream Soviet republics was designed for expanding irrigation land primarily for cotton production in the downstream countries, while the fossil fuel rich downstream republics could provide energy to the upstream republics who lack such resources. The regional water resources were not allocated equally among the republics but there was a benefit-sharing agreement involving the exchange of energy, water and food products (Olsson, Wegerich, & Kabilov, 2012).

The collapse of the Soviet Union led to the gradual rupture of previously established economic, energy and administrative linkages. Initially, for just one year after independence in 1992 all Central Asian countries signed the key multilateral Agreement on Cooperation in Joint Management, Use and Protection of Water resources of Interstate Sources in Alma-Ata (Kushkumbayev & Kushkumbayeva, 2013). This water sharing agreement has been characterized by (Chan, 2010) as a "framework without content" and an "agreement only on paper" based on the soviet system allocation and distribution principles. This soft law document issued by the heads of the Central Asian states enjoys high political significance but lacks legal force (Janusz-Pawletta, 2015). Only in 1998, bilateral and trilateral agreements were signed to set up "water-energy" regulation, particularly focusing on dams as a water control infrastructure, but those also have been only partly implemented (Wegerich 2011). This paper analyses the current state of transboundary water governance through the lens

of governance, an issue that is hotly debated on the agendas of riparian countries in the Aral Sea basin. Based on a review of the available literature on the topic, we identified three key topics to be explored: current trade-offs, future challenges and prospects for cooperation.

3. Current trade-offs in the wicked problem of dam governance in Central Asia

To understand why issues of collaborative governance in Central Asia does not get resolved despite their strategic importance to the involved countries, and despite repeated attempts and external support for doing so, the concept of wicked problems (Churchmen, 1967; Rittel & Webber, 1973) is useful. Wicked problems are 'a class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision-makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing'(Churchmen, 1967). Because they can be understood from many angles and explained in many ways, there is no definitive formulation of a wicked problem. The involved actors often disagree strongly about the formulation of the problem. Wicked problems typically have a history of failed attempts to address the problem, and today's solutions have a tendency to become tomorrow's problems. Every wicked problem is essentially unique, and every attempt at solving the problem becomes part of the context and history of the problem. By definition, wicked problems cannot be solved finally, but they need to be addressed continuously and carefully, while paying attention to unintended effects and new developments. Dam governance in Central Asia exhibits many characteristics of wicked problems. The complexity of the problem, the historical precedents, the conflict potential, the geopolitical significance of the region, and the numerous trade-offs involved make it very difficult to imagine a comprehensive solution that is acceptable for the key actors.

A salient characteristic of the dam governance situation in Central Asia is that political boundaries do not coincide with hydrological boundaries, because the catchments of the major rivers Syrdarya and Amudarya spread out over all five Central Asian republics. Transboundary water resources are a potential source of friction and conflict among riparian states (Rahaman, 2012b). Transboundary water governance "creates intricate diplomatic challenges linking states in asymmetric upstream/downstream relationships, at a time when pressures on the world's water supplies are increasing substantially" (Conca, Wu, & Mei, 2006). At the same time transboundary water governance creates opportunities for cooperation, mutual gains or mechanisms for dispute resolution.

Dams are of strategic importance to the involved countries, albeit for different reasons. Upstream countries such as Kyrgyzstan and Tajikistan have pressing energy needs, particularly in wintertime, but lack fossil fuel resources. They have a high interest in operating and constructing dams for hydropower purposes. Downstream countries like Uzbekistan argue that dam construction and operation might affect their available seasonal water negatively and might lead to unilateral control over water resources. The dam projects have also been criticized on social and environmental grounds, although their impact varies considerably depending on their size and location.

The large-scale ageing dams have been operated for more than 40-50 years (Dukhovny & Sokolov, 2003) and their hydropower operation regime affects downstream countries. While upstream hydropower operations do not reduce the total water availability for the downstream countries, the seasonal water availability has been affected. The most pressing energy needs of the upstream countries occur during the cold Central Asian winters, while the downstream countries need irrigation water during the hot and dry summers. The release of water during the non-vegetation period in winter has caused flooding of the Arnasay depression of Syrdarya river in Uzbekistan and the region of Kyzyl Orda in Kazakhstan (Mueller et al., 2014), and problems have worsened because of a reduction of funding for operation and maintenance (Wegerich, 2011).

