Peace Science and the Hydropolitical Conflicts in Central Asia

The Rogun Dam Conflict between Tajikistan and Uzbekistan

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Introduction

- This paper aims to explore the potential contributions of the peace science to the hydropolitical conflicts in Central Asia by focusing on the case of the Rogun Dam conflict between Tajikistan and Uzbekistan.
- This paper has a mixed methodology of quantitative and qualitative data about the hydropower and water resources for agricultural use.
- Also, the paper evaluates relevant countries' policy options and peaceful settlement alternatives.

Introduction

- This paper argues that objective costs and benefits as well as opportunities and risks need to be emphasized in order to assess the possibility of conflict and cooperation in a shared river basin.
- The data analysis methods of peace science could contribute to the study of water-energy nexus problems.
- The changes in Uzbekistan's position from a conflictual to a more conciliatory one could be explained with the peace science approach and data about the hydropower, water resources for agricultural use as well as the relevant countries' policy options and peaceful settlement alternatives.
- This paper hopes to contribute to the literature by including concepts of political science and environmental economics.

Introduction

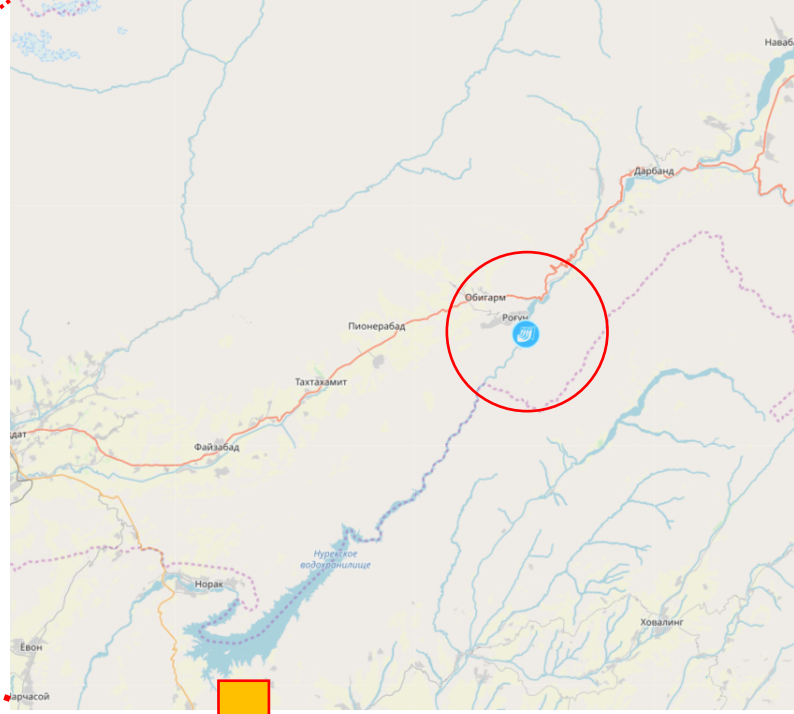
- The existing literature focuses on *water scarcity* for assessing the water-related conflicts between the riparians in the transboundary river basins.
- Water scarcity is among the most serious issues around the World: the Colorado in the southwest of North America, the Nile in Northeast Africa, the Brahmaputra in South Asia, or the Mekong in the Southeast Asia.
- Some researchers evaluated the water scarcity in the shared river basins, yet these ignore the *political* and *economic* aspects of the issue.
- Based on hydraulical data, these studies often reach to a *normative* conclusion that water resources should be shared equally among the riparians to overcome water scarcity.

Water scarcity

- It is the situation in which “local precipitation [in a region or a state] is insufficient to meet needs,” where states have to depend on “external water resources, both physical and virtual” (Munia et al. 2017).
- Water scarcity is also a politically and socially “constructed” concept (Arsel and Spoor 2010).
- According to some authors, global water problems may cause water-induced conflict, especially in the water scarce regions of the globe (Falkenmark 1990, 177-179).
- The scarcity of water may also have impacts on economies, which would exacerbate potential water-related conflicts (World Bank 2016).

The study area: Rogun Dam

- The Rogun Dam is a project on the Vakhsh tributary of the Amu Darya in Tajikistan.
- It is located about 110 kilometers east of Dushanbe.
- The Nurek Dam, which has been operational since 1980, is the tallest concrete dam in the world and lies 70 kilometers downstream of the Rogun Dam site.



