

Tributary-level transboundary water law in the Syr Darya: overlooked stories of practical water cooperation

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Abstract Conventional emphasis on basin-wide water management has often resulted in the formation of transboundary water law on the basin or near basin scale. In Central Asia, however, the Syr Darya Basin possesses an abundance of tributary-level cooperative agreements that guide and codify water sharing and management on the sub-basin scale. To understand the volume and nature of this cooperation, this paper compiled and analyzed a set of agreements that apply to small transboundary tributaries (STTs) in the Syr Darya Basin. The paper assembled the largest collection of STT water agreements—123 in total—and classified such documents according to a range of criteria including: purpose and objectives, water management issues, and operational mechanisms. Results of this work highlight a rise in sub-basin-scale cooperation in the first decade of the twenty-first century, a time when large-scale cooperation appeared tenuous; a practical orientation to transboundary water management at a small scale; and an abundance of treaties of short time duration. These findings present options related to scale, time duration and focus of transboundary water law that can help inform future treaty development.

Keywords Transboundary water cooperation · Transboundary tributaries · Syr Darya Basin · Central Asia · Water law · Water management

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1 Introduction

The importance of transboundary water law to promoting cooperative management and conflict reduction on shared waters is widely accepted (Wolf 1998; Sadoff et al. 2008). The body of transboundary water law has indeed grown vastly in recent years, and nearly 700 agreements—some 250 treaties—are now known to exist (Giordano et al. 2014). Expansion of this corpus of codified transboundary water cooperation has driven a growing body of analysis that focuses on issues such as water quality (Giordano 2003), groundwater (Matsumoto 2002), water allocation (Wolf 1999), flow variability (Drieschova et al. 2008), and equity (Lautze and Giordano 2006).

One issue that has not been directly addressed in analyses of transboundary water agreements is the role of scale—in particular trends in sub-basin or tributary-level water law.¹ Although the importance of scale in the management, utilization, and protection of transboundary water bodies has been acknowledged rhetorically (Fischhendler and Feitelson 2003; Jacobs 2012; Zentner 2011), reviews of transboundary law generally group and analyze basin- and sub-basin-focused agreements together (Hamner and Wolf 1998; Lautze and Giordano 2005; Giordano et al. 2014). For example, Hamner and Wolf (1998) reviewed treaties applying to large rivers (e.g., Niger River) together with those covering small tributaries (e.g., Our River). Giordano et al. (2014) distinguished between treaties affecting an entire basin from those applying only to a sub-basin, but ultimately aggregated basin- and sub-basin-focused agreements when analyzing treaty trends. No study has systematically focused on a set of sub-basin agreements.

In Central Asia, small transboundary tributaries (STTs) of the Syr Darya Basin constitute an important frame through which practical water decisions are made. Recently, STTs have received increasing attention due to their abundance, importance to irrigation and associated community livelihoods, and role in Central Asia's economic development. Kazbekov and Yakubov (2010) highlighted that STTs are critical to livelihoods of communities. Wegerich et al. (2012a) stated that STTs are an important area for irrigation. The FAO (2012) noted that the Fergana Valley—where known STTs are located—is one of the several key areas for irrigation in Central Asia. The Swiss Agency for Development and Cooperation (SDC Nd) acknowledged that fostering effective cooperation can greatly contribute to the region's sustainable development and has funded work related to transboundary cooperation in STTs since 2007.

Despite the importance of STTs in the Syr Darya and an emerging body of the literature focused on them (Stucker et al. 2012; Wegerich et al. 2012a, b; Pak et al. 2014; Pak and Wegerich 2014), research to-date appears more piecemeal in nature with selective focus on one aspect of water management in one or a few STTs. Stucker et al. (2012) analyzed climate change impacts on one small Syr Darya tributary and proposed bottom-up adaptation strategies. Wegerich et al. (2012a) recounted the development of management styles in two small STTs, and Wegerich et al. (2012b) explored local-level management of STTs focusing on small-scale infrastructure. Pak et al. (2014) examined development of agreements related to one STT: the Isfara. Pak and Wegerich (2014) inspected construction of dams in the Karadarya River and three small STTs and analyzed negotiation processes among riparian republics. Lacking is a systematic analysis of a more comprehensive set of agreements applying to Syr Darya STTs.

¹ Tributary refers to a non-main-stem river. Sub-basin refers to a broader watershed associated with a tributary.

This paper systematically analyzes the largest known set of STT agreements in the Syr Darya Basin to understand the history, nature, and spatial variation of codified cooperation on the tributaries. The paper assembled some 123 STT water agreements and classified such agreements according to a range of parameters in order to derive lessons related to water sharing and management in tributaries and associated sub-basins. Section 2 of the paper introduces STTs in the Syr Darya Basin, explains the document collection process, and clarifies the framework used for classification and analysis. Section 3 presents a summary of different mechanisms, goals and objectives of treaties, and evolutionary trends of water cooperation and management of STTs in the Syr Darya Basin. Section 4 considers the paper's central findings in context, and Sect. 5 distills key recommendations that result from the paper's findings. Recommendations provide insights on strengthening current and future transboundary water law applying to the Syr Darya Basin and beyond.

2 Methods

2.1 Study area: Syr Darya Basin STTs

One of the two main rivers in the Aral Sea Basin, the Syr Darya and its associated watershed is 219,000 km² in size, generates an annual flow of 37 km³, and is shared by four Central Asian republics: Kyrgyzstan, Tajikistan, Uzbekistan, and Kazakhstan (Wegerich et al. 2012a). The Syr Darya watershed contains an abundance of tributaries, many of which are small and transboundary. For the purpose of this paper, a small transboundary tributary (STT) is a non-main-stem river with a drainage basin of less than 10,000 km² in area that crosses at least one international boundary. An area threshold for “small” of 10,000 km² was utilized as this was deemed to be less restrictive of the two options previously proposed in the literature: 5000 km² (Krylenko et al. 2005) and 10,000 km² (Milliman and Syvitski 1992).

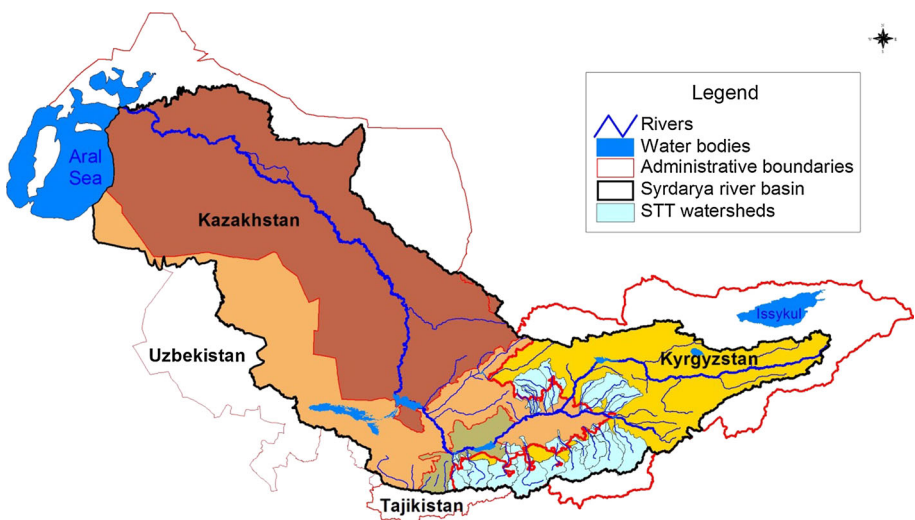


Fig. 1 Syr Darya Basin and its STTs

The Syr Darya was estimated to contain 22 STTs that together contribute about 7.8 km^3 per year to the basin's flow (Wegerich et al. 2012b) and cover approximately $35,800 \text{ km}^2$ (Fig. 1). These figures should be considered indicative rather than precise for at least two reasons. First, clearly establishing STTs proved a daunting exercise, and the list of 22 identified here indeed exceeds the length of similar lists of Syr Darya STTs that were previously proposed (e.g., Pak and Wegerich 2014). Second, the area of watersheds in the Syr Darya is often artificial due to modifications to the natural environment resulting from heavy infrastructure development in Soviet times. This reality at times confounded efforts at precise delineation of watersheds; in such cases approximations were made.

Water use in STTs is heavily focused on agriculture. During Soviet times, the Syr Darya Basin was the most important cotton growing region in Central Asia and the development of irrigation infrastructure in the valley was aimed at increasing cotton production (Antipova et al. 2002). Like a "fan," the large irrigation canals linked the main stem of the Syr Darya River with the STTs irrespective of republican borders (Benjaminovich and Tersitskiy 1975). In the post-Soviet period, irrigation patterns are slowly changing. There is a noticeable shift toward growing food (winter wheat) and cash (orchard) crops (Platonov et al. 2014).

Water utilization varies noticeably within STT countries. Although agriculture is the main water user in the Syr Darya Basin, water is also used in hydropower generation.

Table 1 List of STTs by countries

#	Small transboundary tributary	Riparian countries	Included in the analysis
1	Aksu	Kyrgyzstan, Tajikistan	
2	Khojabakirgansai	Kyrgyzstan, Tajikistan	+
3	Isfara	Kyrgyzstan, Tajikistan, Uzbekistan	+
4	Sokh	Kyrgyzstan, Uzbekistan	+
5	Shakhimardan	Kyrgyzstan, Uzbekistan	+
6	Isfayram	Kyrgyzstan, Uzbekistan	+
7	Aravan	Kyrgyzstan, Uzbekistan	+
8	Akbura	Kyrgyzstan, Uzbekistan	+
9	Karaunkyur	Kyrgyzstan, Uzbekistan	
10	Maylisai	Kyrgyzstan, Uzbekistan	+
11	Padshaata	Kyrgyzstan, Uzbekistan	+
12	Kasansai	Kyrgyzstan, Uzbekistan	+
13	Sumsar	Kyrgyzstan, Uzbekistan	
14	Koksareksai	Kyrgyzstan, Uzbekistan	
15	Gavasai	Kyrgyzstan, Uzbekistan	
16	Abshirsai	Kyrgyzstan, Uzbekistan	
17	Achchisu	Kyrgyzstan, Tajikistan, Uzbekistan	
18	Isfanasai	Kyrgyzstan, Tajikistan	
19	Kugart	Kyrgyzstan, Uzbekistan	+
20	Kurshab	Kyrgyzstan, Uzbekistan	+
21	Bulak-Bashi	Kyrgyzstan, Tajikistan	
22	Madysai	Kyrgyzstan, Uzbekistan	

Upstream Kyrgyzstan controls a number of multipurpose reservoirs that generate hydropower, while downstream countries control extensive irrigation structures (WB 2004). Balancing competing water needs for hydropower generation and irrigation in the Syr Darya Basin has posed challenges (WB 2004; Abbink et al. 2005; Weinthal 2006). Notably, water demand for energy production and hence water release in upstream areas peaks during fall–winter months. In contrast, agricultural water demand in downstream areas is highest during spring–summer months.

