ENERGY POLICY

WATER SCARCITY AND INTERSTATE COOPERATION DYNAMICS IN NARYN/SYR DARYA RIVER BASIN

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Introduction

The Syr Darya river (together with the Naryn river) has the length of 3,019 km and its basin is a part of the Aral Sea basin, which makes it one of the most important transboundary rivers in Central Asia. The river is formed in Kyrgyzstan and flows through Tajikistan, Uzbekistan, and Kazakhstan. The flow of the Syr Darya river and its tributaries are regulated by a series of reservoirs built during the Soviet and post-Soviet period. The most important among them is the Toktogul reservoir with 19.5 cu km water storage capacity. Toktogul was constructed in the 1970s, and is currently located in the territory of Kyrgyzstan. The reservoir area is approximately 280 sq km and is capable of regulating the flow of the Syr Darya river.

The riparian countries of the Syr Darya basin have been experiencing intense conflicts over water distribution since the disintegration of the Soviet Union. While the upstream countries constantly face a shortage of energy resources in winter seasons, the downstream countries have to struggle with water shortages in the summer. The states in the upper reach intend to use water from Toktogul for electricity generation, whereas countries in the lower reach want to operate the reservoir for irrigation. The final consensus over reservoir operation mode has not been achieved so far. On the contrary, it generates frequent tensions between the upstream and downstream countries. Moreover, environmental degradation, climate change and population growth can lead to addi-

tional tensions over regional water sharing, which may increase the likelihood of violent conflict in Central Asia.[1]

There have been several attempts to regulate water sharing through regional water management institutions and agreements. Although these institutions and agreements were described with the high degree of compliance, their performance left much to be desired.[2] Why this happens and what factors affect this outcome? Why were negotiations successful, but mutual agreements remained implausible? In this article, I will argue that during the low water periods of the Toktogul reservoir, one can observe elements of cooperation over water sharing in the Naryn/Syr Darya river basin, whereas during the higher water periods, on the contrary, water cooperation tends to slow down and multilateral agreements remain unfulfilled by the riparian countries. Instead of cooperation, the upstream and downstream countries favor unilateral solutions for their domestic water problems. To illustrate this tendency, I will analyze three water low periods in Toktogul, which include the periods of 1984-1988, 1997-1998 and 2007-2008 (see Fig. 2 on p. 86).

The structure of the article is organized as follows: In the first section I will provide the theoretical and methodological explanation. In subsequent sections I will outline water low periods, where the riparian countries experienced particular conflict and cooperation trends over water distribution. In conclusion, I will summarize the outcomes of the article.

[1] See: R. Strickman, M. Porkka, "Water and Social Changes in Central Asia: Problems Related to Cotton Production in Uzbekistan," *Central Asian Waters*, Helsinki, Finland, 2009, pp. 105-115.

[2] See: T. Bernauer, T. Siegfried, "Compliance and Performance in International Water Agreements: The Case of the Naryn/Syr Darya Basin," *Global Governance*, No. 14, 2008, pp. 479-501.

Methodological Underpinning

A number of scholars such as Aaron Wolf, Shlomi Dinar, Mark Giordano, Eric Mostert, Thomas Bernauer, and Tobias Siegfried have focused on the relationship between water scarcity and dynamics of conflict and cooperation. The debate was developed between scholars who argue that water scarcity leads to conflicts[3] and those who argue that water scarcity can be an incentive for the riparian countries to cooperate.[4] For instance, Aaron Wolf argues that an important determinant which may lead to a water conflict is rapid change, including changes in environmental conditions, socioeconomic circumstances or political structures.[5] Others suggest that scarcity may lead to both conflictive and cooperative outcomes.[6] Although these contributions are significant for the scholar debates on the relationship between water scarcity and cooperation, none of the works are able to offer clear practical evidence backed by consistent explanation.

This section attempts to fill this gap by using the case of the Naryn/Syr Darya river basin. In order to understand the water scarcity and cooperation linkage, first and foremost, we need to explain

[3] See: M.F. Giordano, M.A. Giordano, A.T. Wolf, "International Resource Conflict and Mitigation," *Journal of Peace Research*, No. 42, 2005, pp. 47-65.

[4] See: S. Dinar, "Scarcity and Cooperation along International Rivers," *Global Environmental Politics*, Vol. 9, No. 1, 2009, pp. 109-135.

[5] See: A.T. Wolf, "Shared Waters: Conflict and Cooperation," *Annual Review of Environment and Resources*, No. 32, 2007, pp. 241-269.

[6] See: E. Mostert, "Conflict and Cooperation in International Freshwater Management: A Global Review," *International Journal of River Basin Management*, No. 1 (3), 2003, pp. 1-12.

the questions when water can be considered as scarce and how the cooperation between the riparian countries can be measured. For the purpose of this article, we cannot use the popular water stress indicator suggested by Falkenmark.[7] Although the Falkenmark Indicator is the most used one for water scarcity, it concentrates merely on water scarcity within the particular country or region dividing the available water resources per capita and per year. According to Falkenmark, a country experiences water scarcity if the water supply falls below 1,000 cu m and it is considered absolutely scarce if the water supply is below 500 cu m.