The Amu Darya and the Rogun Dam

- The Rogun Dam is planned on the Vakhsh river, the longest stream in Tajikistan, and a major tributary of the Amu Darya.
- The Amu Darya is the largest river of Central Asia and the Aral Sea Basin.
- The Aral Sea Basin covers a total of 1.76 million square kilometers (AQUASTAT, 2012).
- Kyrgyzstan and Tajikistan are the water rich countries, while Uzbekistan, Kazakhstan and Turkmenistan are the main consumers of the basin waters.
- Kyrgyzstan and Tajikistan control about 68 percent of the total water flow (Jalilov, DeSutter, & Leitch, 2011, p. 161).

Why is the Rogun Dam important?

The source of the conflict

The water of the Amu Darya originates mainly from Tajikistan (59.45 cubic kilometers) → 76% of the total flow (78.46 cubic kilometers).

Uzbekistan has 364,630 km^2 of land within the Amu Darya basin → 81.5% of the total surface area (AQUASTAT, 2012)

Uzbekistan contributes only 5% to the total runoff (AQUASTAT, 2012).

The Vakhsh River is the second biggest tributary of the Amu Darya and contributes about 27% to the total runoff of the river (Jalilov, DeSutter, & Leitch, 2011, p. 161).

Political economic aspect of the conflict

- In Central Asia, agriculture depends on irrigation. 90% of total crops needs irrigation (AQUASTAT, 2012).
- For the Amu Darya Basin the total estimated cultivable land is about 6 million hectares. About 1.7 to 2.3 million hectares of this land is in Uzbekistan (Jalilov, DeSutter, & Leitch, 2011; AQUASTAT, 2012).
- Uzbekistan uses about 28 cubic kilometers of Amu Darya water for irrigation on an annual basis (Jalilov, DeSutter, & Leitch, 2011).
- A protocol signed in 1987 allocates 48% of total Amu Darya water to Uzbekistan.

Table: Water allocation (cubic kilometers) by country in the Amu Darya Basin

Source: (Ahmad and Wasiq 2004; Menga 2017).

	Tajikistan	Kyrgyzstan	Uzbekistan	Turkmenistan	Total
Average water allocated	8.845	0.216	**21.378**	20.96	51.4
Protocol 566	9.5	0.4	**29.6**	22	61.5

Table 2. Actual water use of allocated volumes by countries, in percentage points

Source: Based on BVO data, excerpt from the report of Pöyry Energy (2014, 92).

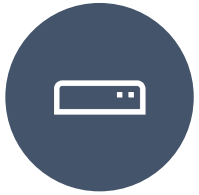
	Tajikistan	Kyrgyzstan	Uzbekistan	Turkmenistan
Minimum	67.6	1.8	**68.3**	74.8
Average	82.8	51.9	**94.7**	92.9
Maximum	91.4	100	**105.8**	101.4

Time inconsistency in water demand

- The agricultural activity withdraws water during the vegetation season, from April to October (Pöyry Energy, 2014, p. 76).
- As the upstream dams in Tajikistan hold water in the summer season to generate electricity in the winter this may have an impact on the agricultural activity in Uzbekistan.
- The main political economic reason behind the conflict is the conflicting seasonality of water use in the Amu Darya Basin.

Energy aspects of the conflict

capacity (MW)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Tajikistan	4,803	4,802	4,809	4,811	4,814	5,035	5,033	5,039	5,039	5,632
Uzbekistan	1,630	1,746	1,746	1,746	1,747	1,762	1,762	1,796	1,843	1,858



The total renewable energy capacity of Tajikistan is 5,632 megawatts as of 2018.

All this renewable energy capacity belongs to hydropower generating capacity for Tajikistan (IRENA, 2019).

The total renewable electricity generating capacity of Tajikistan is three times that of Uzbekistan.

According to the feasibility studies, the Rogun Dam will have 3,200 megawatts installed capacity.

The feasibility study found that the Project has “a potential to reduce average Vakhsh summer flow to 2.0 [cubic kilometers]” (Pöyry Energy, 2014, p. 357).

Water stress aspect of the conflict

- According to the Transboundary Waters Assessment Programme (GEF-TWAP) database, the human water stress indicator for the Aral Sea Basin is graded 4 out of 5.
- The human water stress indicator is highest (5 out of 5) in the downstream countries Uzbekistan and Turkmenistan.
- The AQUEDUCT database indicates to similar results.
- “Baseline water stress” is high in Uzbekistan, and extremely high in Turkmenistan, while Tajikistan is ranked medium.