The Rogun dam projecton the Vakhsh River in Tajikistan has become a contentious issue between the countries of Tajikistan and Uzbekistan. The Tajik government attempts to resume the construction of the Rogun project, which was developed during the Soviet time. Uzbekistan is concerned that the construction of Rogun hydropower plant will change the current river flow regime and will have a devastating effect on water, food and environmental safety of the downstream countries. They raise questions requiring regarding the possibility of man-made catastrophe risks, the protection of the rights of countries in the middle and lower course of the Amudarya, the risks to the environment of the region, and alternative approaches to the problems of energy deficit in Tajikistan in winter period. Downstream countries have expressed concern over the fact that the period of filling the mentioned reservoirs will be long-lasting, and over the energy regime operation of the Rogun and Nurek water reservoirs that could substantially decrease water availability for agriculture in Uzbekistan. In the densely populated Fergana valley, scarcity of water may lead to food shortages and excessive price fluctuations for agricultural products. In July 2014, a World Bank assessment explicitly approved the technical, economic and social aspects of the construction of the planned Rogun hydropower plant. Once again, the conclusions heated up the dispute between Tajikistan and Uzbekistan. Experts say that the World Bank studies, originally conceived as a means to resolve the region's thorny water security issues, now appear to be setting the scene for further disputes and graver political confrontations among the countries (Hashimova, 2014).

Despite the considerable efforts made both at national and regional level for sustainable water management, much can be done by donor organizations and foreign countries in terms of providing assistance in technical modernization, institutional reform and financial incentives for efficient water use (Yakubov, 2012). However, geopolitical struggles are another aspect of the problem, which complicates the negotiation process among the countries of Central Asia. The geo-political interests of extra-regional powers interfere in resolving water governance problems within Central Asia. It is well known that the tactics of "divide et impera" (Wegerich, Olsson, & Froebrich, 2007) in geopolitics means using the contradictions between the individual small states. In some cases, the contradiction can be created artificially and generated by propaganda. There is no doubt that the geopolitical strategy of extra-regional actors causes severe damage to the national interests of the Central Asian countries, and the amplification of these processes will negatively affect the course

of bilateral talks on the disputed stretches of the border or plans to build a new energy and transport corridors. These rival powers fund competing infrastructure and economic development projects such as natural gas pipelines, dams, regional power sources, and roads.

4. Future challenges

Considerable challenges lie ahead. The future impacts of climate change tend to aggravate the issue, e.g. with the risk for glacier melt in the Pamir and Tien Shan mountain ranges. If Afghanistan as a middle-stream country starts (re)building infrastructure and starts using water for irrigation, this will in turn affect downstream countries. Old plans about diverting Siberian water resources towards Central Asia start resurfacing and relate to the future role of Russia in the region.

4.1. Climate change

As a complex issue, climate change introduces new challenges for dam governance in Central Asia. Existing problems can be aggravated by climate change impacts, such as higher summer temperatures and altered rainfall patterns, likely to lead to more drought-prone summers and more flood-prone winter and spring seasons (Sorg et al., 2013). The fact that these are long-term developments, surrounded by considerable uncertainty about the timing and severity of impacts, poses a difficult challenge for dam governance. At the same time glaciers in the Tien Shan mountains have already lost considerable volume over the past decades (Sorg et al., 2013), leading initially to higher water yield but resulting in lower water yield when the glacier volume falls below a certain threshold. Additionally, the formation of moraine-dammed lakes and the potential for glacier lake outburst floods introduces new risks related to glacier retreat (Sorg, Bolch, Stoffel, Solomina, & Beniston, 2012).