STTs fall into parts of three countries: Kyrgyzstan, Tajikistan, and Uzbekistan. All STTs originate in Kyrgyzstan, and the vast majority (>75 %) of the aggregate area covered by STTs falls within its territory. Notably, 20 of 22 STTs are located in just two countries. Only two STTs—the Isfara and Achchisu—are located in all three countries.

This paper is focused on agreements that relate to 12 STTs (Table 1, last column). Agreements applying to these STTs were obtained through relevant contacts in associated provincial water management organizations. Limited relationships with authorities in the other ten STTs constrained collection of agreements from all 22 STTs. While the complete volume of transboundary water law in all STTs is therefore probably greater than that utilized in the current analysis, the number of agreements assembled for this analysis far exceeds the number of any other published collection of transboundary water agreements in Central Asia.

Many of the agreements considered in this paper were concluded in Soviet times, and a valid issue must be addressed related to the degree to which such agreements are truly international. The Union of Soviet Socialist Republics (USSR) was by constitution a federative state and each republic maintained autonomous administrative, legislative, and governance systems. In particular, republics had the right to “...enter into relations with other states, conclude treaties with them, [and] exchange diplomatic and consular representatives...” (USSR Constitution 1977, Art. 80).² Further, each republic maintained the right to secede from the USSR and had its own constitution (USSR Constitution 1977, Articles 72 and 76). The presence of such attributes would seem to render the nature of Soviet republics consistent with sovereign states, which would in turn render STT water agreements from the Soviet period as transboundary agreements. Nonetheless, regardless of whether inter-republican water agreements on STTs are ultimately confirmed to be as transboundary as others (e.g., those in the Transboundary Freshwater Dispute Database³), the fact remains that Soviet-era STT agreements have much in common with other transboundary agreements and as such, for the remainder of this paper, are treated as transboundary water agreements.

2.2 Document collection and sifting

To collect agreements applying to STTs, relevant authorities were approached between 2011 and 2013 and asked to share pertinent documents. In Uzbekistan, the provincial Water Management Authorities of Ferghana, Namangan and Andijan provinces were contacted. In Kyrgyzstan, the provincial Water Management Authority of Osh Province was approached. In Tajikistan, the provincial Water Management Authority of Sughd

² Notably, the Soviet Republics’ ability to conclude treaties renders them distinct from other federated states, where treaty-making power lies in the hands of the central government (e.g., Austria, Australia, Canada, Germany, USA) or is mainly limited to regulation (e.g., Belgium) (Leonardy 1999).

³ <http://www.transboundarywaters.orst.edu/database/interfreshwatertreatdata.html>.

Province was contacted.⁴ Hard copies of documents obtained through such authorities were collected by the International Water Management Institute (IWMI)—Central Asia office in Tashkent.

Ultimately, some 1002 documents were compiled in the IWMI—Central Asia office. To systematize these documents, which were generally in either Russian or Uzbek,⁵ summaries of all texts were translated into English and entered into a database. Four steps were then followed to filter documents into a set of transboundary water agreements that were suitable for analysis.

First, duplicates and ineligible hand-notes were identified and removed, and different parts of the same documents were consolidated. One hundred and nine documents were determined to be duplicate, and 14 were found to be ineligible (e.g., damaged documents with unreadable texts). In addition, 32 documents reflected different parts of the same 10 documents. Removal of the 109 duplicates, 14 illegible hand-notes, and consolidation of such 32 partial documents into 10 complete documents resulted in a reduction to 857 documents.

Second, as this paper is focused on *transboundary* water agreements relating to STTs, documents for which participation of two countries could not be determined were also removed. Accordingly, we removed 9 “internal notes,” 238 documents that involved different agencies within a single country, and 352 documents which did not contain sufficient clarity on participation of more than one riparian. In addition, one agreement—*Nukus Declaration of 1995*—was removed because it focused on the entire Aral Sea Basin rather than the Syr Darya Basin. Elimination of such groups of documents reduced the total number of potentially relevant documents to 257.

Third, careful review of documents revealed that some were in fact merely agreement drafts, and others did not contain the explicit consent of concerned parties. If unambiguous conclusion of an agreement could not be determined, documents were removed. Draft agreements numbered 57 in total. Further, communications (letters, telegrams, radiograms, and opinion letters) that made a request, but for which a response was not determined, numbered 49 in total. An additional 6 documents were “disagreements”—reflecting objection or disapproval—rather than agreements.⁶ Removal of 57 agreement drafts, 49 requests for which a response could not be verified, and 6 disagreements left us with 145 documents.

Finally, consistent with earlier work (Hamner and Wolf 1998; Lautze and Giordano 2005; Giordano et al. 2014), we sought to include only agreements concerning “water as a scarce or consumable resource, a quantity to be managed, or an ecosystem to be improved or maintained.” Application of this criterion resulted in the exclusion of 15 agreements which focused on non-water land issues. Agreements that dealt “only with navigation, border delineation and fishing rights” and “that dealt exclusively with financial aspects of water-related projects” (Giordano et al. 2014) were also removed. This eliminated seven additional documents, resulting in a final total of 123 transboundary water agreements suitable for analysis.

⁴ To accommodate the preferences of those sharing agreements with us, we refrain from naming contacts and organizations from which copies of the documents were obtained.

⁵ All but 4 documents were in one of these two languages. Two documents were in Kyrgyz, one was in Tajik, and one was in English.

⁶ For example, in a *Letter from Kazanskiy—Head of System’s Management for Sokh, Shnel—chief engineer, and Gryazeva—senior water resources engineer, to Bratishev—provincial water resources department of Fergana* (1947), the group of Tajik representatives expressed their disagreement to the proposed exchange of water sources from BFC to Isfara.

2.3 Framework for classification

With the set of agreements reduced to 123, contents were classified according to parameters that can be broadly grouped into four categories: (1) basic information, (2) purpose and objectives, (3) water management issues, and (4) operational mechanisms (Table 2).

Table 2 Parameters used for classification

Parameter	Categorization
<i>Basic information</i>	
Title of agreement	Self-explanatory
Year of agreement	Self-explanatory
Place of agreement	Self-explanatory
Language of agreement	Russian, Uzbek, Tajik, or Kyrgyz
Type of agreement	Primary agreement, protocol to primary agreement, amendment
Time scope of the agreement	Unknown; less than a month; 1–6 months; 6–12 months; 1–5 years; ≥ 5 years; other
Tributary to which agreement applies	Self-explanatory
Countries in agreement	Self-explanatory
Inclusiveness of agreement	Inclusive of all riparians to an STT, non-inclusive, or mediated
Reference to precedence	Was there a reference to past or existing documents? If so, which document?
<i>Purpose and objectives</i>	
Function	Regulatory, procedural, programmatic, generative, or a broader goal
Scope of objectives	Single, few (2–4), multi-objective (≥ 5)
Actual objectives	Water sharing/allocation; basin linkages; compensation; infrastructure development; hydropower generation; operation and maintenance; adapting to water shortage; water measuring; dealing with emergency; property rights; land exchange/expansion; soil salinity/erosion/water logging; border crossing/demarcation/enclave; groundwater; drinking water; water quality; climate change; data/information exchange; gender issues; institutional structure/organizational aspects; financial contribution/cost sharing; assessment (technical and economic feasibility, socioeconomic and environmental impact); pasture use; environmental protection
<i>Water management issues</i>	
Water allocation criteria	None, percentage based, fixed quantity, or other
Groundwater	Was there consideration for groundwater? Yes/no
Water quality	Was there consideration for water quality? Yes/no
Data exchange	Was there provision for data exchange? Yes/no
Compensation mechanism	Description of means provided in exchange for water access or procedures for resolving over/under water withdrawals
Drought-coping mechanism	None; water sharing; limited water use; rotational water sharing; adjustment of allocation through negotiation
<i>Operational mechanisms</i>	
Conflict resolution mechanism	Yes/no, if yes, explain
Enforcement mechanism	Yes/no, if yes, explain
Amendment mechanism	Yes/no, if yes, explain

Classification parameters were adapted from previous work (Hamner and Wolf 1998; Lautze and Giordano 2005; Giordano et al. 2014).

The first major group of parameters focused on an agreement's basic information. Perhaps the most critical parameter in this group relates to type of agreement. It should be noted that there were some 17 titles⁷ for the agreements contained in the database, and creation of 17 types of agreements was not justified. Adapting previous approaches to the topic (e.g., Giordano et al. 2014), we classified agreements into one of the three types: (1) primary agreements or treaties, (2) protocols to primary agreements, i.e., protocols which make direct reference to a preceding agreement; and (3) amendments. Importantly, independent protocols, which make no or only vague reference to a preceding agreement, were treated as primary agreements rather than protocols to primary agreements. This adaptation was made due to the fact that "protocol" appeared to be used somewhat liberally during Soviet times, either due to (a) liberal interpretation of the term in a Soviet Russian environment or (b) the reality that agreements were often completed by engineers, who may have been unfamiliar with implications of legal terminology.