GEF-TWAP risk assessment (5 highest 1 lowest)

	Human water stress	Agricultural water stress	Economic dependence on water resources
Tajikistan	3	3	5
Turkmenistan	5	5	3
Uzbekistan	5	5	5

AQUEDUCT baseline water stress indicators

Country	score	rank	Situation
Turkmenistan	4,04	15	Extremely High (>80%)
Uzbekistan	3,82	25	High (40-80%)
Tajikistan	2,65	51	Medium - High (20-40%)

Water consumption (current)

- Water consumption in an average year is highest in the downstream countries, Uzbekistan and Turkmenistan.
- In dry years, the water deficit is about 12.28 cubic kilometers. Most deficit occurs in Uzbekistan.
- Loss in dry years in Uzbekistan is 342,655 hectares of irrigable land.

	Water consumption			Irrigation		
	Average year (km3/year)	Dry year (km3/year)	deficit in dry year (km3/year)	Water needed (m3/ha)	Area irrigated (ha)	loss in dry year (ha)
Current situation						
Tajikistan	7.89	6.26	1.63	15,780	500,000	103,576
Afghanistan	2.50	1.98	0.52	13,000	192,308	39,837
Uzbekistan	28.12	22.29	5.83	17,000	1,654,118	**342,655**
Kyrgyzstan	0.21	0.17	0.04	13,000	16,154	3,346
Turkmenistan	20.56	16.30	4.26	17,000	1,209,412	250,533
Total	59.28	47.00	12.28		3,571,992	739,947
Total flow	75.00	47.00				
Surplus/deficit	15.72	-12.28				
Percent of total runoff	126.5%	79.3%				20,7%
Future projections						
Tajikistan	9.50	6.61	2.89	15,780	602,028	182,838
Afghanistan	6.00	4.18	1.82	13,000	461,538	140,171
Uzbekistan	29.60	20.61	8.99	17,000	1,741,176	528,802
Kyrgyzstan	0.40	0.28	0.12	13,000	30,469	9,345
Turkmenistan	22.00	15.32	6.68	17,000	1,294,118	393,028
Total	67.50	47.00	20.50		4,129,329	1,254,184
Total flow	75.00	47.00				
Surplus/deficit	7.50	-20.50				
Percent of total runoff	111.1%	69.6%				30,4%

Water consumption (future projections)

- In the future, with the impact of increasing population, growing economies and worsening effects of the climate change, this situation will change.
- Water consumption in the Amu Darya Basin will increase from 59.28 cubic kilometers to about 67.50 cubic kilometers per year.
- Dry years will most probably be drier, and the water deficit of Uzbekistan will increase from its current 5.83 cubic kilometers in dry years to 8.99 cubic kilometers.
- Higher loss of irrigated area in dry years may occur.
- Uzbekistan's loss in dry years will be 528,802 hectares per year.

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Pöyry Energy, 2014, p. 326

Impact of the Rogun Dam

- The Rogun Dam would not have a major impact on the already alarming situation of water deficit in Central Asia.
- The Rogun Dam will shift additional water from summer to winter, which would reduce water availability for irrigation.
- Rogun has the potential for providing additional water in dry years.
- There would be further negative impacts of the Rogun Dam on the Uzbek economic activities, if the Rogun Dam is operated the same way as the Nurek Dam is operated.
- The Nurek uses its live storage in the winter season and gathers water in the summer, which is the vegetation period for Uzbek agricultural products.

Hydropolitics and prospects for the peaceful settlement of the Rogun Dam conflict

- Uzbekistan opposes the construction of the Rogun Dam.
- Press release of the Uzbek Ministry of Foreign Affairs:

“… the Rogun Hydropower Plant will cost Uzbekistan USD 600 million annually in agriculture alone, reduce the country’s GDP by 2%, and make jobless at least 340 thousand of its citizens.”

Hydropolitics and prospects for the peaceful settlement of the Rogun Dam conflict

- These issues on transboundary water management have the potential to cause interstate conflict in the Aral Sea Basin.
- There is no significant water conflict between Uzbekistan and Tajikistan in the past, according to the Transboundary Freshwater Dispute Database.
- The number and severity of water-related conflicts between these two countries are *not* as serious as they appear to be.
- On the other hand, dyadic hydropolitical relations are not adequately quantified to help social scientists to interpret the hydropolitical issues using relevant data.

Conclusions

- In order to have a proper understanding on the regional hydropolitics, a more detailed quantification is useful.
- Future projections are needed to clarify the possibility for conflict resolution in the Aral Sea Basin.
- The principle of equity is a normative approach to the hydropolitical issues.
- This paper argues that objective costs and benefits as well as opportunities and risks need to be emphasized in order to better assess the possibility of the conflict and cooperation between the riparians in a shared river basin.
- Hence, it can be argued that the data analysis methods of peace science could contribute to the study of water-energy nexus problems.

Thank you.