In the case of the Naryn/Syr Darya river basin, the upstream and downstream countries have different level of water availability. Whereas Kyrgyzstan has about 9,293 cu m of renewable water resources per capita, Kazakhstan possesses 7,368 cu m and Uzbekistan only 4,527 cu m of water resources per capita for agricultural, industrial and domestic purposes.[8] According to Falkenmark Indicator, none of the Naryn/Syr Darya riparians can be considered as water scarce. Even if we generalize the water availability of upstream and downstream countries, there will be no variability in the water volume so that it will be impossible to make a linkage to cooperation that may vary over time.

Instead, I suggest we should concentrate on the water availability in the Toktogul reservoir for several reasons.

- First of all, the Toktogul reservoir is the biggest reservoir along the flow of the Syr Darya river. It is located in the Naryn cascade, the Naryn river being the main tributary of Syr Darya along with Kara Darya (see Fig. 1). The Syr Darya river is formed when Naryn confluences with Kara Darya in the Ferghana Valley. Naryn contributes annually 13.7 cu km to the Syr Darya river that is almost half of the annual flow of the river.[9]
- Secondly, Toktogul is a multiyear storage facility with the capacity of 19.5 cu km. This storage capacity exceeds the Naryn river's average yearly inflow.[10] There is no doubt that the delay of 19.5 cu km of renewable water resources into Syr Darya would have drastic effects on irrigation areas of downstream countries. For instance, water from the Toktogul reservoir is an important source particularly for the most populated area in Central Asia, the Ferghana Valley. The population density exceeds here 300-500 people per sq km. The population in the Ferghana Valley is considered to be more than 11 million people, which is more than the total population of Kyrgyzstan and Tajikistan and almost half of the population of Uzbekistan. Most of these people live in rural areas and their livelihood depends mainly on agriculture. Consequently, there is a direct relationship between water volume in Toktogul and the water availability in the river basin.

Last but not least, the water level in the Toktogul reservoir can be measured by considering the annual water inflow and outflow as well as total water volume of the reservoir. This information is available at the CAWATERinfo.[11] Our methodological task is to conjugate the water data in Toktogul and figure out the lowest water periods since the operation start of the reservoir.

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[7] See: M. Falkenmark, J. Lundquist, C. Widstrand, "Macro-scale Water Scarcity Requires Micro-scale Approaches: Aspects of Vulnerability in Semi-arid Development," *Natural Resources Forum*, No. 13 (4), 1989, pp. 258-267.

[8] See: O. Varis, R. Mizanur, "The Aral Sea Keeps Drying Out but Is Central Asia Short of Water?" in: *Central Asian Waters: Social, Economic, Environmental and Governance Puzzle*, Helsinki, 2008, available at [www.water.tkk.fi/English/wr/.../Central_Asian_Waters-book.pdf], 19 June, 2012.

[9] See: "Vodnye resursy basseina reki Syr Darya," available at [http://www.cawater-info.net/syrdarya/water.htm], 19 June, 2012.

[10] See: "Toktogulskoe vodokhranilishche. Rezhim raboty vodokhranilishcha: sravnenie prognoznykh i fakticheskhikh znachenii," CAWATERinfo, available at [http://www.cawater-info.net/analysis/water/toktogul.htm], 19 June, 2012.

[11] CAWATERinfo is the official portal of knowledge for water and environmental issues in Central Asia. CAWATERinfo is the joint project of the main water body in Central Asia, the Scientific Information Center of Interstate Commis-

Figure 1

Background and River Course

Source: Data from [http://www icwc-aral.uz].

Further, we need to agree upon how the "cooperation" can be best understood. According to the theory of International Regimes,[12] cooperation takes place when the parties intend to establish an institution or sign an agreement.[13] Stephen Krasner defined the regime as "a set of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations."[14] In other words, international regimes are embedded in particular policy processes and aim at solving a concrete problem. For the purpose of the article, I use the established term of "water regimes" as an indication of cooperation that is intended by the riparian countries of the Naryn/Syr Darya river basin.

In the next section, I will draw parallels between the lowest water periods in Toktogul and identify attempts aimed at establishing "water regime" at the regional level. By looking at Fig. 2 on p. 86, we can observe three most water low periods in Toktogul. The regional cooperation efforts in these periods will be scrutinized in subsequent sections.

Cooperation Dynamics during the Soviet Period

One of the water low periods in Toktogul falls between 1984 and 1988. Although in this period the riparian countries were not independent yet, the Central Asian Soviet republics had frequently expressed their concerns over the existing water management system. Since the construction of Toktogul and introduction of irrigation plans in Central Asia, the Aral Sea has shrunk several times in size and volume. Along with the Aral Sea crisis, it became apparent in the middle of the 1980s that the water in Toktogul was not enough for further discharge, so that the riparian countries had to immediately review the water management system and regulate it not only at the national but also, and more importantly, at the regional level.