The second group of parameters focused on an agreement's goals and objectives. Building on the work of Gerlak et al. (2011) and Giordano et al. (2014), classification of agreements by goals as generative, procedural, programmatic, or regulatory was adopted from Young's (1999) framework⁸ as applied to transboundary waters. In the context of transboundary water law, regulatory and to a lesser degree programmatic treaties typically encompass more specific issues focused on specific water divisions and uses while generative and procedural goals lay out principles toward more cooperative management (Giordano et al. 2014). Agreements were then classified by specific objectives that the document intended to accomplish and by the number of objectives—as single, few (2–4), or many (≥ 5).

The third group of parameters focused on water management provisions contained in the agreements. Each agreement was classified according to an array of water management requirements: criteria used for water allocation; consideration for water quality; consideration for groundwater; information or data exchange clauses; compensation mechanism for resolving under or over water withdrawal by a riparian or description of means provided in exchange for water access; and drought-coping mechanism.

The last major group of parameters focused on operational mechanisms included in an agreement. An operational mechanism is a procedure for implementing or amending the terms of agreement or settling related disputes. For the purpose of our classification, the operational instruments included are conflict resolution mechanism, enforcement mechanism, and amendment mechanism. An enforcement mechanism confers the implementation of provisions of an agreement to a particular agency (or agencies). A conflict resolution mechanism specifies an established course of action(s) in the event of disputes.

⁷ Act, agreement, calculation, decision, instruction, letter, opinion letter, position, prescription, protocol, protocol's amendment, regulation, schedule water intake, special opinion, table, telegram, and telephonogram.

⁸ Young (1999, p. 82) describes generative as "coordinated activities that lead to new understandings of common problems and, often, to new ways of organizing efforts to deal with these problems"; procedural as "arrangements designed to produce collective or social choice regarding matters in which a number of stakeholders have a legitimate interest"; programmatic "involve the development and execution of joint projects in situations where individual actors are not in a position or do not have the resources to carry out important projects alone"; and finally, regulatory as specifying explicit rules to "govern the behavior of subjects in well-defined and recurrent situations."

2.4 Review and analysis

Review and analysis were conducted in a two-step process. The first step involved a general review of the agreements. The second step involved analysis of the contents of treaties. Methods utilized in each of the two steps are described here.

2.4.1 Review

STT agreements were first examined to reveal broad findings (Results 3.1). Points of focus included: (1) the number of agreements, protocols, and amendments; (2) variation in titles for agreements; (3) the relative abundance of agreements in different STTs; and (4) inclusion of Kazakhstan in some STT agreements even though it is not a riparian. Review of these points sets the context for the more in-depth analysis performed. For instance, identification of the spatial dispersion of STT agreements can clarify whether results of treaty analysis reflect potentially anomalous water cooperation in just one or few STTs, or whether the results are more broadly indicative of transboundary water management in the Syr Darya's STTs.

2.4.2 Treaty analysis

A more specific set of analyses were then undertaken on STT treaties. To be consistent with previous work (e.g., Drieschova et al. 2008, 2011; Giordano et al. 2014), we defined a treaty as “an international agreement concluded between states in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation” (Vienna Convention of the Law of Treaties, Article 2(1), United Nations, vol. 1155 (1980), p. 333). As such, we grouped agreements according to lineage. In practice, application of lineage calls for grouping any protocols and amendments referring to a primary agreement with the primary agreement to which it refers (Drieschova et al. 2011; Giordano et al. 2014). Accordingly, 13 protocols were merged with the primary agreements to which they corresponded.⁹ This reduced the broader number of 123 agreements to a slightly smaller number of 110 treaties, which constituted the fundamental units utilized in the treaty analysis section (Results 3.2).

To understand temporal evolution, treaty goals and objectives, third-party involvement and possible latent beneficiary, preference of riparians for fragmented or inclusive governance, and inclusion of different types of operational and joint management mechanisms, the following analyses were undertaken.¹⁰

- *Treaties completed by decade* To provide an indication of the rate of agreement completion over time, treaties were stratified by the decade of their conclusion and the number completed in each decade was determined.
- *Mediated versus unmediated treaties* To understand whether a third party helped facilitate treaty formation, the number of mediated and unmediated treaties stratified by country was determined. Consideration for third-party mediation in treaties helps

⁹ If a protocol referred to a primary agreement but the primary agreement could not be obtained, this protocol was treated as an independent unit and not merged with its primary agreement. There were 8 protocols for which this exception was applied. Similarly, one identified amendment was the only available portion of a treaty, and for the purpose of this paper, it was treated as an independent unit.

¹⁰ Number of treaties varied across analyses for reasons that are explained in figure captions.

clarify potential presence of latent beneficiaries—mediators whose interests may align with the outcome of negotiations.

- *Treaty inclusiveness* To establish treaty inclusiveness, the percent of treaties including all riparians was determined. Given that all bilateral treaties include both riparians, the subset of treaties applying to trilateral basins was examined to determine the proportion that applies to all three riparians. Moreover, to gauge the degree to which each riparian's tendency toward inclusive management frameworks in trilateral tributaries, we also determined the proportion of each country's treaties that are inclusive. A treaty's inclusiveness is presumed to provide an indication of coherence between or among a tributary's countries.
- *Variation in treaty objectives* To understand treaty foci, the relative frequency of different objectives was determined.
- *Frequency in use of different types of water allocation* To understand the relative frequency that different types of water allocation were employed, abundance of water allocation provisions by type was computed.
- *Variation in treaty function* To determine frequency of different treaty goals, we calculated number of treaties containing specific functions.
- *Variation in treaties' intended time duration* To evaluate the planning horizon, the intended time duration of treaties was determined.
- *Treaties' inclusion of compensation, drought-coping, data exchange, groundwater, and water quality mechanisms* To compare frequency and inclusion of different types of management mechanisms, the number of treaties containing each type of mechanism was calculated.
- *Treaties' inclusion of operational mechanisms* To compare frequency and inclusion of conflict resolution mechanism, amendment mechanism, and enforcement mechanism, number of treaties containing different types of each was calculated.

3 Results

3.1 STT agreements: a review

Overall, the 123 agreements included in our data set contained 101 primary agreements, 21 protocols to primary agreements, and 1 amendment (Table 3). This set of agreements represents a major expansion in the total number of transboundary global freshwater law.¹¹ Moreover, this set of transboundary agreements constitutes the most voluminous body of international water law applicable to one river basin.

Agreements were classified into one of the three categories despite the fact that the final set of 123 agreements contained 17 different titles. Consistent with other evidence (Triska and Slusser 1962, p. 38), variation in titles appeared largely semantic. For example, the *Protocol from the Meeting on the Issue of Water Allocation from Isfara River among Tajik, Uzbek, and Kyrgyz SSR* (1974) and a *Decision of the Meeting of Ministers of Melioration and Water Resources of the Uzbek SSR, Tajik SSR and Kyrgyz SSR on the Issue of Water Allocation of Isfara River* (1975) possess different titles: The first is a “protocol,” and the second is a “decision.” However, both play the same functional role of addressing water allocation in Isfara STT. Perhaps the only difference between the two agreements was the

¹¹ We used 688 agreements identified by Giordano et al. (2014) as a baseline for our assertion.

Table 3 Transboundary water agreements applying to STTs

Type of agreement	Number
Primary agreement	101
Protocol to primary agreement	21
Amendment	1
	123

actors involved. The agreement from 1974 involved the water ministry of USSR and representatives from the water ministries of the three republics, whereas the agreement from 1975 was adopted by the water ministers of the three republics and approved by the deputy water minister of USSR. It may therefore be that agreement participants brought different language preferences.

Most STTs were covered by several applicable agreements (Fig. 2). Five STTs (numbers 3, 4, 5, 6, and 10 on the map) are covered by 5 or more agreements. Four STTs (numbers 7, 8, 11, and 12 on the map) are covered by 3–4 agreements. One STT (number 2 on the map) is covered by two agreements. Only 2 STTs (numbers 19 and 20 on the map) are covered by one agreement. Cooperation is fairly disperse rather than concentrated across STTs in the Syr Darya.

While exceptions can be found, it appears a relationship may exist between an STT's watershed area and hydraulic infrastructure on the one hand, and the number of applicable agreements on the other. STTs Sokh, Isfara, and Shakhimardan (numbers 4, 3, and 5 on the map, respectively), for example, have the second, third, and fourth largest watershed areas among STTs, and such STTs have the greatest concentration of transboundary water law. Another factor affecting a watershed's number of agreements may be that watershed's concentration of irrigation canals—likely reflecting level of irrigation development. Seven agreements apply to the Maylisai (number 10 on the map), for example, which intersects with two major irrigation canals.

One final point relates to inclusion of Kazakhstan in STT agreements despite the fact that Kazakhstan does not fall in any known STTs. The rationale for Kazakhstan's inclusion results from its status as downstream riparian that is subject to decisions made upstream. For example, the *Agreement among the Governments of the Republic of Kazakhstan, Kyrgyz Republic and the Republic of Uzbekistan on Joint and Integrated Use of Water and Energy Resources of the Naryn-Syr Darya Cascade of Water Reservoirs in 1998* specifies average daily water release amounts from the Toktogul reservoir and the volume of water that would be supplied to Kazakhstan during the vegetation period through Dostyk canal. In this case, by releasing water from the Toktogul reservoir, Kyrgyzstan would supply water to Kazakhstan through the Dostyk canal in the Syr Darya and to the Big Ferghana Canal (BFC) which is linked with STTs: Sokh, Isfayramsai, and Isfara. In short, this agreement secures water releases to Kazakhstan, Tajikistan, and Uzbekistan through sources linked to STTs.

