EUROPE-ASIA STUDIES
Vol. 65, No. 10, December 2013, 1994–2013

Routledge
Taylor & Francis Group

The International Politics of Water Security in Central Asia

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Abstract

The article examines the international politics of water security in Central Asia with a particular focus on the level of regionalism. Are the five Central Asian states evolving into a region capable of solving water management problems on a regional basis? To examine the extent to which water has shaped the structure of Central Asian relations, I use water-related events. The empirical findings suggest that international relations of the Central Asian states are characterised by at least two sets of triads rather than a singular region. The presence of regional fragmentation is likely to exacerbate existing disputes over water and possibly destabilise the region.

FOLLOWING THE DISSOLUTION OF THE SOVIET UNION IN 1991 there was a general expectation that the newly independent Central Asian states would form a coherent economic, security and political regional unit, focused more on problems and actors within the region than on distant issues and actors. A number of factors supported this regional logic. First, the defining feature of Central Asia's international politics was that the new states had all formerly been part of the same Soviet system and, consequently, they remained bound together by a myriad of political, economic and ethnic connections.[1] Second, all five states inherited political and economic structures which subjected them to interdependence more extensive than anything in their dealings with the outside world (Webber 1996). Third, they were distinct from the other Soviet republics, with a population that was ethnically mostly Turkic, linguistically almost entirely Turkic-speaking, predominately Islamic in religion. Finally, the collapse of the Soviet Union left the Central Asian states with unequal distribution of natural resources. Asymmetry of resources, claims Gleason, should theoretically create 'the potential for a great many complementary

[1]The anomalous frontiers of most of the Central Asian states have no rationality, particularly with respect to ethnic divisions. Prior to Soviet occupation, the ethnic groups were so extensively intermingled that the Soviet imposition of new boundaries artificially severed them leaving sizable minorities outside the territory of their republics. For example, Uzbekistan's boundaries make the least sense with ethnic Uzbeks living on the other side of all its borders. The predominately Tajik cities of Samarkand and Bukhara were made part of Uzbekistan while leaving a large percentage of ethnic Uzbeks in Tajikistan.

ISSN 0966-8136 print; ISSN 1465-3427 online/13/1001994–20
http://dx.doi.org/10.1080/09668136.2013.848647

exchanges regarding fuel and water' since the upstream countries are energy-poor but water-rich, whereas the downstream countries are energy-rich but water-poor (2003, p. 46).

Given the foregoing shared factors, one would expect Central Asia to be a natural ground for the formation of what some international relations scholars call 'a regional subsystem'.[2] A regional subsystem is characterised by a regular and intense pattern of interaction among geographically proximate states. The boundaries of a region, in other words, are institutionalised by means of mutual interaction. The potential benefits of subsystemic interaction are well established. Yet nearly two decades after the collapse of the USSR the patterns of interaction among the Central Asian states have been less subsystemic, not more.

What accounts for the less than subsystemic tendencies exhibited by the Central Asian states? To what extent are the Central Asian states set on the path toward an eventual regional subsystem, either interacting with each other more than they do with others or at least satisfying some minimal level of interaction to be considered a regional group? Why have the Central Asian states, previously integrated into the broadly uniform network of Soviet political institutions and economic relationships, failed to evolve into a regional subsystem? Why, from a similar point of departure, have these countries pursued interstate relations that took them in different directions? Why have the Central Asian states generally been unable to forge and maintain relations that make use of their complementarities, especially in the area of natural resources? More importantly, what can the experiences of these countries teach us about the structure of regional politics in the post-Soviet period?

In this article I attempt to answer these questions by focusing on a key regional issue which has dominated the foreign policies of the Central Asian states since 1991. Over the past few years, it has become clear that Central Asia's international relations cannot be fully explained without serious recourse to the region's freshwater supplies and their equitable distribution among the Central Asian states. To illustrate the extent to which water has shaped the structure of intra-Central Asian relations in the post-Soviet period, I use water-related events as a type of interaction data. To interpret the results of water events, I draw on two theoretical approaches about the types of structure one might expect to find in Central Asia; namely, fully fledged interactive subsystem and fragmented subsystem. The focus of concern is limited to the 15 years following the demise of the USSR. Looking at 15 years rather than focusing on certain points in time helps reveal general structural patterns of interaction over time.

Why focus on water events as an indicator of subsystemic interaction? Water is a policy area which has instigated both conflict and cooperation in the region—which to some extent is what the subsystem idea is all about. Decisions made during the Soviet period provided the Central Asian states with common transport, energy and irrigation systems, which compelled the Central Asian states to manage natural resources jointly. The collapse of the Soviet Union divided the region into energy-rich and energy-deficit states. This has led to a major source of friction between energy-rich downstream states and water-rich upstream states. For example, Uzbek gas supplies to Kyrgyzstan were routinely disrupted during winter months inducing retaliatory threats from the latter to use its water reserves for hydroelectric heat generation. As such, the fundamental incompatibility between the respective demands of the downstream and upstream states has led to two contrary trends in

[2]For earlier significant contributors to the literature on regional subsystems, see Brecher (1963, 1969), Berton (1969), Cantori and Spiegel (1970), Thompson (1970, 1973, 1981) and Zartman (1967). For more recent works, see Lake and Morgan (1997) and Buzan and Waever (2003).

Central Asia—an impulse toward cooperation stemming from interdependence and a tendency toward conflict stemming from competition (Webber 1996).

Subsystemic approaches

The conventional approach is to assume that groups of states that are considered to be a 'natural' region (countries sharing borders or located close to each other geographically, and distinguished by culture and history) will form regional subsystems within the larger international system. The regional subsystem approach posits that states constituting a region regularly interact over particular issues and those states which do not belong to the same subsystem are characterised by a low degree of interaction. A regional subsystem entails patterns of interaction within a geographic area that 'exhibit a particular degree of regularity and intensity to the extent that a change at one point in the subsystem affects other points' (Thompson 1973, p. 101).[3] The approach also assumes that 'regions are composed of states in a partly autonomous network of interactions that constrain and shape their behavior' (Lake 1997, p. 48). While subsystemic members may have extra-regional concerns, 'their primary involvement in foreign affairs ordinarily lies in the region in which they find themselves' (Cantori & Spiegel 1970, p. 1).