For this purpose, new water mechanisms were introduced in the middle of the 1980s. For instance, the River Basin Organizations (BVOs) of the Syr Darya and Amu Darya rivers were created in 1986, which took control of the rights over the usage of storage and diversion facilities along the Syr Darya and Amu Darya river basins. The BVOs regulated water allocation and distribution by finding agreements among the riparian countries, which were approved by the U.S.S.R. Ministry of Water Management. The new mechanism of water distribution included a new system of irrigation based on top-down and bottom-up schemas. According to the bottom-up schema, water is allocated on the demand from water users at district, province and state levels. In the top-down approach, in contrast, the limit on water was assigned by the BVOs. The demands by water users and the de-

sion for Water Coordination (SIC ICWC) and international organizations that makes the data source reliable. In CAWATER, in the database section of the Syrdarya river basin, we can find information about the operation mode of the Toktogul reservoir, including data about annual inflow, outflow and water volume in vegetation and non-vegetation periods dated since 1991 to 2012.

[12] The concept of International Regimes was first introduced by Stephen Krasner. In the early 1980s, the theory attracted the attention of many scholars of International Relations, because it offered a more conclusive explanation for international order and international organizations. Later, the concept of International Regimes found its use in the explanation of international environmental management issues.

[13] See: T. Bernauer, "Explaining Success and Failure in International River Management," *Aquatic Science*, No. 64, 2002, pp. 1-19.

[14] St.D. Krasner, "Structural Causes and Regime Consequences: Regimes as Intervening Variables," *International Organization*, Vol. 36, No. 2, Spring 1982, pp. 185-205.

mands estimated by BVOs were translated into water-use plans at the district level and distributed to the users. Even after independence, the riparian countries continued to rely on the irrigation water limit.[15]

Since the collapse of the U.S.S.R., the water management system and water sharing principles established in 1986-1987 have not been changed, despite the newly emerged political and economic situation and changed interests of the countries involved. On the contrary, after the region achieved independence, the heads of water economy organizations attempted to retain the previous regulations agreed during the Soviet Union. With the Tashkent Agreement signed on 10-12 October, 1991, water ministers of the Central Asian states agreed that they would adhere to the Soviet allocations and distribution principles from the late 1980s.[16] This was formalized by the heads of state by signing the Almaty Agreement on 18 February, 1992.[17]

Why did this happen? One would expect that independent countries discuss the outmoded Soviet water management system and negotiate upon new water regulations considering their national interests. The downstream countries—Kazakhstan and Uzbekistan—were in favor of Soviet water regulations, because they benefited from the irrigation mode of Toktogul. Thus, it is understandable why the downstream countries insisted on the retaining Soviet water regulations. Upstream Kyrgyzstan and Tajikistan, however, had to be against these regulations, as they did not grant them rights to control water facilities located in their territories.

There is a general assumption among scholars that the newly independent Central Asian countries were overburdened by *nation-building* and the strengthening of sovereignty, so that they did not have enough capacity to adapt water regulation mechanisms to new realities.[18] Although this might be true to some extent, it is also important to consider the fact that there was also no extreme water pressure on the riparian countries in the early years of independence that would leave them in the situation, where they had to renegotiate existing water regulations. As illustrated in Fig. 2, the water volume in Toktogul was above 13 cu km in 1991, so that Toktogul was able to discharge water in vegetation and non-vegetation periods at the same time, satisfying the needs of both upstream and downstream countries.

As Figs. 2 (on p. 86) and 3 (on p. 88) demonstrate, Toktogul has been starting to operate in energy and irrigation mode since 1992. Particularly in 1993, the water level in Toktogul began to decrease and continued to decrease until 1997. In the period between 1994 and 1997, the riparian countries preferred bilateral agreements on water sharing which were signed annually between Uzbekistan and Kyrgyzstan, Kazakhstan and Kyrgyzstan as well as Uzbekistan and Tajikistan. These bilateral agreements specified the amount of compensatory deliveries of fuel and energy resources as well as releases from the Toktogul reservoir on an annual basis. Based on these agreements, Uzbekistan and Kazakhstan received excess energy from Kyrgyzstan generated by the Toktogul hydropower plant in the summer, and in the winter they provided Kyrgyzstan with energy by delivering natural gas and coal, respectively. These agreements were renegotiated every year and, in fact, replaced the long-term regional planning for water sharing.[19]

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[15] See: H. Murray-Rust *et al*., *Water Productivity in the Syr Darya River Basin*, Research Report 67, 2003.

[16] See: *Statement of Heads of Water Economy Organizations of Central Asian Republics and Kazakhstan adopted on 10-12 October, 1991 Meeting in Tashkent*, available at [http://www.icwc-aral.uz/statute2.htm].