4.2. Afghanistan as a new player

Moreover, when it comes to the Central Asian water problems, researchers and politicians mostly ignore the Afghanistan factor. Currently, this country uses only about 2 billion cubic meters of water for irrigation purposes (Mukhammadiev, 2014; Wegerich, 2011). Experts imply that because of the ongoing conflicts and ruined economic infrastructure Afghan farmers are not able to fully use the available water resources. Potentially Afghanistan can take up to 10 billion cubic meters of water (Wegerich 2011), which will have negative consequences for the downstream countries. If Afghanistan joins the regional "water talks", the current water regulation system would take a completely different shape than it has today.

Given that the infrastructure-as-prerequisite-for-development discourse is quite dominant in relation to dam development in Afghanistan today (Ahlers, Brandimarte, Kleemans, & Sadat, 2014), Afghanistan can be considered as a potential "game changer" in Central Asian water management. The challenges for dam governance in Afghanistan

are even more pronounced then elsewhere in Central Asia, and have to do with lack of security, an institutional context under transition, the absence of transboundary dialogue and agreements, and uncertain and fragmented aid provision (Ahlers et al., 2014).

4.3. International water

Another ambitious project designed in Soviet time is the transfer of water from the Ob-Irtysh river basin to water-scarce Central Asian countries (Kazakhstan, Uzbekistan and even Turkmenistan). However, the project was abandoned in 1986, without much actual construction work ever done. Meanwhile, some Russian officials consider it as a commercial project with the opportunity to sell freshwater to the southern countries in need. Recently, due to the effect of climate change some scientists raise this issue once again and call for resuming the project. They argue that its realization is an effective measure to solve the problem of the shallowing of transboundary rivers (Vasilenko, 2014). Similar to big dam projects, this type of mega-projects relate quite closely to the ambitions of geopolitical powers in the region.

5. Cooperation needed where conflict prevails

Despite the wickedness of the dam governance issue in Central Asia, there are some prospects for future cooperation. Central Asian countries share a history of the oldest irrigation systems in the world, and their common cultural heritage could form a basis for mutual understanding. Furthermore, the interdependencies, which form the basis for conflicts of interest, also can provide a basis for developing mutual gains solutions at the water-energy-food nexus. As the impacts of climate change make themselves more and more felt throughout the river basins, the necessity of cooperation might become clearer to the involved countries.

Conflict of interest in the Central Asian countries sharing transboundary water should be seen as a given. For sustainable development of the region, it is very important to find an acceptable balance between countries' national interests and the collective interests of the whole region, particularly in the area of dam governance. In the relation between Tajikistan and Uzbekistan, for example, conflicts could be avoided through the development of small hydropower projects, modern irrigation systems in the main water consuming countries and large hydropower projects for control of water resources for hydropower and irrigation. For this purpose a water treaty between upstream and downstream countries would be necessary (Karimov, Giordano, Mukherji, Borisov, & Djumanov, 2012). Cooperative management of existing and new dam infrastructure can also make a big difference. Unilateral maximization of hydropower benefits of the Rogun dam, for example, would result in significant losses in the agricultural sector downstream, while cooperative basin-wide management of the Rogun dam could significantly increase hydropower production with only minor adverse impacts downstream (Bekchanov, Ringler, Bhaduri, & Jeuland, 2015). The difficulty for the Central Asian states is to apply the principles of equitable and reasonable use by revising the

Syrdarya water allocation scheme as well as to agree on a balanced reservoir management. This would allow the generation of energy in winter – benefiting upstream countries and irrigation for large-scale agriculture in summer – benefiting downstream countries (Sorg et al., 2013). Approaches that are more comprehensive are required to direct investments from being focused on infrastructure only to taking into account environmental sustainability, capacity building and participatory management also.

Of course, the achievement of regional cooperation is affected by the broader geopolitical struggles and foreign countries' interest in the region. Interstate cooperation between the Central Asian republics can also be thwarted by the competition among global actors that could use dam governance as a long-term instrument of their own foreign policy agenda. In order to avoid "divide and rule" effects national governments could rely on multi-vector diplomacy to them to keep balance and not to be dependent on one external actor. Over time, the detrimental effects of external interference should consolidate the countries of the region and encourage them to building a direct, immediate and trusty relationship at the regional level. In this context, a special role in the "reset" of relations in the region must play not only official diplomatic channels, but also the community of experts, researchers, journalists and public figures of the five Central Asian countries.