The regional subsystems approach presupposes that regularly interacting proximate actors are likely to form one subsystem. An alternative approach assumes that in the developing world, especially in the aftermath of imperial disintegration, regional subsystems are unlikely to form because the foreign policies of individual states are too local to sustain larger collectivities and too weak to deal with relatively distant issues. This thinking is consistent with Dominguez (1971), who argues that as peripheries break away from the imperial centre, they are likely to face severe resource limitations and an increase in the probability of local conflicts. As a result, the interests of peripheral states become mainly local with little interaction on a broader regional scale. Thus, the dissolution of colonial empires initiates a trend toward the fragmentation of the world into pockets of smaller-scale subsystems.[4] In such a world order, states are likely to deal mainly with adjacent neighbours, often forming bilateral relations because, overloaded by domestic pressures and demands, they lack the resources to engage in regional projects. Once the international system breaks down into smaller units, new interaction opportunities emerge allowing previously dependent states to cultivate new foreign policy goals (Pickering & Thompson 1998). Affected by the new world order, peripheral states pursue foreign policy interests which are more closely tailored to their perceived local goals and needs.

Overview of water relations in Central Asia

Prior to 1991, decisions about the production and distribution of water in the region were centralised. Moscow imposed water quotas which favoured downstream countries at the expense of those upstream. In accordance with Moscow-imposed arrangements,

[3]This definition, first advanced by Thompson nearly 40 years ago, is still widely accepted as the best definition of regional subsystems. For recent applications of this definition, see Vayrynen (1984), Lake (1997) and Ayoob (1999).

[4]See Thompson (1981) and Pickering and Thompson (1998) for good summaries of Dominguez's argument.

water-abundant Kyrgyzstan and Tajikistan were supposed to supply irrigated agriculture economies of Uzbekistan, Turkmenistan and Kazakhstan with water in spring and summer for cotton fields. In exchange, the downstream states were supposed to supply Kyrgyzstan and Tajikistan with gas and coal when the latter experienced peaks in electricity demand in winter. The highly integrated network of irrigation systems was constructed and paid for by the Soviet government to satisfy Moscow's incessant demand for cotton (O'Hara 2000a). Under the Soviet system, water management was a domestic issue which meant that Moscow covered all maintenance and operating costs of dams and reservoirs. With the collapse of the USSR, '[a]ll of a sudden, a very complex [domestic] water management problem became a very complex [international] water management problem' (Viega da Cunha 1996, p. 6).

Disputes over water are largely the result of an allocation policy rather than scarcity of water supplies in the region (Gleason 2001). Indeed, according to World Bank estimates, Central Asian states consume at least twice as much water as industrialised states. Of the Central Asian states, Tajikistan and Turkmenistan are relatively water-rich, having more of it than most European countries. None of the Central Asian countries comes close to the rough indicator of water scarcity which is 1,000 m^3 *per capita*. Uzbekistan, for instance, has almost double the amount of water *per capita* in comparison to Spain, which is one of the major agricultural producers within Europe (Varis & Rahaman 2008). Rather, the problem is about unsustainable agricultural development and inefficient water use which has contributed to the accumulation of salts and pesticides in soils, which has further aggravated disputes over water allocation. More specifically, downstream states have inherited large agricultural sectors which are heavily dependent on irrigation, whereas water-rich upstream states together withdraw only 24% of total water supplies. By contrast, Uzbekistan withdraws 52% and 43% from the Syr Darya and Amu Darya rivers, respectively. Turkmenistan uses 43% of Amu Darya's total water, followed by Kazakhstan which withdraws 38%. This allocation arrangement clearly benefits the three downstream states which together receive 86% of withdrawals from the Amu Darya and 90% from the Syr Darya (see Table 1). The upstream states resent this allocation policy, which they claim is unfair.

Disputes over allocation are further aggravated by the enormous cost of maintaining the dams and reservoirs which are located in the territory of the upstream states and are therefore their financial responsibility (O'Hara 2000a). Tajikistan controls about 60% of total storage capacity of the Amu Darya and 9% of the Syr Darya. Kyrgyzstan's Toktogul Reservoir with a total storage capacity of 19 km^3 controls 58% of the Syr Darya water

TABLE 1
WATER ALLOCATIONS UNDER THE 1992 ALMATY AGREEMENT

Country	*Syr Darya allocation, %*	*Amu Darya allocation, %*
Kazakhstan	38.1	0
Kyrgyzstan	1.0	0.4
Tajikistan	9.2	13.6
Turkmenistan	0	43.0
Uzbekistan	51.7	43.0

Source: Modified from Table 1 in O'Hara (2000b, p. 434).

(O'Hara 2000b). However, the reservoir mainly benefits the downstream states, which is why the latter have been so adamant about retaining the Soviet-fixed allocation quotas. In order to pay for the maintenance of the reservoirs, the upstream states have proposed switching to a monetary system whereby the downstream states pay for water instead of exchanging it for other free goods. Additionally, the upstream states have sought to expand irrigation in their own territories and to increase hydropower production. The downstream states have responded mainly by cutting off gas and coal deliveries to the upstream states during peak electricity demand seasons. Consequently, in the post-1991 period, downstream and upstream states have pursued goals which were not always mutually supportive or in line with existing water treaties.

In most other regions where states share water systems, 'agreements and management structures between littoral states have gradually evolved over time' (Horsman 2001, p. 72). This was not the case for the Central Asian states which were forced to develop management strategies quickly. The Central Asian states entered into an agreement regulating water allocation in the region at the 1992 Almaty meeting, which left the existing water quotas largely intact despite the emergence of new national boundaries and new regional challenges. As a result, downstream states continued to receive the largest quotas while the upstream states were given much smaller quotas due to their smaller populations and low cotton production. The one positive event to emerge from the Almaty Agreement was the establishment of the Interstate Water Management Coordination Commission (IWMC) with a mandate to control rational utilisation of the trans-boundary water resources. However, both upstream and downstream states have routinely failed to uphold the IWMC quotas as the Central Asian states have pursued individual policies to increase their irrigated lands. According to some estimates, Turkmenistan and Uzbekistan are in the process of expanding their irrigated land total by 600,000 hectares (or close to 1.5 million acres). Similarly, Kyrgyzstan and Tajikistan seek to increase irrigation land by 400,000 hectares and up to 140,000 hectares, respectively (Micklin 2000; Weinthal 2006). Further expansion of irrigated land would exacerbate disputes over the already contested water allocation quotas.