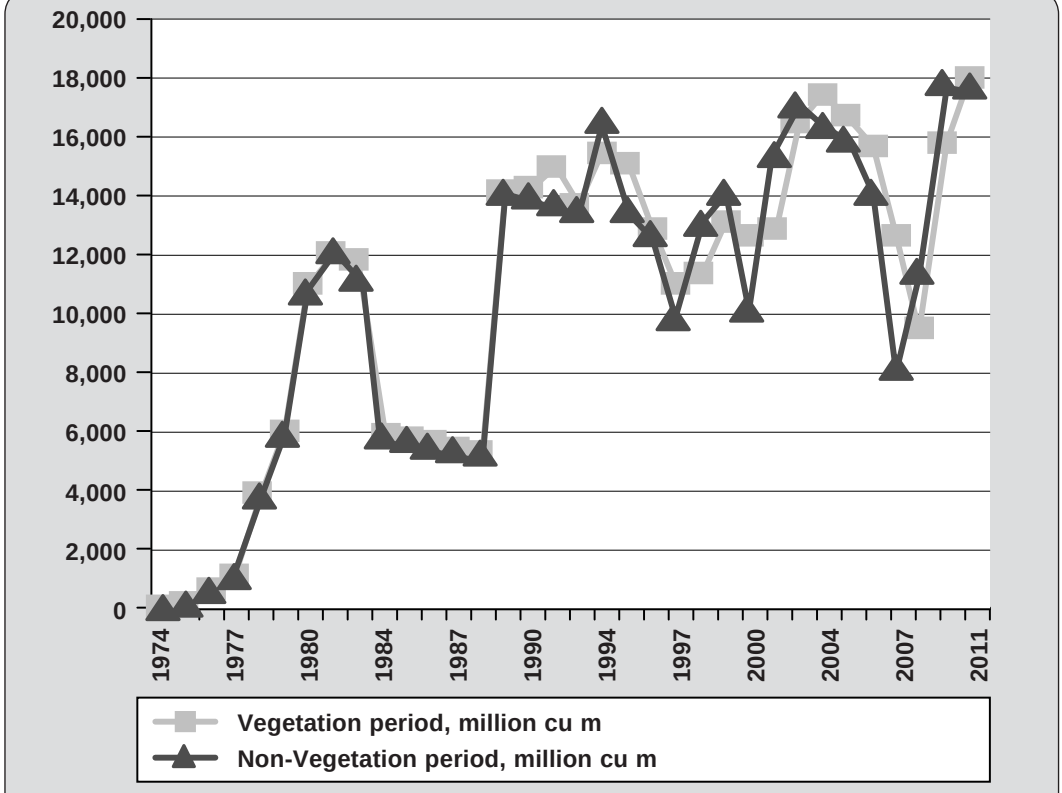
[17] See: *Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, Republic of Uzbekistan, Republic of Tajikistan, and Turkmenistan on Cooperation in Joint Management of Use and Protection of Water Resources of Interstate Sources*, signed on 18 February, 1992.

[18] See, for instance: *Central Asia: Water and Conflict*, ICG Asia Report No. 34, Osh/Brussels, 30 May, 2002.

[19] See: E. Giese, J. Sehring, "Konflikte ums Wasser Nutzungskonkurrenz in Zentralasien," *OSTEUROPA*, Jg. 57, 8-9/2007, S. 483-496.

Figure 2

Water Volume of the Toktogul Reservoir, 1974-2011



Source: CAWATERinfo data, available at [http://www.cawater-info.net/analysis/water/toktogul.htm].

Water Scarcity and Cooperation Dynamics after 1997

The bilateral agreements continued until the winter of 1997-1998, when the water level in the Toktogul reservoir had dropped to a minimum since 1991 (see Fig. 3 on p. 88). The water volume in Toktogul was low to the extent that it was not sufficient for discharge either in the vegetation or non-vegetation period. Since the bilateral agreements did not provide sustainable solution for the water sharing issues, because the water problem in the basin carried more regional and not bilateral character, the immediate need for multilateral cooperation emerged in late 1997. I assume that particularly the shrinkage of Toktogul significantly contributed to the beginning of multilateral negotiations, which one could observe in early 1998.

On 17 March, 1998, Kazakhstan, Kyrgyzstan, and Uzbekistan signed in Bishkek the Agreement on the Use of the Water and Energy Resources of the Syr Darya River Basin,[20] of which Tajikistan became a full member in 1999.[21] The Bishkek Agreement included specific barter agreements on energy and water exchanges and was valid for a period of five years.[22] According to the agreement, during the vegetation period Kyrgyzstan was to supply electricity to each downstream country, whereas Kazakhstan and Uzbekistan, in exchange, were to deliver energy resources such as coal, gas, electricity and fuel oil in the non-vegetation period. The compensation could be also carried out in the form of labor, services or money.[23]

By signing the Bishkek Agreement, the riparian countries brought the water management system practically back to the Soviet period. This agreement recognized the willingness of Kyrgyzstan to use Syr Darya for hydroelectricity purposes, as well as the wish of Kazakhstan and Uzbekistan to receive the previously agreed volume of water for irrigation and agricultural purposes. The only difference from the Soviet system was that Toktogul was to work in irrigation-energy regime instead of only irrigation regime.

In the same year, in Bishkek, the governments of Kazakhstan, Kyrgyzstan, and Uzbekistan attempted to take the first step in finding a fundamentally new solution to the use of water resources in transboundary watercourses. The Central Asian states signed a protocol decision on the establishment of the international water and energy consortium.[24] In accordance with the protocol decision, the purpose and objectives of the water-energy consortium were[25]:

- creating a system of mutually beneficial joint activities of the participants necessary to ensure effective use and development of hydropower resources of the region;
- deepening the processes of production and technological cooperation of water and fuel and energy industries, and creating conditions for the expansion of export potential;
- attracting investment in the development of hydropower potential in the region;
- providing a strategy saving water and energy resources;
- developing and proposing the introduction of advanced technologies for the use of water and energy resources;
- developing and implementing mutually beneficial joint projects on construction of new and reconstruction of existing ones.