6. The Central Asian Governance Challenge for the near Future

Over the last two decades, riparian countries of the transboundary Amudarya and Syrdarya Rivers have failed to establish a stable and a well-functioning cooperation mechanism on water use. During the negotiation and decision-making processes, states' behaviours mainly were motivated by ensuring short-term interests. Long-term sustainable goals for the use of water resources, preserving regional biodiversity or improving intergovernmental dialogue were out of reach.

There are valid explanations for why water management remains as conflict-prone issue in the region. The roots of this problem go much deeper and can be found in areas not directly related to water. However, these factors do not allow to undertake successful political talks between the countries of the region.

Firstly, after the dissolution of the Soviet Union, no regional identity has evolved (Abdolvand et al., 2014). Despite the fact that all Central Asian countries share the same cultural, religious and historical heritage, there is no common policy to build a supranational body capable of speeding up regional integration between five Central Asian republics. The lack of regional identity has a direct impact on intergovernmental talks over the use of Transboundary Rivers.

Secondly, there is an effect of so-called "Aral Sea syndrome" (Downing & Lüdeke, 2002; Groll, Opp, & Aslanov, 2013; Horst, Shamutalov, Pereira, & Gonçalves, 2005; Saiko & Zonn, 2000). This syndrome refers to the environmental damage to natural landscapes, because of large-scale projects such as dams, river dimensions or irrigation schemes. It also implies that water shortage can lead to the complex desertification process in the region. Usually, the downstream countries feel more affected psychologically by this syndrome.

Thirdly, strong population growth and ongoing economic development require more access to water resources for household, economic, energy and agricultural demands (Djanibekov, Rudenko, Lamers, & Bobojonov, 2010).

To sum up, the increasing number of dam construction projects on rivers located on the upper part of the basin and their eventual operation can increase water shortages and potentially could lead to man-made environmental hardships. Such projects and their social impacts will ultimately threaten peaceful co-existence of multinational societies in this region. Ignoring these serious challenges could hamper the prospects of sustainable development in Central Asia.Indeed, the efficient use of water resources, well-balanced coordination of water and energy policies seem to be the real keys to ensure a peaceful and progressive development of the region, its economic prosperity and improve the lives of the peoples of Central Asia.

Since ancient times these people lived in Central Asia sharing not only a common historical destiny, but also resources of the Amudarya and Syrdarya rivers that have historically formed a single hydrological system in the region. However, the adoption of politically driven decisions in the past led to an extensive intervention into natural processes, wasteful use of water resources and dramatically altered the flow regime formed of these two rivers over the centuries. All of this has caused on of the greatest environmental catastrophes related to desiccation of the Aral Sea. Water shortages, loss of cultivated land, a sharp decrease in flora and fauna, as well as accelerated melting of mountain glaciers in the Pamir and Tien Shan continue to challenge Central Asian republics.

As for the regional dimension of the issue, Central Asia is one of the complex regions in the world where the regional economy is built on two pillars – energy supply and use of irrigation water. Despite the fact that Central Asia is rich in hydrocarbon resources, the task of ensuring energy security of Central Asia becomes difficult in the near future. Along with the problem of energy security, water governance has emerged as the most urgent challenge of the Central Asian economic development, largely due to the water scarcity and intensified contradictions between upstream and downstream countries over the joint use of Transboundary Rivers. In this regard, some important questions remain open and should be answered primarily from the regional perspective.

Despite the differences among the Central Asian countries, rapid population growth in the region requires local governments to increase the area of irrigated land per capita. Due to the dry climate of Central Asia, water for irrigation is an essential factor of management. So improving regional dam governance is potentially a very good investment for eradicating poverty and enabling economic growth in a long-term perspective. For this reason, there is a shared responsibility among upstream and downstream countries over the effective water use and the lives of millions of people.

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