Data source and analysis

What is the role of water in structuring the international relations of the Central Asian states? To measure the level and intensity of interstate interaction over water, I use the International Water Events Database (IWED) which is part of the Transboundary Freshwater Dispute Database (TFDD),[5] developed by the Department of Geosciences at Oregon State University. The database contains events data on historical international water relations from 1948 to 2008. It documents most of the reported instances of conflict and cooperation over international freshwater resources in several river basins around the world. I focus on the water-related events of the Aral Sea basin, which includes all five Central Asian states. For each event, the database lists the actors involved, date of interaction, the main issue discussed and level of intensity on the conflict–cooperation scale. According to the founders of the database, water events are defined as 'instances of conflict and cooperation that occur within an international river basin; involve the nations riparian to that

[5]TFDD is an electronic collection of several databases consisting of water-related events and international water treaties. The database is available online at: http://www.transboundarywaters.orst.edu/database/, accessed 25 August 2013.

basin; and concern freshwater as a scarce or consumable resource (e.g. water quantity, water quality) or as a quantity to be managed (e.g. flooding or flood control, water levels for navigational purposes)' (Yoffe *et al.* 2003, p. 1110).

The event data are widely used by scholars to explain international relations in a quantitative framework. They first emerged in the field of foreign policy analysis in response to traditional methods which primarily used narrative sources such as documents, histories and memoirs. They have since been mainly used to understand and predict international conflict. One of the important contributors to the event data, Philip Schrodt, explains the methodology behind events data collection:

> Event data are generated by examining thousands of newspaper reports on the day to day interactions of nation-states and assigning each reported interaction a numerical score or a categorical code. ... When these reports are averaged over time, they provide a rough indication of the level of cooperation and conflict between two states. (1993, p. 1)

The water events database is compiled using two types of sources: existing political science events datasets and electronic news databases such as the Foreign Broadcast Information Service (FBIS), the World News Connection (WNC) and Lexis-Nexis (Yoffe & Larson 2001).

Two aspects of the water events database require explanation. First, even though the IWED documents water relations classified by their level of cooperation and conflict, the database is designed to identify basins at potential risk for future international conflict. As such, the data are slightly biased toward conflictual relations. However, in their initial analysis of approximately 1,800 water-related events for 124 countries, Yoffe *et al.* (2003) find that generally cooperative relations outweigh conflictual ones. This provides some degree of certainty that the goals of the IWED will not skew the findings. Second, while the water events database documents most of the water relations in the Aral Basin, it excludes incidents that do not specifically mention water terms (such as water resources and hydropower) and terms of cooperation or conflict (such as disputes, war, accords and treaties). As Yoffe and Larson admit in the methodology section of the water events database:

> Despite the advantages of electronically searchable information sources, one should also be aware of the constraints that database (and search engine) structure place on the efficiency and accuracy of searching for specific information, especially if that information was not a key component in the initial creation of the data source being mined. (2001, p. 18)

Since my objective in this article is specifically to delineate regional boundaries based on the regularity and intensity of interstate interaction, any incident of interstate interaction over water counts as an event in my analysis. As such, I supplemented the IWED data by conducting my own primary search using more specific keywords. I used the FBIS, which contains translated news reports from countries around the world, and the WNC, which is an electronic version of the FBIS. As a result, I verified the data in the IWED, but more importantly, I identified relevant events from both the FBIS and WNC about interstate interactions related to freshwater resources. Table 2 provides a sample of what the water events database looks like.

Since a subsystem is about interactions, the final dataset is restricted to water events that involve at least two states in the 1992–2006 period. For example, incidents that entail a

TABLE 2
SAMPLE OF WATER-RELATED EVENTS IN THE ARAL SEA BASIN, 1992–2006

Date	*Countries involved*	*Amu vs. Syr*	*Event summary*	*Issue type*	*Source*
20 September 1995	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	Both	Nukus Declaration on the problems of sustainable development of the Aral Sea Basin	Joint management	ITAR-TASS, WNC
16 January 1996	Turkmenistan, Uzbekistan	Amu	Uzbekistan and Turkmenistan sign a package of 21 cooperation agreements, including an outline political treaty and agreements on border protection, water use, oil exploitation	Joint management	Interfax, WNC
17 March 1998	Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan	Syr	Agreement on Cooperation in the Area of Environment and Rational Nature Use	Water quality	TFDD

Source: Modified from the TFDD database.

single government making a statement about water are omitted from the dataset. The events data are further aggregated into five-year periods in order to identify general structural tendencies over time, and account for the influence of major events on the international politics of the region.

The final dataset consists of 183 water-related events in the Aral Sea basin from 1992 to 2006 (see Table 3). The data include events for the five Central Asian states and approximately 25 other countries, most of which were involved in only one or two events over the 15 years. The role of extra-regional actors was partly limited to providing aid to regional water management projects, construction of hydropower plants, and to alleviating problems associated with the desiccation of the Aral Sea. Although about 47% of water events include at least one non-Central Asian country, the majority of the events are concentrated among the Central Asian states. The dataset begins with the signing of the Almaty Agreement on 18 February 1992 and ends with several bilateral meetings concluded on 26 December 2006 by heads of state while attending the funeral of Turkmenistan's president Saparmyrat Niyazov in Ashgabat.

The summary of water events reveals at least two general patterns about the structure of international relations of the Central Asian states unfolding in the post-Soviet period. Overall, bilateral relations far outweighed multilateral relations. A large portion of the bilateral relations tended to concern water quantity, water usage, water cut-off and controversy over construction of hydropower stations. This is consistent with general patterns of water relations found in other basins of the world where states find it difficult to reach multilateral agreements on such issues as water quantity and allocation (Yoffe *et al.* 2003). By contrast, multilateral freshwater interactions emphasised joint management, water quality and ecological problems facing the Aral Sea basin.[6] The data in Table 3 also

[6]For a detailed analysis of the Aral Sea environmental disaster, see Micklin (2000, 2006).