The establishment of the international water and energy consortium could be an effective mechanism to prevent conflicts arising from the use of the Syr Darya transboundary water resources. However, this consortium remained a mere "paper tiger" and was never implemented. Although the progress in the creation of water and energy consortium was renewed within the framework of the Eurasian

[20] See: *Agreement between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, and the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin*, 17 March, 1998.

[21] *Protocol on Amendments to the Agreement between the Government of the Republic of Kazakhstan, the Kyrgyz Republic and the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin adopted on 17 March, 1998*, 17 June, 1999.

[22] See: *Agreement between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, and the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin*, 17 March 1998, Art 10.

[23] See: Ibid., Art 4.

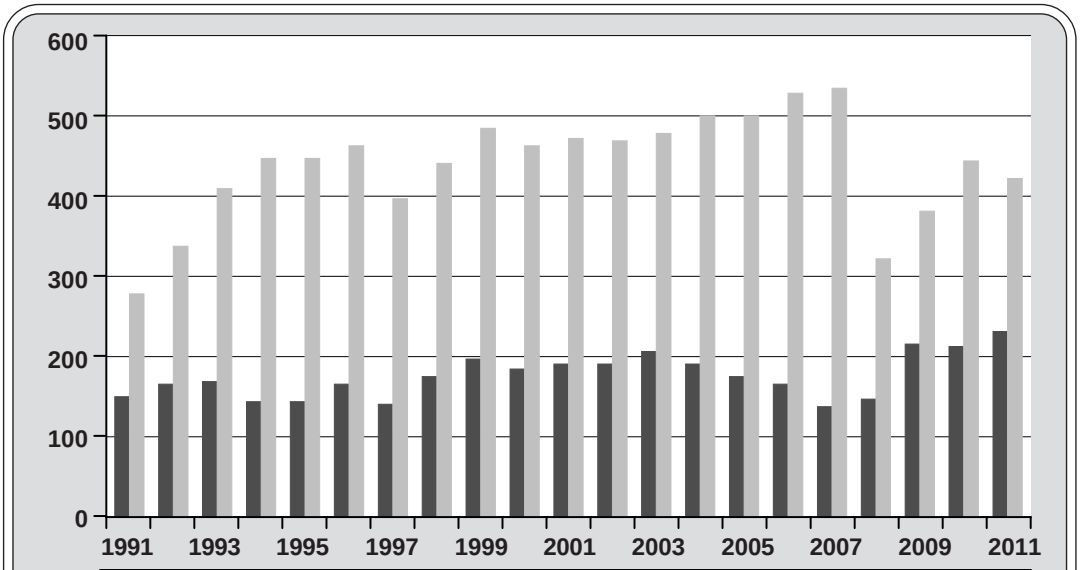
[24] See: *Protocol Decision on the Establishment of the International Water and Energy Consortium*, 17 March, 1998.

[25] See: Ibid., Section 2.

Economic Community (EurAsEC) in 2006,[26] it was of no avail when Uzbekistan suspended its membership in EurAsEC in 2008.

Figure 3

Operation Modes of the Toktogul Water Reservoir, 1991-2011



Source: CAWATERinfo data, available at [http://www.cawater-info.net/analysis/water/toktogul.htm].

The Bishkek Agreement could be considered as a success in sharing the Naryn/Syr Darya river basin. However, it also became obvious that it would be problematic to implement this agreement in practical terms. It was argued that the Bishkek agreement could not satisfy the upstream countries during the middle runoff periods and downstream countries during the lower runoff periods. During the higher runoff periods none of the riparians benefited from the Bishkek Agreement.[27] The downstream countries have called for below average releases for the growing season during the higher runoff periods. This has resulted in reduced surplus electricity deliveries to downstream countries, accompanied by reduced deliveries of fuel to Kyrgyzstan the following winter season.

[26] See: *Decision of the Interstate Council of EurAsEC of 16 August, 2006, No. 315 "About the Concept of Efficient Use of Water and Energy Resources of Central Asia."*