3.2 STT treaty analysis

Transitioning from broader examinations on agreements to specific analyses of treaties, a first result is that water cooperation at the STT level was greatest in the 1960s and 2000s (Fig. 3). Moreover, perhaps surprisingly given perceptions of hydropolitical challenges among Central Asian states, the greatest number of treaties signed per decade occurred

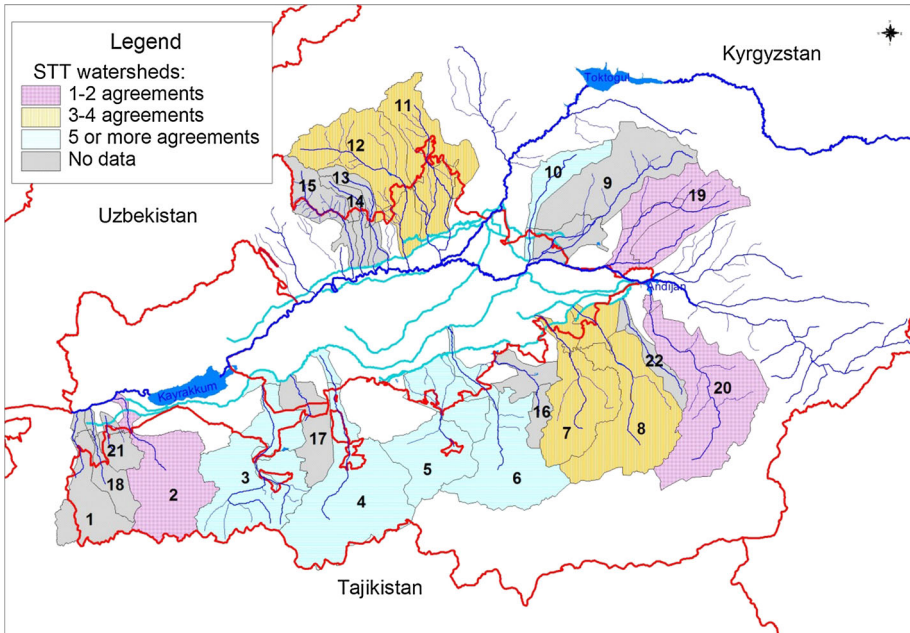


Fig. 2 Number of agreements applying to each STT. STTs corresponding to each number are presented in Table 1. As noted above, the modified nature of STTs constrained precise delineation of watershed areas. Limits reflect an adaptation to this reality

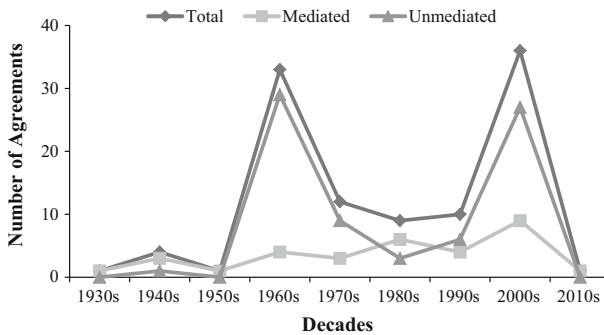


Fig. 3 Treaties completed by decade. Three treaties do not have clear dates and are thus not included in the graph

2000–2009. The least number of treaties were signed in the 1930s and 1950s. During decades of the greatest treaty formation, the increase in treaty conclusion is associated with an increase in the number of unmediated treaties. To the extent that one can apply cooperation on water as a measure of relations between states, increases in cooperative activity evidenced in the specified two periods indicate improved relations—at least in the context of Ferghana Valley where such cooperation occurred.

Thirty percent (33 treaties) were mediated by a third party. During Soviet times (pre-1992), mediation was most commonly provided by the Ministry of Melioration and Water

Resources of the USSR or approved by that ministry (11 treaties). Other mediating agencies during the Soviet times were the Ministry of Agriculture (6 treaties), the Syr Darya Basin Water Organization (BWO) (2 treaties), the Council of Ministers of USSR (1), the Council of People's Commissioners of USSR (1), and the State Planning of USSR (1). In contrast, all 11 mediated treaties completed after the collapse of the Soviet regime were mediated by the Syr Darya BWO. Ultimately, more than two-thirds of treaties were concluded without explicit third-party mediation, suggesting that riparians were frequently willing and able to cooperate on their own, in response to local needs. Nonetheless, third-party presence was evidenced in Soviet and post-Soviet times; in Soviet times, such mediation may have promoted socioeconomic interests of the Union, while after independence such mediation may have fostered alignment with basin-level resources management.

An example of a mediated treaty in Soviet times was the *Protocol of the Meeting with the Deputy Head of Glavvodkhoz* [main water department] *of the Ministry of Agriculture of the USSR, Comrade V.M. Melnikov, on the Issues of Allocation of Water Resources of BFC and Isfara River between Uzbek SSR and Tajik SSR*. Completed in 1957, the treaty focused on resolving water allocation issues between Uzbek SSR and Tajik SSR. Specifically, it states that starting from 1957 onwards, during vegetation periods a “permanent water discharge of 13.0 [m] per second” should flow into Tajik SSR through BFC. At the same time, the treaty “confirms previously set percent share of water to Uzbek SSR” from the total stock of Isfara STT. The mediating role of Moscow in this case was to ensure that the “water organizations of Uzbek SSR and Tajik SSR put things in proper order and increased the discipline of water sharing.” In short, Moscow initiated the discussion at a higher level, and served as an observer in the negotiations to ensure that the process is aligned with the state plan for the economic development of USSR.

Uzbekistan is the most active state in treaty formation on STTs (Fig. 4). It signed the greatest number of treaties (102), followed by Kyrgyzstan (74), Tajikistan (55), and Kazakhstan (13). The number of unmediated treaties surpasses the number of mediated treaties in all countries but Kazakhstan. In the case of Uzbekistan, the number of unmediated treaties is more than twice the number of mediated treaties, while in the case of Kyrgyzstan that ratio is close to 3. Since Kazakhstan is not in any STTs, it usually only participates in annual agreements that concern operation of reservoirs and are mediated by the Syr Darya BWO. Participation in annual agreements implies some financial contribution (ICWC-CA 2015).

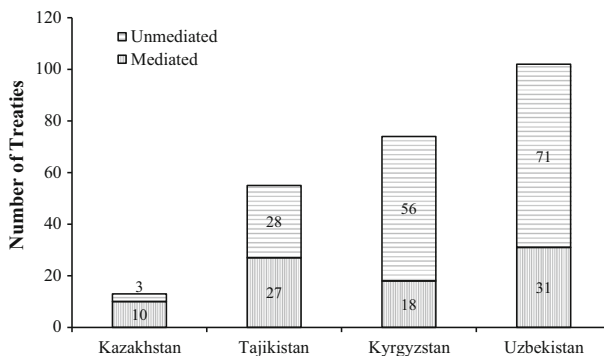


Fig. 4 Number of treaties per country

Kazakhstan appears a recent entrant to STT agreements. All of the treaties with the participation of Kazakhstan were completed after the collapse of the USSR. Furthermore, 10 out of the 13 treaties signed by Kazakhstan were completed after 2000. Nine of those treaties deal with the use of water resources of the Kayrakum reservoir, for example the *Protocol among the Committee for Water Resources of the Republic of Kazakhstan, the Ministry of Melioration and Water Resources of the Republic of Tajikistan, and the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, on the Use of Water Resources of the Kayrakum reservoir in July–August of 2008*. As noted above, Kazakhstan puts much focus on the Kayrakum reservoir because as a downstream country it is heavily affected by the reservoir's operation.

Overall, 84 treaties (76 %) apply to bilateral tributaries and hence include all riparians. Of the subset of treaties that apply to the trilateral tributaries, only 31 % include all riparians (Fig. 5). Sixty-four percent of treaties in which Kyrgyzstan participated on trilateral tributaries include all riparians, compared with only 29 % of Tajikistan and Uzbekistan's treaties, respectively. It appears, therefore, that Tajikistan and Uzbekistan frequently concluded treaties without the participation of upstream Kyrgyzstan. For example, a *Protocol of the interstate discussion on the supply of water through Isfara to Kirov district of Uzbek SSR and through BFC to Tajik SSR* from 1977 contains a joint decision to convene a commission consisting of "representatives of water ministries from the interested republics." While a possible reason for Kyrgyzstan's exclusion was the relatively low water utilization in its territories, failure to achieve complete riparian participation may highlight a point on which STT treaties could improve.

In terms of number of objectives, most treaties are narrowly focused. Eighty (73 %) treaties had a single objective, 28 (25 %) treaties had 2–4 objectives, and 2 (2 %) treaties had 5 or more objectives (Fig. 6). An example of a multiobjective (≥ 5) treaty is the *Protocol from the Inter-Republican Meeting on Regulating Water Allocation from Isfara River on the Water Supply through the Big Ferghana Canal Named after Stalin*. Concluded in 1946, the treaty covered water allocation, compensation, cost sharing, data exchange, water measuring, and institutional structure. For instance, the treaty defines that "Isfarupr should make all allocations from Isfara to the canals that irrigate lands in Kyrgyz, Tajik, and Uzbek SSRs." Furthermore, it specifies that Isfarupr should serve as an "Inter-republican System Authority and be fully responsible for the correctness of implementation of all instructions pertaining to the issue of water allocation." In short, the treaty specifies the institutional structure for water allocation from Isfara STT.

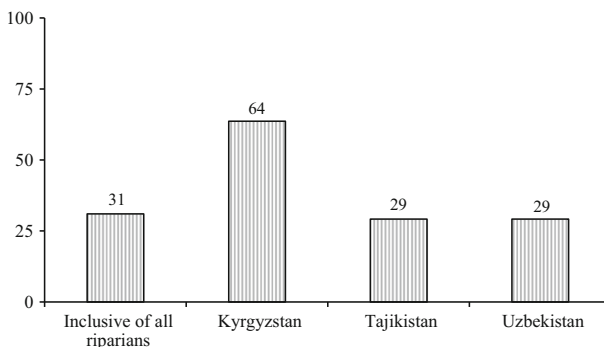


Fig. 5 Percent of treaties, by inclusiveness in the trilateral basin

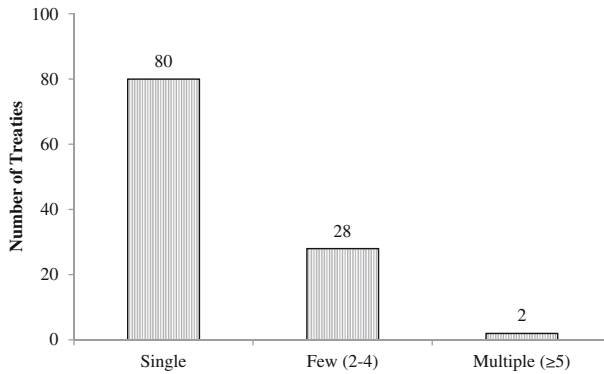


Fig. 6 Number of objectives in treaties

The most common objective was water allocation, stated in 98 treaties (Table 4). Operation and maintenance (O&M) was the next most common objective, discussed in 15 treaties. Institutional structure and infrastructure development were also common objectives, discussed in 11 and 10 treaties, respectively. Other objectives were stated in 5 or fewer treaties.