TABLE 3
SUMMARY OF WATER EVENTS, 1992–2006

Year	*Number of events*	*Bilateral/multilateral*
1992	4	Multilateral (4)
1993	4	Bilateral (1), Multilateral (3)
1994	2	Multilateral (2)
1995	5	Bilateral (1), Multilateral (4)
1996	6	Bilateral (3), Multilateral (3)
Total number of events in 1992–1996 = 21 (BI—5, MU—16)		
1997	17	Bilateral (7), Multilateral (10)
1998	12	Bilateral (6), Multilateral (6)
1999	17	Bilateral (12), Multilateral (5)
2000	12	Bilateral (10), Multilateral (2)
2001	5	Bilateral (5)
Total number of events in 1997–2001 = 63 (BI—40, MU—23)		
2002	12	Bilateral (8), Multilateral (4)
2003	15	Bilateral (9), Multilateral (6)
2004	16	Bilateral (9), Multilateral (7)
2005	23	Bilateral (14), Multilateral (9)
2006	33	Bilateral (22), Multilateral (11)
Total number of events in 2002–2006 = 99 (BI—60, MU—35)		
Total number of events = 183		

Source: Author's calculations from the data obtained from TFDD, WNC.

suggest that the number of interactions increased with each five-year period. As the Central Asian states consolidated their governments, whose economies heavily depended on agriculture, the tension over water use intensified between downstream and upstream states. What began in the early 1990s as joint efforts to manage the region's two main freshwater rivers shifted to bilateral disputes by the mid-to-late 1990s. The following sections examine general patterns of interaction in each of the five-year periods separately.

Period I: 1992–1996

The period immediately following independence was marked by relatively few reported instances of water-related events in the region. However, of the documented events, most of them involved at least three of the Central Asian states. Multilateral relations outweighed bilateral relations over water. Of the 21 reported events, 76% (16 events) were multilateral and 24% (five events) bilateral. Overall, joint management, water quality and ecological problems were prevalent in events involving several states. Table 4 identifies the main actors involved in this period. Among the five Central Asian states, Kazakhstan was the most interactive in the region's water relations (19 events). At the low end, Tajikistan took part in 12 events, with the other three Central Asian states falling somewhere in between. The findings suggest that while interactions over water among the Central Asian states were hardly intense in this period (with an average of four interactions per year), nevertheless, the Central Asian states tended to deal with water issues locally.

The data on water events also reveal that in the early 1990s, external powers were not prominent in the water relations of the Central Asian states. Of the documented events,

TABLE 4
PARTICIPATION IN WATER EVENTS BY STATE, 1992–2006

	1992–1996	*1997–2001*	*2002–2006*
Kazakhstan	19	42	41
Kyrgyzstan	15	35	38
Tajikistan	12	30	52
Turkmenistan	13	17	25
Uzbekistan	16	41	54
Russia	4	5	17
China/Xinjiang	1	4	6
USA	–	2	3
Turkey	–	2	–
Japan	–	1	5
Afghanistan	–	–	9
Iran	–	–	17
Belarus	–	–	6

Source: Author's calculations from the data obtained from TFDD, WNC.

Russia's involvement in the region was limited to four events, of which three were bilateral agreements with Kazakhstan over joint management of the trans-boundary rivers of Ob, Ural, Volga and Tobol. A possible rerouting of excess water from these rivers could increase Russia's involvement in the region's water relations in the future. In theory, a canal from Siberia across Kazakhstan to Uzbekistan would solve the problem of water shortage in Uzbekistan and help Russia control the flow of these rivers which tend to flood frequently. Politically, it could ensure dependency in Uzbekistan and possibly in Kazakhstan on Russian water. However, there has been much Russian nationalist as well as scientific opposition to the diversion of these rivers to Central Asia due to the significant impact it would have on the ecology of the Siberian river basins. As it stands, Moscow still needs to study the possible environmental impact of this project, which may also 'prove more expensive than any benefit could justify' (ICG 2002, p. 26).

China's interaction in the region entailed signing a bilateral agreement with Kyrgyzstan over sharing of four trans-boundary rivers along the Kyrgyz–Xinjiang border. The EU's role in the region involved an appeal by the Kazakh ambassador to the EU about the ecological problems of the Aral Sea. In short, none of the three external powers seem to have played any role in influencing how the Central Asian states dealt with regional issues such as joint management, water shortage and flooding caused by the release of excessive water from the reservoirs.

Period II: 1997–2001

In the second five-year period, there were 63 events, of which an overwhelming majority was bilateral (63%), and the rest were multilateral (37%). The one trend which remained the same in the first two periods was the salience of the Central Asian states in water relations of the region. At the high end, Kazakhstan participated in 42 of the water-related events with Uzbekistan and Kyrgyzstan following in close second and third places, respectively. At the low end, Turkmenistan interacted in only 17 of the interstate relations. While this number

seems rather low, Turkmenistan still managed to participate in more water-related events than all the external actors combined, including Russia (five events), China (four), the USA and Turkey (two each), and Japan (one). Russia's involvement in the region in the late 1990s was limited to bilateral relations with mainly Kazakhstan and Tajikistan over water quality and construction of hydropower stations, respectively. The important issues of water use and supply, water cut-off and shortage tended to involve the participation of at least four of the Central Asian states.

According to the data summarised in Table 3, the late 1990s saw a shift in two regional patterns of interaction over water. First, while multilateral relations stayed more or less constant between the two periods, the number of bilateral relations increased many-fold in the second period. Just about all the multilateral relations involved a joint effort by the Central Asian states to address the ecological problems facing the Aral Sea region. By contrast, issues of water supply by upstream states to the irrigated fields of the downstream states dominated bilateral relations. This period was also characterised by deliberate efforts sought by the Central Asian states to resolve their water problems bilaterally rather than multilaterally, which may explain why there were so many instances of bilateral interactions.

Second, the overall number of interactions in the second five-year period tripled from 21 to 63 events. The remarkable increase in events is mainly due to an increase in interstate disputes, which were triggered by such events as Kyrgyzstan's decision to charge its neighbours for water in 1997, periodic cutting of gas and coal deliveries to upstream states, and Uzbekistan's continual expansion of its irrigated land.