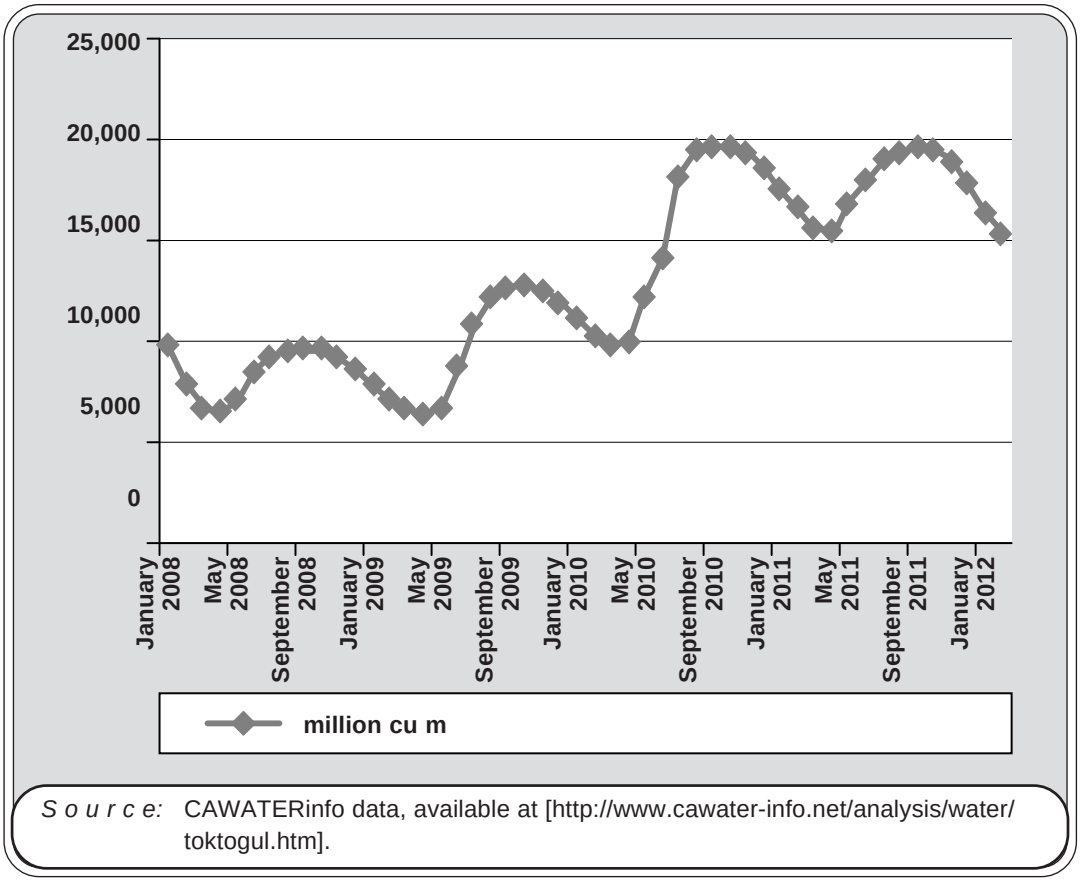
[27] See: Y. Rysbekov, V. Sokolov, B. Tillaev, "Vodnye resursy Tsentralnoy Azii: voprosy sovmestnogo ispolzovaniya i potentsial sotrudnichestva," *Kontinent partnerstva*, Evraziyskiy bank razvitiya, Ezhemesyachniy informatsionno-analiticheskiy vestnik, July 2007, p. 39.

The Bishkek Agreement ceased to exist in 2004-2005[28] and the riparian countries returned to the bilateral agreements negotiated in the 1990s.

As can be seen in Fig. 3, in 1999, the inflow into Toktogul started to increase and water volume in Toktogul began to restore. In this context, it is possible to assume that the high water period came after 1999, the Bishkek Agreement became useless, and the riparian countries did not feel the necessity to adhere to the agreed regulations. For instance, Kazakhstan and Uzbekistan did not consider the necessity to pay for the electricity delivered from Kyrgyzstan, so that fuel resources were not delivered in time and in quantity to upstream Kyrgyzstan. In return, Kyrgyzstan increased winter discharges from Toktogul that caused floods in downstream countries. As a result, none of the riparian countries executed firmly the obligations of the agreement. As soon as one of the riparian states violated the agreed rules and mechanisms, the other party answered with a counter-violation.

Figure 4

Toktogul:
Average Monthly Water Volumes
(2008-2011, relative to multi-year averages)



Source: CAWATERinfo data, available at [http://www.cawater-info.net/analysis/water/toktogul.htm].

[28] See: Deputy Prime Minister of Kyrgyz Republic Umirzak Shukeyev at the October meeting of the vice premiers of five Central Asian states in Almaty, *Kazakhstan segodnya*, 20 October, 2008, available at [http://www.03portal.kz/index.php?option=com_content&task=view&id=5034&Itemid=57], 20 June, 2012.

As the Bishkek Agreement was frequently violated and excessive winter releases from Toktogul had adverse impacts on downstream countries,[29] the downstream countries have started to take unilateral actions toward water management. This was mostly expressed in the form of construction of a number of re- and contra-regulating water facilities. For instance, Uzbekistan proceeded with the design of new water storage capacity of the Karamansay reservoir as well as construction of the Razaksay and Kangkulsay reservoirs in the Ferghana Valley. The completion of these reservoirs should provide additional storage of about 2.5 cu km that could absorb the equivalent additional discharge from Toktogul in the winter and subsequently release the same quantity of water again in the summer for downstream irrigation.[30] Similarly, Kazakhstan announced the construction of contra-regulator, Koksarai reservoir near Shymkent.