Most treaties that focused on water allocation contained explicit quantities. From a total of 98 treaties that contained water allocation provisions, 90 specified actual quantities of water. Water allocation that specified a fixed discharge or water quantity was the most common instrument for inter-state water sharing, observed in 75 treaties or 68 % of the total. Percent-based water allocations were used in 7 treaties (7 %). Rules that specified both fixed water quantity and percent-based water allocation were detected in 8 treaties (7 %). While not elaborating underlying criteria for such allocations, it can be assumed that irrigation water demand was a key driver for quantities of water that each state sought to secure.

Few treaties explain the rationale or criteria on which water was to be allocated. Qualitative conceptual criteria (e.g., needs, equitable allocation) were only mentioned in 19 treaties. Of these, 6 treaties translate the qualitative criteria into actual quantities, 6 treaties

Table 4 Treaty objectives

Objective	Number of treaties
Water allocation	98
O&M	15
Institutional structure	11
Infrastructure development	10
Compensation	5
Water measuring	5
Cost sharing	3
Property rights	2
Hydropower	2
Data exchange	2
Dealing with emergency	1
Address water logging	1

The total adds up to more than 110 because 30 treaties contained more than one objective

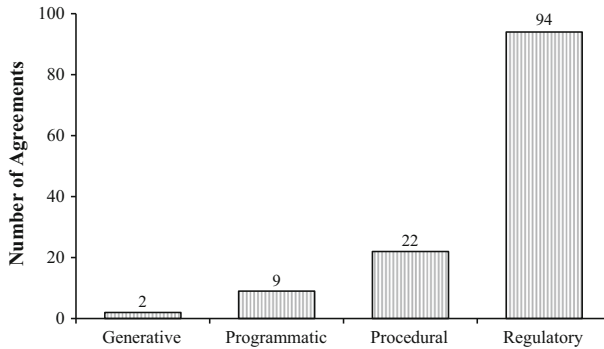


Fig. 7 Number of treaties, by function. The total number adds up to more than 110 because 17 treaties contained two functions

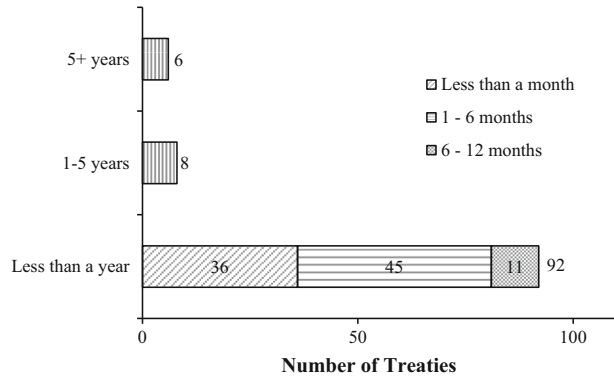
specified qualitative conceptual criteria without specifying quantities, and 7 treaties apply to multiple STTs and utilize a combination of qualitative and quantitative criteria. An example of the conceptual criteria for water allocation is given in the *Protocol of the Meeting on the Issues of Water Division on the System of Canals—North Ferghana Canal, Big Andijan Canal, Big Ferghana Canal, South Ferghana Canal and Karadarya*, from 1973. Specifically, article 3 states “to consider the optimal needs of Kyrgyz SSR from Karadarya” for the purpose of formulating water use plan for 1974. In other words, water allocation to Kyrgyz SSR was driven by the goal of optimally satisfying water needs—and one can assume that those water needs mainly related to irrigation.

Analysis of treaties by function suggests that treaties containing regulatory rules or requirements far exceed in number those serving other functions (Fig. 7). Ninety-four treaties contain regulatory rules. Twenty-two treaties contain procedural goals, and 9 treaties contain programmatic goals. Only two treaties contained a generative function along with one other function. Seventeen treaties had dual functions, of which 15 had a regulatory function combined with either a programmatic or a procedural function. Two treaties with a dual function had a generative function combined with either a procedural or a regulatory function, e.g., the *Protocol on the Inter-State Allocation of Fergana Valley’s Small Rivers’ Flows* from 1980. The introduction section of the treaty states “Water allocation of rivers’ flows in Ferghana Valley is presently being arranged without considering water management measures that have been completed in the previous years, of which the most important being—commissioning of the Toktogul and Andijan reservoirs.” In other words, the treaty calls for new ways of arranging flow allocations, which is a generative function. It then provides actual flow allocations, a regulatory function.

In terms of duration of a treaty’s mandate, the vast majority of treaties (92 out of 110) were intended to last less than a year (Fig. 8). Thirty-three treaties, or more than 25 %, were in fact developed specifically for vegetation or non-vegetation periods that last 6 months. Further, an unexpected 20 treaties were signed with a time duration of 1 day. All of such “daily” treaties were completed July–August of 1962, between the representatives of Uzbekistan and Kyrgyzstan to allocate irrigation water through the Karadarya River’s system. Only 14 treaties¹² were intended to last for a year or more.

¹² This excludes four treaties for which time duration could not be determined.

Fig. 8 Number of treaties, by intended time of duration. Four treaties either did not specify dates or specified actions (e.g., completion of constructing the canal) that could take a variable time depending on the pace and hence are not included



Importantly, the prevalence of short-duration treaties meant that no more than 10 treaties were legally valid at any one time and only 4 treaties can be conclusively determined to be valid at present. While the time-limited nature of many treaties may trigger questions about the magnitude of their impacts, it is believed that provisions created in treaties often constitute precedents that become customary law, and continue to be applied after treaty mandates have expired. As such, the volume of treaties wielding influence on water management likely extends beyond those that are legally valid or presently in force.

A host of other instruments to facilitate joint management received less focus (Fig. 9). A compensation mechanism was found in 23 % of treaties, data exchange in 12 %, drought-coping mechanism in 7 %, and groundwater clause in 5 % of treaties. Water quality provision was mentioned in one treaty which also included cooperation and information exchange provisions, e.g., *Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan and the Republic of Uzbekistan on Cooperation in the Field of Joint Management on Utilization and Protection of Water Resources from Interstate Sources* (1992). Specifically, Article 3 states that actions in the respective territories of signatories that could lead to the “pollution of water bodies” should be prevented.

Few treaties contain conflict resolution, amendment, and enforcement mechanisms (Fig. 10). Eight (7 %) treaties contain conflict resolution mechanisms, six (5 %) contained amendment mechanisms, five treaties (<5 %) contain an enforcement mechanism. Five treaties (<5 %) contain two operational mechanisms with no treaty containing all three operational mechanisms. The short time duration may explain why such mechanisms were not frequently included in treaties.

4 Discussion

This paper has expanded the known volume of global transboundary water law by over 15 %¹³ and provided a rich set of evidence on tributary-level water treaties. The paper reflects the outcome of a multiyear, multistate process of data collection, classification, and analysis. Moreover, the incorporation of new agreements identified in this paper into the global set of transboundary water law—resulting in a relative increase in tributary-focused

¹³ We used evidence contained in Giordano et al. (2014) as a baseline.

Fig. 9 Number of treaties, by inclusion of water management mechanism

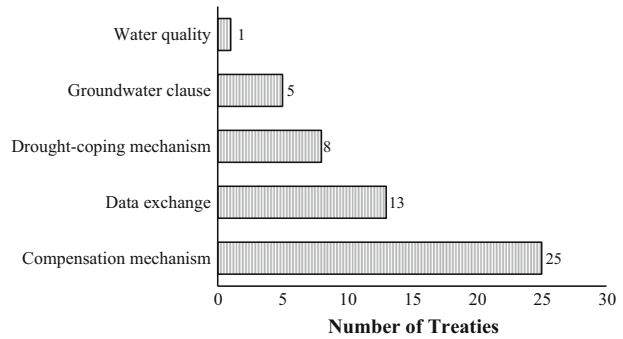
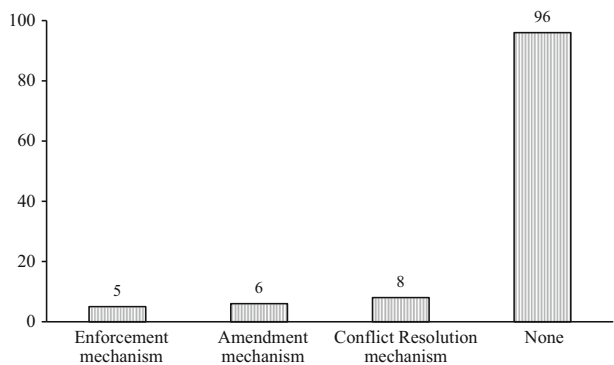


Fig. 10 Number of treaties, by inclusion of enforcement, amendment, and conflict resolution mechanisms. The total number adds up to more than 110 because five treaties included two operational mechanisms



transboundary water agreements—may fundamentally alter findings contained in previous global analyses of transboundary water law.

This review of STT agreements in the Syr Darya Basin produced three major findings. A first major finding is that water cooperative activity on STTs—gauged on a decadal basis—peaked at the beginning of the twenty-first century. A second major finding is that treaty life span is often quite short, often less than a year. A third major finding is that STT treaties often focus narrowly on hard or technical issues such as water allocation and infrastructure and less on soft or “peripheral” issues such as amendment and conflict resolution mechanisms.