The Kyrgyz parliament's decision to issue a decree in June 1997 to end the free supply of water from Kyrgyzstan's rivers to its neighbours triggered a series of retaliations by the downstream Central Asian states which had used the region's water as a common pool resource rather than a commodity (Parshin 2008). In the decree, Bishkek demanded that Uzbekistan, Kazakhstan and Tajikistan pay for the water emanating from Kyrgyzstan's reservoirs. Kyrgyzstan maintained that water was essentially the same as oil and consequently 'should be priced like any other commodity to reflect its value as determined by what the market will bear' (Gleason 2003, p. 46). Moreover, Kyrgyzstan claimed that it was spending more money to maintain its reservoirs than it received in economic benefits (Horsman 2001), and therefore wanted the downstream states to share some of the financial burden, especially since the latter were the main beneficiaries (Weinthal 2006).

As the major beneficiary from Kyrgyzstan's free water, Uzbekistan was particularly vocal in its opposition to the Kyrgyz decree. As a result, conflictual relations between Uzbekistan and Kyrgyzstan intensified. Tashkent claimed that the Kyrgyz decision to charge for water violated the 1992 Almaty Agreement under which water and energy were exchanged freely between water-abundant upstream states and energy-rich downstream states. Uzbekistan further claimed that Kyrgyzstan violated the 1995 bilateral swap agreement under which Kyrgyzstan had agreed to release sufficient supply of water to Uzbek farmers during peak cotton season in exchange for which Uzbekistan had agreed to supply its neighbour with natural gas in winter.

However, neither bilateral nor multilateral swap agreements were sustainable because during the mid-1990s Uzbekistan and Kazakhstan began to formulate their energy development strategies independently of the needs of the upstream states. For example, Uzbekistan decided to be self-sufficient in oil and gas production to avoid using its cotton revenue to pay for Russian energy at world prices. With increased energy production,

Uzbekistan became a net exporter of gas for which it demanded world market prices. Around the same time, Kazakhstan began to privatise its energy sector, which meant that it, too, sought hard currency for its energy exports to the upstream states (Weinthal 2006). The upstream states, whose economies were already weak due to the lack of natural resources, began to mount debts. Without hard currency to purchase energy, Kyrgyzstan began to operate its power plants for electricity generation to satisfy domestic needs for heat in winter. The chain of events that followed compelled the Central Asian states to increase interaction over fresh water resources.

The periodic cutting off of energy deliveries to the upstream states halted water supplies to the downstream states. In 1997, for instance, Kyrgyzstan received only 130,000 tonnes of coal instead of the agreed 600,000 tonnes from Kazakhstan. Similarly, since 1998, Uzbekistan has intermittently cut off gas deliveries to Kyrgyzstan citing Bishkek's mounting debts, which according to a recent report are estimated at $19 million (Khamidov 2009). 'The large amounts of water needed by Uzbekistan to sustain the agricultural sector of its economy require that it negotiate with its upstream neighbours on an almost continual basis' (McKinney 2004, p. 207). However, the gas cut-off has proven counterproductive for Tashkent since it has only reinforced Kyrgyzstan's resolve to divert water from irrigation to domestic energy production.

Perhaps, the most persistent source of tension between the upstream and downstream states in this period was the latter's continual expansion of irrigated land and agricultural production. For example, in 1997 cotton harvest in Uzbekistan increased by 50%. Similarly, rice production in Kazakhstan grew from 23,000 to 654,000 tonnes.[7] According to the *Itar-Tass* news agency, in 1999 Tashkent increased total agricultural output by 6% compared to the previous year, of which cotton constituted four million tonnes (compared with 3.2 million tonnes in 1998 and 3.7 million in 1997). Meanwhile, Kyrgyzstan, which produced 51 billion cubic metres of water, consumed only one-fifth of that.

Period III: 2002–2006

The third five-year period contained the most number of reported events (99), of which 39% were multilateral and 61% were bilateral. Interestingly, while the total number of events in this period increased from the previous period, the ratio of bilateral to multilateral relations in both periods remained almost identical. Four issues—hydropower, water quantity, water management and water cooperation—dominated the events between 2002 and 2006. Roughly 20% of the interactions concerned water quantity. Surprisingly, interstate interactions concerning the environmental problems of the Aral Sea declined in period III with only a few multilateral events in 2002 and 2003. This is largely due to deliberate attempts sought by Kazakhstan and Uzbekistan—two states affected by the Aral Sea disaster directly—to solve the ecological problems unilaterally or at the very least bilaterally with various international financial and aid organisations such as the World Bank, the Asian Development Bank, the United Nations and the Organization for Security and Cooperation in Europe.

Consistent with the patterns observed in the previous two periods, the Central Asian states remained the most prominent players in period III. Uzbekistan and Tajikistan each

[7] *Rossiiskaya Gazeta*, 6 August 1997.

participated in over 50 out of 99 total events. Kazakhstan and Kyrgyzstan interacted in about 40 events in the region. Turkmenistan was the least interactive of the five Central Asian states accounting for only 25% of the total interactions. In this period, external powers such as Russia (with 17 interactions), Iran (with 17), and to a lesser extent Afghanistan (nine) and China (six) increased their interactions in the region. Over half of Russia's interactions were bilateral relations with mainly two Central Asian states. Russia was instrumental in funding the reconstruction of Tajikistan's existing hydroelectric power plants and aiding Dushanbe with its new power plant Rogun. Since the upstream states are allies of Russia, the latter has supported the upstream states' ambitious plans to build new power plants since both states house Russian military bases. Russia also interacted with Kazakhstan over trans-boundary division of water.

Iran's involvement in the region in the 2002–2006 period was limited to bilateral relations with Turkmenistan and Tajikistan. More than half of Iran's interaction was with Tajikistan over the construction of hydropower plants. On this particular issue, Iran competed with Russia for developing Tajikistan's hydropower production capacity with the ultimate goal of importing hydroelectricity in the future. During the same period, Iran interacted a few times with Turkmenistan over the construction of the Friendship Dam located along their shared borders.