Water Level and Cooperation Dynamics after 2007

The extensive use of hydropower for heating from winter releases in Kyrgyzstan led to the fact that in 2007 the water level in Toktogul reached its critical point. As a consequence, the downstream countries, Uzbekistan and Kazakhstan, did not get as much water for irrigation in spring and summer periods as in average years. Kyrgyzstan used most of water resources in Toktogul in order to generate electricity in winter periods. In 2007, the water volume in Toktogul reached 8 cu km, which was 7 cu km less than in 2003 (see Fig. 2 on p. 86). This is almost half of the average levels. According to the results of the ISTC project, the water level in Toktogul decreased by 74 meters compared to 2000.[31] This shortfall did not bode well both for electricity generation of upstream and irrigation prospects of downstream countries.

In 2008, the Central Asian governments renewed efforts aimed at multilateral cooperation. In May 2008, in the joint statement of the heads of Tajik and Kyrgyz Republics it was declared that the parties agreed to make joint efforts toward intergovernmental protocol on the use of hydropower resources along the Naryn/Syr Darya basin.[32] On 10 October, 2008, regional countries used the CIS Summit meeting in Bishkek to announce an expanded regional cooperation program, with a special focus on "*hydro-energy support, fuel resources supply, water accumulation in the Toktogul and Nurek reservoirs.*" The reason for the meeting was the fear of the riparian countries to experience again unprecedented low water levels in Toktogul. On 18 October, 2008, the Protocol was signed between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, Tajikistan, Turk-

[29] First of all, because of a drastic decrease of water in summer periods, the oases in Kazakhstan and Uzbekistan located along the Syr Darya river had serious problems with irrigation. Secondly, the water release in winters caused harsh floods in the areas located in the vicinity of Syr Darya in Kazakhstan.

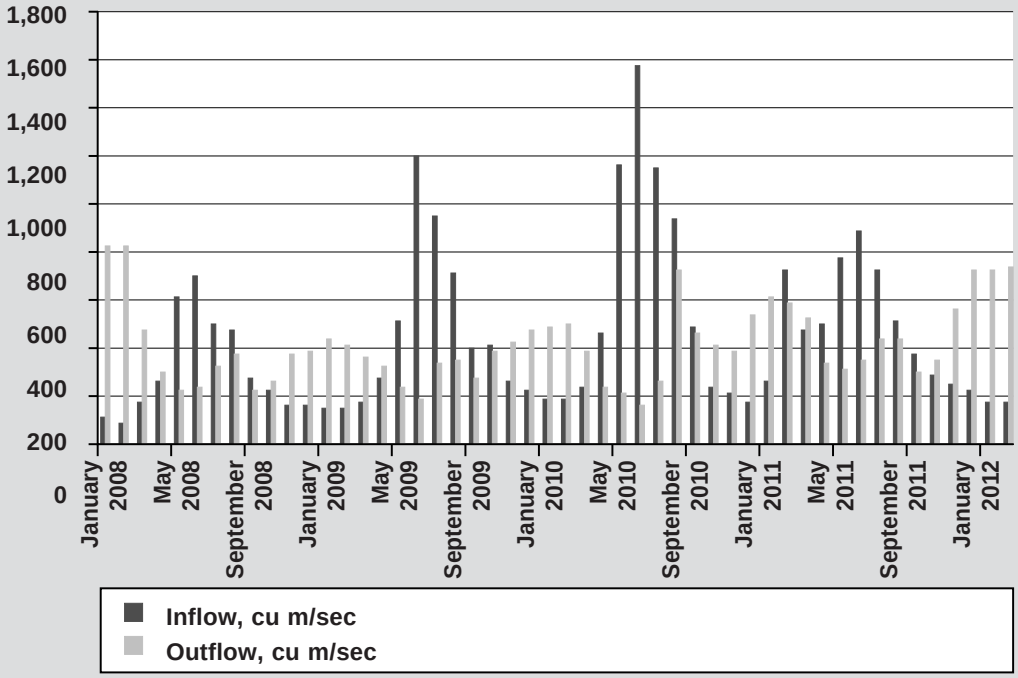
[30] See: "Central Asia, Regional Electricity Export Potential Study," Europe and Central Asia Region, The World Bank, Washington D.C., December 2004, available at [http://siteresources.worldbank.org/INTUZBEKISTAN/Resources/REEPS_Main_Report_Final_English.pdf], 20 June, 2012.

[31] See: ISTC project KR-1430: "Study of Formation Factors and Estimation of the Nizhny-Naryn HEPP Cascade Effect on the Quality of the Naryn River Catchments Using Isotopic Methods," available at [http://www.istc.ru/ISTC/ISTC.nsf/va_WebPages/KR-1430Eng], 20 June, 2012.

[32] See: "KR i RT namereny podpisat protokol ob ispolzovanii vodno-energeticheskikh resursov," *Kazakhstan segodnya*, 16 May, 2008, available at [http://news.gazeta.kz/art.asp?aid=231167], 20 June, 2012.