4.1 New era of cooperation?

This paper found that the water cooperation in the STTs of the Syr Darya Basin reached its decadal peak in 2000–2009 despite notable contemporaneous discourse on growing hydro-political tensions among Syr Darya riparians (ICG 2002; Spoor and Krutov 2003; Varis 2014). The peak in treaty formation between 2000 and 2009 in STTs also diverges slightly from: (1) the global trend, where the peak of cooperation occurred in the last decade of the twentieth century (Giordano et al. 2014), and (2) high-level trends in Central Asia, where the peak in water treaty formation was between 1992 and 2000 (Volovik 2011). While the comprehensive identification of underlying drivers for the elevated rate of treaty completion in the twenty-first century is not possible, one can speculate that severe consecutive droughts in 2000–2001 (Agrawala et al. 2001; WB 2006) and setbacks in

implementing basin-scale water agreements concluded in Central Asia in the 1990s (WB 2004; Allouche 2007) may have played a role. Ultimately, the twenty-first-century water cooperative activity in STTs may highlight the enduring and perhaps more essential nature of sub-basin-scale cooperation.

4.2 Treaty life span as out-of-the-box tool?

This paper found the time mandate of most treaties to be quite short. Although seasonality and timelines have been noted as important to treaties (Zentner 2011) and indigenous negotiations (Wolf 2000), systematic investigations into treaty time duration in the water sector is scant.¹⁴ Though unconventional, short-term treaties may create opportunities, in at least three ways. First, treaties of shorter duration may assuage fears that states are indefinitely binding themselves to an undesirable accord; if a state determines a short-term agreement is not in their interest, they can simply not sign another one. Second, short-term treaties may drive more frequent interaction which can become habitual, cultivate trust, and build toward more profound and sustainable cooperation. And third, short-term treaties may add flexibility to adjust to changes that cannot be confidently predicted, such as uncertainty associated with climate change. Nonetheless, despite these positives, two limitations of short-term treaties can be identified. First, short-term treaties foster a weak legal basis for large, long-term investments such as construction of an irrigation system. Second, short-term treaties may augment transaction costs.

4.3 Narrow focus on core issues

Water allocation appears to be the central focus in Syr Darya STTs, including in the twenty-first century. Such focus on water allocation is at odds with the other findings (e.g., Lautze and Giordano 2005; Giordano et al. 2014), which indicates treaties increasingly focus on softer issues. One possible reason for the much greater emphasis on water allocation in STTs is the fact that practical issues may be driving practically oriented cooperation on such tributaries, while water cooperation at other scales may be more politically and less technically oriented. Another possible reason is that water allocation at the STT scale is a straightforward process driven by negotiators' better understanding of the available water quantities and water users at a manageable geographic space.

4.4 Final points

Reinforcing findings above, a final point is that regulatory and procedural functions tend to be the most common at the STT scale—consistent with global trends (Giordano et al. 2014). The abundance of regulatory and procedural functions rather than generative and programmatic functions suggests that despite the large volume of STT treaties, narrow focus remained on concrete issues. This may result from the stationary management structures at the sub-basin scale, which are geared toward regulating water in recurrent situations (e.g., dam operation) and making small adjustments to unforeseen circumstances. As such, sub-basin water management regulates existing operations but may not require new approaches or fundamental changes.

Ultimately, the bottom line is that cooperation on transboundary waters in Syr Darya STTs—cooperation focused on practical water management issues no less—is ongoing in

¹⁴ There is nonetheless evidence of time limitation on treaties outside the water sector (see UNCTAD 2013).

the twenty-first century. This cooperation may not receive the attention it deserves, as frequent focus is rather devoted to narratives of tension and conflict between Central Asian states (e.g., Sievers 2001; Allouche 2007). While the extent to which emphasis on the conflictual side of the conflict to cooperation pendulum in Central Asia reflects a local manifestation of emphasis on broader theories of “water wars” (e.g., Serageldin Nd), it is certainly hoped that this paper has helped push the pendulum back toward the center to reflect the reality that sustained cooperation has occurred at tributary levels in the Syr Darya—even if the story line at a broader basin level is different.

5 Conclusion

This paper analyzed the largest set of the tributary-level transboundary water law in the Syr Darya Basin to reveal important lessons on dynamics of transboundary water management in sub-basins. One lesson from this work is to think more broadly about the scale of water cooperation; while basin-wide management frameworks receive the greatest attention, valuable steps may be taken at more local levels where practical cooperation may be more needed, and where cooperation may come with fewer political complications. Similarly, while conventional focus is on treaties of long term to indefinite time duration, the findings presented above suggest that there may be a role for short-term agreements. A final lesson from this work is that there remains a role for focusing on practical water management issues at a transboundary level.

One recommendation falling out of this work is therefore to consider different scales for water cooperation. While best practice has increasingly advocated for basin-level management frameworks that align with the hydrologic boundaries of a basin (Sadoff et al. 2008; Aguilar and Iza 2011; INBO and GWP 2012), solutions to certain water issues (e.g., dam operation, flood prevention, pollution control, conservation works) may be effectively delimited at geographies other than the full-basin. Accordingly, there may be a role for crafting transboundary water law that is tailored to such geographies.¹⁵ Management frameworks at scales within basins may no doubt need to be navigated carefully due to basin interconnectedness, as developments in a particular sub-basin will affect areas downstream. Nonetheless, focus on a selective part of a basin may constitute more achievable or “second best” (Molden et al. 2010; Wegerich et al. 2012a) forms of water management that can serve as initial steps to cultivate trust.

A second recommendation is to include short-term treaties in the toolbox of transboundary water cooperation. Short-term treaties may help reduce riparians risks by allowing flexibility to adapt to hydrologic changes. Treaties with limited time duration can also serve as forward-thinking adaptation to climate change-related risks (e.g., extreme events, water restrictions), which are expected to increase over time (Field et al. 2014). In addition, short-term treaties may engender frequent interactions that help to build trust and foster progress toward more comprehensive agreement.

A last recommendation falling out of this work is to put on the table the option to focus on select, concrete, hard water management issues at a transboundary level. Indeed, global trends in transboundary waters suggest increasing importance for softer aspects of water management frameworks (e.g., the design and responsibilities of River Basin

¹⁵ Suggestion to focus on alternate scales other than the basin has indeed also been made by Mostert (2009) and Allan (2005). Mostert (2009) suggested that solutions to water quality issues may be best delimited at scales other than basin. Allan (2005) called for use of political economy approaches that look beyond the narrow focus on the river basin.

Organizations) (Lautze et al. 2013; Schmeier 2014). While such trends have likely fostered improvements, there is nonetheless increasing recognition of the limitations of such frameworks (Merrey 2009; Lankford and Hepworth 2010; Söderbaum 2015). It is hoped that this paper has helped to put squarely back on the table the option to utilize transboundary water cooperation as a practical tool to accomplish concrete objectives.

Three caveats have to be acknowledged before concluding. First, while we assembled the largest collection of transboundary agreements applicable to one river basin, these agreements are likely not exhaustive. Second, while power dynamics have likely played a role in conclusion of most treaties, the role of Moscow in STT agreements from the USSR period merits special attention. Indeed, Moscow-based state authority at times went so far as to impose obligatory language in some treaty texts; inclusion of such language in turn may have affected how they were classified. A final point is that this paper focused on examination of treaty existence and contents, but stopped short of assessing treaty impacts.

In terms of future work, three areas could be investigated to build on findings presented in this paper. A first avenue for future investigation could focus on assessing impact or effectiveness of STT treaties. Understanding on the ground impact can further elucidate the desirability of applying similar treaties elsewhere. Moreover, information on factors contributing to effectiveness could assist with improving implementation and compliance. A second avenue of future work could examine the relationship between the rate of treaty completion and treaty contents, in order to better understand the attributes that drive cooperation. Finally, a third, somewhat related, avenue of future investigation could explore correlations between and among the presence of attributes in the contents of treaties.

Despite much discussion on tensions over water in the post-Soviet Central Asia, STTs have experienced a long history of cooperation which peaked in the first decade of the twenty-first century. These treaties often possessed short-term mandates and were focused on technical water management issues. The recent peak in water cooperation in Central Asia will hopefully encourage us to examine evidence rather than headlines. The atypical time durations and frequent focus on technical water issues present—or remind us of—options for crafting water management treaties. More broadly, the abundance and diversity of sub-basin agreements in just one basin in Central Asia call for greater consideration for the option of developing transboundary treaties at non-basin scales.

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Appendix

Title	Signatories	Date
Regulation No. 1051 from 14 July 1939 of the Council of People's Commissars and Central Committee of the Communist Party of USSR on extending Big Ferghana Canal into the territory of the Tajik SSR	Uzbekistan, Tajikistan	14/07/1939

Title	Signatories	Date
Protocol from the inter-republican meeting on regulating water allocation from Isfara River on the water supply through the Big Ferghana Canal named after Stalin	Uzbekistan, Tajikistan	08–10/04/1946
A letter to the Minister of Water Resources of the Uzbek SSR, Comrade Koldayev, the Minister of Water Resources of the Tajik SSR, Comrade Miroshnichenko and the Minister of Water Resources of the Kyrgyz SSR, Comrade Yusupov, from the Deputy Minister for Industrial Crops of the USSR, Kosov—on percentage water allocation of the Isfara River's stock	Uzbekistan, Kyrgyzstan, Tajikistan	29/10/1946
Table with percentage based water sharing of the factual Isfara River's flow for Uzbek, Tajik, and Kyrgyz Republics for the month of April 1948, established at the inter-republican meeting	Uzbekistan, Tajikistan	1948
Special opinion and proposals on the protocol of inter-republican meeting on water allocation through Isfara River from 08/04/1949	Uzbekistan, Tajikistan	8/4/1949
Protocol of the meeting with the Deputy Head of Glavvodkhoz of the Ministry of Agriculture of the USSR, Comrade V.M. Melnikov, on the issues of allocation of water resources of BFC and Isfara River between Uzbek SSR and Tajik SSR	Uzbekistan, Tajikistan	29–30/05/1957
Protocol from 4 May 1961 on the issue of compensation of undelivered water resources to Marhamat district of Andijan province, Uzbek SSR	Kyrgyzstan, Uzbekistan	4/5/1961
Protocol from 21 July 1961 of the inter-republican and inter-provincial meeting on the issues of water allocation on Isfayramsai and Shakhimardansai	Kyrgyzstan, Uzbekistan	21/07/1961
Protocol of the inter-republican meeting of the representatives of Kyrgyz and Uzbek SSRs on the issue of allocation of water resources of the Karadarya River system	Kyrgyzstan, Uzbekistan	18/07/1962
Calculation of allocation of water resources of the Karadarya River system between Uzbek and Kyrgyz SSRs for 21–23 July 1962	Kyrgyzstan, Uzbekistan	21/07/1962