Afghanistan's increased interaction in the region is largely the result of the post-Taliban effort to diversify the Afghan economy. A new political environment as well as US-led efforts to push the Afghans away from poppies to more irrigation-based agriculture modestly increased Afghanistan's contact with its Central Asian neighbours. Even so, Afghanistan's interaction has been limited only to Tajikistan. As upstream states, both see water as a potential source of hydroelectric power and irrigation. As such, '[t]here may be scope for the two to work together to strengthen their position *vis-à-vis* the downstream states' (Horsman 2008, p. 70).

Furthermore, revival of the agricultural sector in northern Afghanistan is critical for the state's economy, particularly since this region is considered to be the most fertile land in Afghanistan (Ahmad & Wasiq 2004). If Afghanistan manages to rebuild its agricultural sector, previously devastated due to decades of war, it will require more withdrawals of water from the Amu Darya with an impact downstream. While some scholars are sceptical about the level of Afghanistan's impact on the downstream states (Horsman 2008), it has been argued elsewhere that increased water diversions from the Amu Darya could 'exacerbate economic hardship, environmental destruction and fuel interstate conflict over water' (Weinthal 2006, p. 19). Whatever the impact of Afghanistan's increased water use, the water events data suggest that Afghanistan's interaction with its riparian neighbours is likely to remain limited, at least for the foreseeable future.

The one issue type which constituted a constant source of tension in the 2002–2006 period was the construction of new hydropower plants in the upstream states. The construction of Kambarata in Kyrgyzstan and Rogun in Tajikistan will inevitably limit water allocated to the downstream states. The controversy over the construction of hydropower plants has been further aggravated by the absence of natural resources in the upstream states. Both Kyrgyzstan and Tajikistan emerged from the Soviet Union as the poorest republics and therefore require water to generate electricity for export as well as to increase irrigated land. Kyrgyzstan has been particularly hard hit with severe power shortages in winter due to the failure of its neighbours to make up the country's electricity

shortfall. In response, not only has Bishkek increased electricity production from the Toktogul plant to satisfy local demand for heat but it has been actively promoting the construction of a new power plant to generate electricity for export. Uzbek President Karimov has staunchly opposed plans to build Kambarata, for which Russia has already pledged $1.7 billion in credits.[8]

Similar disputes marked water relations between Uzbekistan and Tajikistan in the post-2002 period. Like Kyrgyzstan, Tajikistan too depends on gas deliveries from Uzbekistan, which has 'a virtual monopoly on energy supplies' to its neighbours (Pannier 2008). Due to the erratic nature of gas deliveries, Tajikistan has been actively seeking funds to complete the Rogun dam, whose construction first began in the 1980s but halted when the collapse of the Soviet Union led to the Tajik civil war. The Rogum dam could easily break Tajikistan's dependence on Uzbek gas to satisfy domestic needs as well as generate enough electricity for export. While in principle, nobody could prevent Tajikistan from using more water than was allocated by the quota agreements due to its decimated infrastructure from years of civil strife (ICG 2002), the Rogun dam will inevitably reduce water supplies to downstream states, which means that Tajikistan will need to reach an agreement with Turkmenistan and Uzbekistan—two states that have adamantly opposed its construction.

Discussion of findings vis-à-vis *subsystemic models*

A fully fledged interactive subsystem

The findings from the water events data provide limited support for the fully fledged interactive model. Of the 178 water-related events in the 1992–2006 period, only 26 events actually involved the interaction of all five Central Asian states. This is roughly 15% of the total of water events that took place in Central Asia following independence. An overwhelming majority of these multilateral interactions dealt with the Aral Sea environmental disaster. While some of the earlier interactions resulted in the establishment of various institutions to save the Aral Sea, empirical evidence suggests that the Central Asian states have yet to address the root source of the Aral Sea's problems, that is irrigation. During the 15 years under analysis, the water levels of the Aral Sea continued to drop while the water needs of the Central Asian states continued to grow. Cotton remained the region's most significant cash crop accounting for more than 90% of total water use with the downstream states using 85% of it (McKinney 2004). Cotton remained the region's 'most strategic crop' generating significant state revenues and providing a critical source of employment for Uzbekistan and Turkmenistan (Weinthal 2006, p. 19). Thus, no serious efforts to diversify agriculture toward replacing cotton with less thirsty crops have been undertaken. The only thing the Central Asian states have achieved in their interstate water relations was negotiating for more water rather than cutting back on their usage.

A fragmented subsystem

Most of the evidence from the water events data points to the presence of two small-scale subsystems along the region's two main rivers. About 40% of the interstate interactions in

[8]'Central Asian Leaders Clash over Water at Aral Sea Summit', *Eurasia News*, 28 April 2009, available at: http://www.eurasianet.org/departments/insightb/articles/eav042909.shtml, accessed 22 December 2011.

the region was concentrated among states contiguous to the Amu Darya river and 57% of the interactions involved states in the Syr Darya basin (see Table 5). More crucially, water relations in both basins increased over time. In the Amu Darya basin interstate interactions over water nearly doubled in each five-year period. Similarly, in the Syr Darya basin, water relations doubled in period II but remained relatively constant in the post-2002 period. With fewer dams and hydropower plants, the Amu Darya was much less regulated than the Syr Darya, which might explain why there were fewer interactions among the Amu Darya states relative to interactions among the Syr Darya states. Still, there was considerable discontent along the length of the Amu Darya over water quantity. The two river basins overlapped around Uzbekistan. Due to its location as a midstream state and the size of its irrigated land, Uzbekistan regularly interacted in both river basins receiving about 50% of freshwater supplies from each of the rivers. All these patterns point to the presence of a fragmented region with the Central Asian states operating within their respective triads.

TABLE 5
DISTRIBUTION OF WATER EVENTS BY RIVER BASINS

	1992–1996	*1997–2001*	*2002–2006*	*Total*
Amu Darya	13	21	38	72
Syr Darya	20	38	43	101

Source: Author's calculations from the data obtained from TFDD, WNC.