Figure 5

Toktogul:
Average Monthly Water Inflows and Outflows
(relative to multi-year averages)



Source: CAWATERinfo data, available at [http://www.cawater-info.net/analysis/water/toktogul.htm].

menistan and Uzbekistan on the use of water and energy resources of the Central Asian region for the fourth quarter of 2008 and 2009. Kazakhstan agreed to provide Kyrgyzstan with 250 million kWh of electricity and coal for Bishkek TPP in 2009 and Uzbekistan agreed to provide additional 150 million cu m of gas to Kyrgyzstan during the first quarter of 2009. In return, Kyrgyzstan obliged to release 5.25 cu km of water from Toktogul during the vegetation period, thereby ensuring that the amount of water available at the beginning of the vegetation period in 2009 will not be inferior to 2008.[33]

Although the worst was avoided in 2010, when Toktogul started to restore (see Fig. 4 on p. 89), it did not remain without trace at the political level. The relative low outflows from Toktogul were done at the expense of upstream Kyrgyzstan that experienced the catastrophic political impacts of water shortfall in the beginning of 2010. Trying to avoid hitting the "minimum level" in Toktogul, the Kyrgyz government had to increase the electricity price which was followed by frequent black-outs during the cold winter in 2009. Some scholars argue that high electricity tariffs introduced in

[33] See: "Strany TsA podpisali protokol ob ispolzovanii vodno-energeticheskikh resursov v TsA, v 2008 i 2009 godu," 20 October, 2008, *Ekonomika* [http://www.cis-news.info/read/73798/], 20 June, 2012.

early 2010 caused a lot of anger across the country, which consolidated the processes that led to the ouster of President Bakiev,[34] which, in turn, contributed to the violent ethnic clashes between Uzbeks and Kyrgyz.

Since 2008, there has been no real attempt by the riparian countries to sign the next multilateral agreement on the share of the Naryn/Syr Darya river basin. To a larger extent, this may be related again to the fact that Toktogul started to restore. Currently, there is no guarantee that the scenario of 1997 and 2007 will repeat in the future. According to the outcomes of this analysis, the next multilateral cooperation in the Naryn/Syr Darya river basin will occur when the water volume in Toktogul decreases to the extent that no water is available simultaneously for interests of upstream and downstream countries. In this context, it is also possible to assume that the multilateral cooperation will not occur anymore, since the riparian countries continue ensuring themselves unilaterally by building new hydro facilities in their territories.

Conclusion

Already in 2008, the profound analyses of Bernauer and Siegfried showed that water scarcity relates to cooperation and conflict trends in the Naryn/Syr Darya river basin: "…as soon as an extended period of low precipitation sets in, seasonal trade-offs will become manifest again and the conflict is likely to heat up very quickly."[35] Although this observation is accurate, this article attempted to extend their argument by suggesting that the water cooperation should develop in parallel to the conflict during the water low periods in the Naryn/Syr Darya river basin.

As it was argued in this article, the riparian countries of Syr Darya feel the need to cooperate because they all experience the same kind of stress from the water situation in Toktogul. This encourages the parties involved to share water as fair as possible among each other and fix it in relatively long-term multilateral agreements. Once the higher runoff period comes, the riparian countries cease to feel an acute need for water resources. As a result, these countries do not adhere to the obligations agreed within the framework of regional water management institutions or agreements.

Despite the fact that water scarcity is linked to water cooperation dynamics, it is important to consider other political, economic, geographic and hydrological aspects that tend to influence water cooperation. For instance, the willingness of the countries to cooperate does not depend merely on low or high water periods in Toktogul. This issue is also related to economic and political stability in the riparian countries. The instability in upstream Tajikistan, caused by the prolonged civil war during the 1990s and two revolutions in 2005 and 2010 in Kyrgyzstan must have rendered uncertain the agreed multilateral water regulations.

Moreover, it should be acknowledged that the findings in this article might be limited due to exclusion of other significant reservoirs along the Syr Darya river, such as Kayrakkum reservoir on the Kara Darya river—the second important tributary of Syr Darya. Kara Darya contributes annually 11.7 cu km to Syr Darya, whereas the Kayrakkum reservoir with its storage capacity of 4.2 cu km can also significantly influence the water volume in the Syr Darya basin. The implication of this is that with the new reservoirs in Ferghana, Karamansay, Razaksay and Kangkulsay, the Ferghana

[34] See: D. Gullet, *Analiticheskiye zametki o politike bezopasnosti v Tsentralnoy Azii*, No. 1, *Vozrozhdenie politiki energeticheskikh tarifov v Kyrgyzstane*, November 2011, available at [http://www.osce-academy.net/uploads/docs/gulette_version_to_upload__ru_.pdf], 20 June, 2012.

[35] T. Bernauer, T. Siegfried, "Compliance and Performance in International Water Agreements: The Case of the Naryn/Syr Darya Basin," *Global Governance*, No. 14, 2008, pp. 479-501.

Valley could be completely independent from the operation of the Toktogul reservoir. This may explain why there was no need for Uzbekistan to cooperate with upstream countries on long-term water regulations.

Thus, further research in this area should focus on the general degree of water scarcity, including operation modes of all reservoirs in the basin and its influence on conflict and cooperation dynamics in the basin. To what extent can water scarcity affect conflict trends and when does it start to stimulate cooperation? What can we expect when the next low precipitation and drought period comes? It is also important to consider the question of climate change in this process such as how climate change may influence water scarcity and cooperation dynamics in the Naryn/Syr Darya basin. The answers to these questions may prepare the riparian countries for preventing potential conflicts over water distribution.