Title	Signatories	Date
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 26 July 1962	Kyrgyzstan, Uzbekistan	26/07/1962
Calculation of allocation of water resources of the Karadarya River system between Uzbek and Kyrgyz SSRs for 27 July 1962	Kyrgyzstan, Uzbekistan	27/07/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 28 July 1962	Kyrgyzstan, Uzbekistan	28/07/1962
Calculation of allocation of water resources of the Karadarya River system between Uzbek and Kyrgyz SSRs 29 July 1962	Kyrgyzstan, Uzbekistan	29/07/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 30 July 1962	Kyrgyzstan, Uzbekistan	30/07/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 31 July 1962	Kyrgyzstan, Uzbekistan	31/07/1962
Detailed calculation of allocation of water resources of the Karadarya River System between Uzbek and Kyrgyz SSRs for the period of 24–30 July 1962	Kyrgyzstan, Uzbekistan	07/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 1 August 1962	Kyrgyzstan, Uzbekistan	1/8/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 2 August 1962	Kyrgyzstan, Uzbekistan	2/8/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 4 August 1962	Kyrgyzstan, Uzbekistan	4/8/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 5 August 1962	Kyrgyzstan, Uzbekistan	5/8/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 6 August 1962	Kyrgyzstan, Uzbekistan	6/8/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 8 August 1962	Kyrgyzstan, Uzbekistan	8/8/1962

Title	Signatories	Date
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 9 August 1962	Kyrgyzstan, Uzbekistan	9/8/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 11 August 1962	Kyrgyzstan, Uzbekistan	11/8/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 12–13 August 1962	Kyrgyzstan, Uzbekistan	12/8/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 18 August 1962	Kyrgyzstan, Uzbekistan	18/08/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 21 August 1962	Kyrgyzstan, Uzbekistan	21/08/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 22 August 1962	Kyrgyzstan, Uzbekistan	22/08/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for 23 August 1962	Kyrgyzstan, Uzbekistan	23/08/1962
Calculation of allocation of water resources of Karadarya between Uzbek and Kyrgyz SSRs for the period of 24–27 August 1962	Kyrgyzstan, Uzbekistan	24/08/1962
Calculation of allocation of water resources of the system of Karadarya between Uzbek and Kyrgyz SSR for 28 August 1962	Kyrgyzstan, Uzbekistan	28/08/1962
Calculation of allocation of water resources of the system of Karadarya between Uzbek and Kyrgyz SSR for 29 August 1962	Kyrgyzstan, Uzbekistan	29/08/1962
Calculation of allocation of water resources of the system of Karadarya between Uzbek and Kyrgyz SSR for the period of 1–10 September 1962	Kyrgyzstan, Uzbekistan	1/9/1962
Prescription No. 511-R of the Council of Ministers of the USSR from 13 March 1963	Kyrgyzstan, Uzbekistan	13/03/1963
Protocol of the inter-republican meeting on the issue of construction of the second stage of Karkidon reservoir	Kyrgyzstan, Uzbekistan	20/02/1964

Title	Signatories	Date
Protocol: inter-provincial meeting under Nadjimov F.N.—the Vice-Minister of Water Resources of Uzbek SSR on the review and approval of plans of water allocation from Big Ferghana Canal, South Ferghana Canal, and North Ferghana Canal for 1964	Kyrgyzstan, Tajikistan, Uzbekistan	18/06/1964
Protocol of the meeting of representatives of Minvodkhoz of Uzbek SSR, Minvodkhoz of Kyrgyz SSR, GosStroy of Kyrgyz SSR, Design Institutes “SredAzGiproVodKhlpok” and “KyrgyzGiproVodkhoz” on issues concerning utilization of water resources of Karadarya together with Andijan reservoir	Kyrgyzstan, Uzbekistan	23/09/1965
Protocol of the inter-republic meeting on the issue of designing water allocation patterns at the Uch-Kurgan dam on the left-bank Canal	Kyrgyzstan, Uzbekistan	13/04/1966
Protocol of the inter-republican meeting on regulation of land–water issues between Uzbek SSR and Kyrgyz SSR	Kyrgyzstan, Uzbekistan	7/6/1973
Protocol of the meeting on the issues of water division on the system of canals—North Ferghana Canal, Big Andijan Canal, Big Ferghana Canal, South Ferghana Canal and Karadarya	Kyrgyzstan, Uzbekistan	23/08/1973
Protocol #3 from the inter-republican meeting on the issue of water supply to Kirov district of Uzbek SSR from Isfara River and through the Big Ferghana Canal to Tajik SSR. For the period of July 8–26, 1974	Uzbekistan, Tajikistan	27/07/1974
Protocol from the meeting on the issue of water allocation from Isfara River among Tajik, Uzbek, and Kyrgyz SSR	Kyrgyzstan, Tajikistan, Uzbekistan	31/07/1974
Decisions of the meeting of the representatives of Uzbek and Kyrgyz SSR in Frunze	Kyrgyzstan, Uzbekistan	6/9/1974
Protocol of the meeting on the issue of water allocation from Isfara River among Tajik, Uzbek and Kyrgyz Republics for the non-vegetation period	Kyrgyzstan, Tajikistan, Uzbekistan	21/11/1974

Title	Signatories	Date
Protocol from the inter-republican meeting on mutual settlement of water calculations through Isfara River to Kirov district of Uzbek SSR and through the Big Ferghana Canal to Tajik SSR	Uzbekistan, Tajikistan	4/8/1975
Decision of the meeting of ministers of melioration and water resources of the Uzbek SSR, Tajik SSR, and Kyrgyz SSR on the issue of water allocation of Isfara River	Kyrgyzstan, Tajikistan, Uzbekistan	12/8/1975
Protocol from July 3, 1976	Uzbekistan, Tajikistan	3/7/1976
Decision: meeting of ministers of melioration and water resources of Tajik SSR—Kasymov A. and Kyrgyz SSR—Kojamkulov A. on the issue of sharing Isfara River's flow	Kyrgyzstan, Tajikistan	20/07/1976
Protocol of the interstate discussion on the supply of water through Isfara to Kirov district of Uzbek SSR and through BFC to Tajik SSR	Uzbekistan, Tajikistan	7/7/1977
Protocol on mutual calculations of water delivery through Isfara River to Kirov district of Uzbek SSR and through the Big Ferghana Canal to Isfara's irrigation systems in Tajik SSR, for the period from 01/06/1979 until 03/07/1979	Uzbekistan, Tajikistan	5/7/1979
Protocol on the inter-state allocation of Fergana valley's small rivers' flows	Kyrgyzstan, Uzbekistan	4/10/1980
Protocol from the meeting of ministers of water resources of Uzbek SSR and Kyrgyz SSR with a Participation of the Vice-head of "Glavvodresurs" [main water resources] at the Ministry of Water Resources of USSR on the issue of "allocating rivers' flows from Isfayram-sai and Shahimardan"	Kyrgyzstan, Uzbekistan	16/07/1980
Letter from Ahmatkulov S.—Vice Chairman of the Executive Committee of the Ferghana Provincial Council of People's Deputies, to Alymbekov M.—Vice Chairman of the Executive Committee of the Osh Provincial Council of People's Deputies and copies to: Ismailov—Chairman of the Executive Committee of the Aravan District Council of People's Deputies and to Kachkynbayev—Head of the Industrial Department of Water Resources for Osh province	Kyrgyzstan, Uzbekistan	26/02/1981

Title	Signatories	Date
Protocol: from the meeting on the inter-republican allocation of Isfara River's flow for 1981 and consequent years	Kyrgyzstan, Tajikistan, Uzbekistan	18/05/1981
Decadal water allocation for Kyrgyz SSR from Isfara River for the irrigation period of 1982	Kyrgyzstan, Tajikistan, Uzbekistan	1982
Decadal water allocation—schedule water intake for Kyrgyz SSR from the River Isfara as instructed by the Head of Water Resources Department (GlavVodResursy) of Minvodkhoz of USSR, V.K. Adam and approved by the Deputy Minister of Minvodkhoz of USSR, I.I. Borodavchenko. Sent to Kirov Canal Management	Kyrgyzstan, Tajikistan, Uzbekistan	28/06/1982
Protocol of the technical meeting on issues related to allocation of water resources of Isfara between Uzbek SSR and Tajik SSR	Uzbekistan, Tajikistan	20/06/1989
Protocol of the technical meeting on resolving water issues between State Water Committee of the Uzbek SSR and Minvodkhoz of the Kyrgyz SSR	Kyrgyzstan, Uzbekistan	22/08/1989
Agreement on regulation of allocation of water resources between Uzbekistan and Kyrgyzstan at the joint consideration of Ferghana and Osh Provincial Water Departments	Kyrgyzstan, Uzbekistan	28/08/1989
Schedule of reducing limit from Isfara River in Ferghana province on the account of supplying from the Besharyk Pump Station for the vegetation period of 1990	Uzbekistan, Tajikistan	1990
Protocol of the meeting at the Ministry of Melioration and water resources of the Tajik SSR from 28/03/1991	Kyrgyzstan, Tajikistan	28/03/1991
Protocol of the meeting on the allocation of water resources of Isfara River between Uzbek SSR and Tajik SSR	Uzbekistan, Tajikistan	3/4/1991
Amendment to the protocol from May 14 of 1991: "decadal, percentage based allocation of Sokh River's flow between Uzbek and Kyrgyz SSR"	Kyrgyzstan, Uzbekistan	14/05/1991