Competing demands for freshwater supplies have been a key source of tension among the Central Asian states in the post-1991 period. The Syr Darya basin has locked Kyrgyzstan, Uzbekistan and Kazakhstan in a complex array of barter agreements involving water use and energy provision. In the post-1991 period, interstate interaction in the Syr Darya basin centred on the operation of the Toktogul reservoir located in the upstream state of Kyrgyzstan. The reservoir was designed during the Soviet period to facilitate irrigated agriculture in Uzbekistan and Kazakhstan. According to the original plan and design, the Toktogul reservoir was supposed to operate under the so-called 'irrigation mode', which calls for 75% of annual water releases to take place in summer and 25% in winter. In exchange, Uzbekistan and Kazakhstan agreed to buy surplus electricity generated by the Toktogul in summer and deliver gas and coal to Kyrgyzstan in winter. When the Soviet Union dissolved, Kyrgyzstan could no longer afford to import fossil fuels, for which Kazakhstan and Uzbekistan charged world market prices. As a result, Kyrgyzstan began to operate Toktogul in a 'power mode', releasing more water in winter to produce more electricity. For instance, during 1990 and 2000, summer releases declined to 45% and winter releases increased to 55% (ICG 2002). As a consequence, Uzbekistan and Kazakhstan faced water shortages for irrigation in summer and flooding in winter.

Of the three Syr Darya states, Kyrgyzstan and Uzbekistan have had the most interaction over water and energy. Often, the dyadic disputes had negative implications for the farmers living in the southern regions of Kazakhstan. For example, the decision by Bishkek to charge downstream states for water in 1997 meant that Uzbekistan did not receive sufficient water supplies during its peak cotton irrigation season. This prompted Uzbekistan to reduce

the flow of water to southern Kazakhstan. Consequently, Kazakh farmers protested against Uzbek border guards. A tripartite dispute between Kyrgyzstan, Uzbekistan and Kazakhstan repeated itself again in July 2000 when southern Kazakhstan faced a serious water shortage after Bishkek reduced supplies in retaliation for Kazakhstan's failure to supply coal in exchange for Kyrgyz water and electricity. The water shortage in southern Kazakhstan, which is the most important cotton growing area of the country, was further aggravated by Uzbekistan's failure to adhere to the schedule of water use approved by an interstate water commission set up in 1998. The result was a tragedy of the commons in which nobody benefited.

Intensifying the water security disputes is the inefficient use of water. According to Dyushen Mamatkanov, the director of the Kyrgyz National Water and Hydropower Institute, the Central Asian states waste $2 billion annually due to poor water management (Parshin 2008). The lack of fortifications needed along riverbanks to stop rivers from overflowing also cause seasonal floods in Tajikistan (Parshin 2008). In southern Kazakhstan floods in 2008 forced the evacuation of 13,000 people, with 5,000 forced temporarily into tents. These floods have caused at least $125 million worth of damage. In the Kyzylorda region of Kazakhstan 400 families had to be resettled even in a relatively mild flood season (Lillis 2009). Kyrgyzstan's ageing energy infrastructure also plays a big factor in the country's energy shortage problem. According to Kyrgyzgaz, a state-operated gas company, in 2009 the state lost 53 m^3 of gas, or roughly 25% of its overall imports, due to holes in the pipelines (Khamidov 2009). Instead of coming together to resolve these potentially devastating regional problems, the Central Asian states have, for the most part, been acting in their own self-interest, often limiting interaction to their respective river basins.

The Amu Darya basin can be characterised in terms of Tajik–Uzbek and Turkmen–Uzbek relations. Due to rapid population growth and increasing shortage of food, Tajikistan has been seeking to expand its irrigated lands and generate more electricity for export. Both plans call for the cutting of water supplies allocated for irrigation downstream. Ironically, Tajikistan has the greatest hydroelectric capacity in Central Asia, with an estimated potential to produce over 300 billion kilowatt-hours of electricity annually and is the world's third largest producer of hydropower (Najibullah 2007). Yet Tajikistan's hydropower plants currently produce only about 17 billion kilowatt-hours of electricity annually. Ironically, it is 'the only country in Central Asia that faces such severe seasonal power shortages, with towns and villages receiving electricity for only a few hours during the early mornings and evenings' (Najibullah 2007).

Turkmen–Uzbek water relations affect about 18 million people who live off the water of the Amu Darya. At the 1996 water agreement the two states agreed to withdraw an equal amount of water from the Amu Darya even though 14 million Uzbeks depend on it compared to four million Turkmens. This agreement is seen by many Uzbeks as unfair since Uzbekistan has more land to irrigate than Turkmenistan. Turkmen–Uzbek relations have also been mired in disputes over exceeding quotas. Turkmenistan has routinely overdrawn its water share from the Amu Darya to sustain its Karakum Canal—an artificial canal built during the Soviet period to irrigate the desert lands of Turkmenistan. But the Karakum Canal is poorly maintained and seriously inefficient in terms of water loss and delivery (O'Hara & Hannan 1999). Rather than implementing expensive reconstruction work on the canal, Ashgabat has been withdrawing more water from the Amu Darya—a strategy which has intensified conflictual relations with Uzbekistan.

Reflections on post-2006 water relations

The current water relations of the Central Asian states for the most part continue to maintain the fragmented structures of the pre-2006 period. Interstate interactions are mainly limited to conflictual relations between the upstream and downstream states within the boundaries of the two river basins. A good example of the fragmented nature of international relations in the region manifested itself in 2007 when Uzbekistan halted the transfer of Turkmen electricity to Tajikistan. Uzbekistan demanded 10% of the $0.03 per kilowatt paid by Tajikistan to Turkmenistan, which agreed to deliver 1.3 billion kilowatts of electricity to Tajikistan for the period December 2008–January 2009. Failure to agree on a transit fee for Turkmen electricity crossing Uzbek territory into Tajikistan forced Dushanbe to operate its power plants at full capacity, which reduced water supply to Uzbekistan and forced Ashgabat to suspend its electricity indefinitely during transit negotiations (Najibullah 2007). As a result, many people in Tajikistan suffered from freezing conditions, Uzbek farms experienced drought, and the Turkmen government lost revenue.

A recent decision by Uzbekistan to withdraw from the Central Asian Unified Grid System further complicated the water management crisis. The unified power system is a mechanism which was set up by the Central Asian states in 2001 to coordinate energy swaps and deliveries (Khamidov 2009). In the Soviet era, the upstream states supplied surplus electricity from their hydropower plants to the three downstream countries in summer, in exchange for deliveries of gas and electricity in winter. Turkmenistan was the first to withdraw from the unified system in 2003. Kazakhstan announced its intention to withdraw from the shared power system in November 2009, seeking to develop its domestic power system independently. 'Uzbekistan's departure from this system is expected to hurt the efficiency of regional electricity distribution, potentially leading to more waste in isolated power-strapped countries such as Kyrgyzstan and Tajikistan' (Khamidov 2009). Of the two Central Asian states which depend on the power system the most, Kyrgyzstan has been assured of support from Kazakhstan due to their friendly relations, while Tajikistan has literally been left in the cold (Nuttall 2009).

Despite the fragmented structure of international relations, some recent events suggest a possible shift toward more regional subsystemic interactions. At least, there have been increased instances of interaction between the two triads. Namely, Bishkek's decision to push forward with plans to build the Kambarata hydropower station in winter 2008 escalated Uzbek–Kyrgyz tensions in the Syr Darya basin, but more importantly, forced Tashkent to collaborate with its long-time adversary across the Amu Darya in Turkmenistan. In a rare instance of regional diplomacy at a water summit in 2009, the leaders of Uzbekistan and Turkmenistan presented a united front against the construction of hydropower plants in the upstream states.[9] Uzbekistan and Turkmenistan have been particularly vocal in their opposition to ambitious Kyrgyz and Tajik hydroelectric projects (Lillis 2009).

Another instance of possible regional interaction took place over water shortage between the two upstream states.[10] The Kyrgyz–Tajik border area is primarily agrarian, and farmers on both sides of the border shared irrigation systems for decades prior to independence.

[9] 'Central Asian Leaders Clash over Water at Aral Sea Summit', *Eurasia News*, 28 April 2009, available at: http://www.eurasianet.org/departments/insightb/articles/eav042909.shtml, accessed 22 December 2011.

[10] 'Ambiguous Kyrgyz–Tajik Border Increases Risk of Conflict', *Eurasia News*, 1 February 2009, available at: http://www.eurasianet.org/departments/insightb/articles/eav020209b.shtml, accessed 25 August 2013.

After 1991, however, a serious water shortage caused by antiquated irrigation systems and the failure of the governments to repair and upgrade the existing infrastructure compelled local farmers to take matters into their own hands. In March 2008, a group of 150 Tajiks crossed into Kyrgyzstan to destroy a dam where they were met by Kyrgyz border guards. Consequently, a violent clash ensued between the Tajik and Kyrgyz farmers, thereby intensifying interaction between the members of two separate river basins.[11]

The inability of the Central Asian states to resolve vital water-management issues in Central Asia was reflected at a meeting of the International Fund for Saving the Aral Sea, held in Dushanbe in October 2008. The meeting was convened 'to lay the groundwork for a regional water doctrine to govern the long-term use of Central Asian resources' but ended in the usual manner of yielding no general consensus among the Central Asian states (Parshin 2008). The situation was further complicated by the conspicuous absence of representatives from Uzbekistan, which is ironically the only Central Asian state whose irrigated land exceeds those of the four Central Asian states combined (McKinney 2004).

In May 2009, Kazakhstan hosted a UNESCO-led workshop on trans-boundary groundwater in Central Asia. The aim of the workshop was to share information on trans-boundary groundwater in Central Asia and to identify areas of cooperation in solving the region's water problems on a regional basis and in cooperation with international organisations. A follow-up workshop took place in Almaty in September 2011. Except for Turkmenistan, the other four Central Asian states were represented by various ministries. Within the framework of the UNESCO International Shared Aquifer Resources Management (ISARM) initiative, the second workshop also stressed the need for an integrated approach to trans-boundary aquifer management in Central Asia. While the workshops constituted nothing more than a formal gathering of state officials, they nevertheless opened up the intra-regional discussion on water security in the region.[12]

Conclusion

This article has analysed the impact of water resources on the structure of post-Soviet Central Asian international relations. A close examination of water events in the region over the 1992–2006 period suggests that the international relations of the Central Asian states are characterised by two fragmented subsystems operating in the Amu Darya and Syr Darya basins. Central Asia's major rivers have become a focus for growing competition and conflict among their riparian states. Independence from the Soviet Union created asymmetries of interests, capabilities and natural resource endowments in the region, which has locked Uzbekistan, Kyrgyzstan and Kazakhstan in a bitter dispute over water in the Syr Darya basin, and Turkmenistan, Uzbekistan and Tajikistan in the Amu Darya basin. The upstream countries have comparatively less leverage than the downstream states; they are poorer, smaller in size, less powerful and have fewer resources to develop.

Uzbekistan and Turkmenistan could reduce their water needs by shifting away from cotton. However, cotton is such a lucrative harvest that any fall in cotton income would only further impoverish a rural population already in difficult straits. As long as cotton

[11] 'Ambiguous Kyrgyz–Tajik Border Increases Risk of Conflict', *Eurasia News*, 1 February 2009, available at: http://www.eurasianet.org/departments/insightb/articles/eav020209b.shtml, accessed 25 August 2013.

[12] For more information about the ISARM initiative in Central Asia, visit www.isarm.org, accessed 25 August 2013.

monoculture remains the backbone of the economies of the Central Asian states (with the exception of Kazakhstan), and the two biggest producers of cotton in the region retain their state set production targets despite declining yields due to salinisation of the soil, flooding or drought, the structure of international relations among the Central Asian states is likely to remain fragmented.

Most of the evidence about the water relations of the Central Asian states points toward the presence of two sets of triads. Given the range of issues plaguing the Central Asian states, there is good reason to suggest that there are other sets of triads operating in the region. The composition of these triads seems to be sensitive to specific issue areas. Some preliminary evidence on border disputes indicates the presence of a triad in the Ferghana Valley involving Uzbekistan, Kyrgyzstan and Tajikistan. Another possible triad in the region exists in the Caspian basin over energy resources. The landlocked nature of the Central Asian states has arguably forced the energy-rich Central Asian states (Kazakhstan, Uzbekistan and Turkmenistan) into regular interaction. More research is needed to test the presence of these triads in a rigorous and systematic way. For now, certain common goals and competition on water management have provided a focus for triadic interaction. In this respect, the presence of fragmented subsystems means that the existing dyadic disputes are likely to persist unresolved and the presence of extra-regional actors (Russian border guards, US air bases or international organisations) will be needed to resolve interstate conflicts.

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