Title	Signatories	Date
Protocol of the meeting on the issues related to the exploitation of Tortgul water reservoir on the River Isfara and water allocation between the Republic of Kyrgyzstan and the Tajik SSR	Kyrgyzstan, Tajikistan	16/05/1991
Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan and the Republic of Uzbekistan on cooperation in the field of joint management on utilization and protection of water resources from interstate sources	Kyrgyzstan, Tajikistan, Uzbekistan, Kazakhstan, Turkmenistan	18/02/1992
Protocol No. 1 of inter-provincial meeting on the issue of water supply from Isfara River to Besh-Aryk (Kirov) district of Ferghana province and from BFC to Kanibadam district of Leninabad province	Uzbekistan, Tajikistan	22/06/1992
Act on transmission-reception of the Big Ferghana Canal and other supplementary means from picket 2495 to picket 2540 + 90	Uzbekistan, Tajikistan	27/01/1998
Agreement among the governments of the Republic of Kazakhstan, Kyrgyz Republic and the Republic of Uzbekistan on joint and integrated use of water and energy resources of the Naryn-Syr Darya cascade of water reservoirs in 1998	Kyrgyzstan, Uzbekistan, Kazakhstan	17/03/1998
Protocol of the extraordinary meeting of the Inter-State Commission for Water Coordination (ICWC)	Kyrgyzstan, Tajikistan, Uzbekistan, Kazakhstan	9/7/1999
Protocol of the meeting between the Working Groups of the Republic of Tajikistan and Kazakhstan	Tajikistan, Kazakhstan	21/07/2000
Protocol of the technical meeting of the Representatives of the Water Management Organizations of Kazakhstan, Tajikistan, Uzbekistan and Syr Darya BWO	Tajikistan, Uzbekistan, Kazakhstan	23/07/2000
Protocol of the joint technical meeting on providing the uninterrupted work of the pump stations 'Mahram-0', 'Mahram-1' and drawdown of the Kayrakum reservoir up to the mark of 340.0	Uzbekistan, Tajikistan	8/11/2000
Protocol from the joint technical meeting on the integrated use of water resources in the Syr Darya river basin during the vegetation period of 2001	Uzbekistan, Tajikistan	13/02/2001

Title	Signatories	Date
Protocol # 29: meeting of the Republic of Kazakhstan, the Republic of Kyrgyzstan, the Republic of Tajikistan, Turkmenistan and Uzbekistan at the Interstate Commission for Water Coordination (ICWC)	Kyrgyzstan, Tajikistan, Uzbekistan, Kazakhstan, Turkmenistan	12–13/04/2001
Protocol of the negotiations between the delegation of the Republic of Uzbekistan and the Republic of Tajikistan on the regulation of the water availability to the water users in the Syr Darya basin	Uzbekistan, Tajikistan	23/05/2001
Protocol of the meeting for establishing the operation regime of the Kayrakum reservoir for the period from June 19 through July 1 of 2001	Tajikistan, Uzbekistan, Kazakhstan	19/06/2001
Protocol of the meeting for establishing the operation regime of the Kayrakum reservoir for the period from August 3 through August 14 of 2001	Tajikistan, Uzbekistan, Kazakhstan	2/8/2001
Agreement: between the government of the Republic of Uzbekistan and the Government of the Republic of Tajikistan on the cooperation in the field of the rational use of water-energy resources in 2002	Uzbekistan, Tajikistan	2002
Schedule of water intake from the mechanized canal Hodjabakirgan by the Lyaylyak district in 2002	Kyrgyzstan, Tajikistan	2002
Agreement: between the government of the Republic of Uzbekistan and the government of the Republic of Tajikistan on the cooperation in the field of the rational use of water-energy resources in 2003	Uzbekistan, Tajikistan	3/3/2003
Protocol of the joint consideration of issues of providing uninterrupted work of the pump stations Mahram-0, Mahram-1, and drawdown of kayrakum reservoir to the mark of 340.5 m in the vegetation period of 2003	Uzbekistan, Tajikistan	17/04/2003
Agreement: between the government of the Republic of Uzbekistan and the government of the Republic of Tajikistan on the cooperation in the field of the rational use of water and energy resources in 2004	Uzbekistan, Tajikistan	29/12/2003
Schedule of water intake from the river Ak-bura for Andijan province of Uzbekistan for the Vegetation period of 2004	Kyrgyzstan, Uzbekistan	2004

Title	Signatories	Date
Schedule of water intake from the river Aravansai for Andijan province of Uzbekistan for the vegetation period of 2004	Kyrgyzstan, Uzbekistan	2004
Schedule of water intake of Kyrgyzstan from Savai Canal for the period of March–November 2004	Kyrgyzstan, Uzbekistan	2004
Schedule of water intake from the canal “Suzak” for Pakhtaabad district of Andijan province of Uzbekistan for the vegetation period of 2004	Kyrgyzstan, Uzbekistan	16/04/2004
Plan-schedule of limit of water of the Kyrgyz Republic in the account of 13 % of the factual volume of karkidon water reservoir for the vegetation period of 2004	Kyrgyzstan, Uzbekistan	14/04/2004
Schedule water intake from Andijan water reservoir through Right-Bank Kamyrvat Canal for the Suzak district of Jalalabad province of Kyrgyzstan and Kurgantepa district of Andijan province of Uzbekistan for the vegetation period of 2004	Kyrgyzstan, Uzbekistan	16/04/2004
Schedule of water allocation on South Ferghana Canal for the period 2004	Kyrgyzstan, Uzbekistan	19/04/2004
Schedule water intake from the river Maylissai for Pakhtaabad district of Andijan province of Uzbekistan for the vegetation period of 2004	Kyrgyzstan, Uzbekistan	16/04/2004
Schedule of water intake from the Andijan reservoir through Right-Bank Kamyrvat canal for the Suzak district of Jalalabad province of the Republic of Kyrgyzstan and the Kurgantepa district of Andijan province of the Republic of Uzbekistan for the vegetation period of 2005	Kyrgyzstan, Uzbekistan	2005
Schedule of water intake for the Pakhtaabad district of Andijan province of Uzbekistan from the river Maylissai for the vegetation period of 2005	Kyrgyzstan, Uzbekistan	2005
Schedule of water intake for the Pakhtaabad district of Andijan province of Uzbekistan from canal “Suzak” for the vegetation period of 2005	Kyrgyzstan, Uzbekistan	2005

Title	Signatories	Date
Agreement: between the government of the Republic of Uzbekistan and the government of the Republic of Tajikistan on the cooperation in the field of the rational use of water and energy for the period of February 2005 to April of 2006	Uzbekistan, Tajikistan	10/2/2005
Protocol on the joint regulation of water discharges through water intake structures from Syr Darya River for the vegetation period of 2006	Uzbekistan, Tajikistan	24/06/2006
Protocol of the negotiations of the delegates of the Republic of Uzbekistan and the Republic of Tajikistan	Uzbekistan, Tajikistan	26/12/2006
Protocol among the Committee on Water Resources of the Republic of Kazakhstan, the Ministry of Melioration and Water Resources of the Republic of Tajikistan and the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan on the cooperation in the sphere of the rational use of water resources of the Kayrakum reservoir in 2007	Tajikistan, Uzbekistan, Kazakhstan	18/05/2007
Protocol on cooperation in the field of rational utilization of water and energy resources between the government of the Republic of Uzbekistan and the government of the Republic of Tajikistan for 2008	Uzbekistan, Tajikistan	28/12/2007
Plan-schedule of water intake from the pump station "Drujba" in the river Naryn for the vegetation period of 2008 for the Pakhtaabad district of Andijan province of the Republic of Uzbekistan	Kyrgyzstan, Uzbekistan	2008
Plan-schedule of water intake from the river Maylisai for the vegetation period of 2008 for the Pakhtaabad district of Andijan province of the Republic of Uzbekistan	Kyrgyzstan, Uzbekistan	2008
Protocol on the cooperation for maximum utilization of water resources of the Kayrakum reservoir for the period 2008 signed by the Committee of Water Resources of the Republic of Kazakhstan, Ministry of Melioration and Water Resources of the Republic of Tajikistan and the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan	Tajikistan, Uzbekistan, Kazakhstan	11/4/2008

Title	Signatories	Date
Protocol: regional meeting of Managers of the Water Resources and Fuel-energy Sectors of the Republic of Kazakhstan, Kyrgyzstan Republic, Tajikistan Republic and the Republic of Uzbekistan on the issues of using water-energy and fuel resources in the Naryn-Syr Darya River basin in 2008 and the 1st quarter of 2009	Kyrgyzstan, Tajikistan, Uzbekistan, Kazakhstan	30/04/2008
Protocol among the Committee for Water Resources of the Republic of Kazakhstan, the Ministry of Melioration and Water Resources of the Republic of Tajikistan, and the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, on the use of water resources of the Kayrakum reservoir in July–August of 2008	Tajikistan, Uzbekistan, Kazakhstan	17/07/2008
Protocol of the second meeting of the Joint Tajik-Uzbek Commission on the issues of Trade-Economic Cooperation (water and energy related section—on rational utilization of water and energy resources)	Uzbekistan, Tajikistan	18/02/2009
Instruction on joint exploitation of the head water-works facility of Machai (Aktatyr) Canal	Kyrgyzstan, Tajikistan	18/06/2009
Protocol of the joint meeting of the Heads of Departments for Water Resources of Kazakhstan, Uzbekistan and Tajikistan on the issue of utilization of water and energy resources of the Syr Darya River basin for the period of second half of July and August of 2010	Tajikistan, Uzbekistan, Kazakhstan	15/07/2010
Opinion on the issue of eliminating unfavorable natural meliorative conditions in the territory of Isfara-Lyakkan depression	Kyrgyzstan, Tajikistan	Unknown
“Telegram from Rasulov K.—Head of the Ferghana’s Provincial Department of Irrigation Systems and from Negmatov—Head of the Provincial Production Management of Irrigation Systems for Leninabad province, to Alyonin— at the Ministry of Water Resources of USSR”	Uzbekistan, Tajikistan	Unknown

Title	Signatories	Date
Position on the Working Group on examining bilateral issues on use of water resources between the Kyrgyz Republic and the Republic of Tajikistan	Kyrgyzstan, Tajikistan	Unknown

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