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Research Report

Rapid Assessment as a Tool for Transboundary Water Governance: Proof-of-Concept Evidence from the Ferghana Valley

Bunyod Holmatov, Jonathan Lautze, Matthew McCartney, Botirjon Abdurakhmanov, and Isomiddin Akramov

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Contents

Acronyms and Abbreviations

CAREC	Central Asia Regional Economic Cooperation
EU	European Union
GPSCSW	Global Partnership for Sustainable Cooperation on Shared Waters
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IFAS	International Fund for Saving the Aral Sea
JWMC	Joint Water Management Commission
OSCE	Organization for Security and Cooperation in Europe
RAP	Rapid Assessment Process
RBO	river basin organization
SANIIRI	Central Asian Scientific Research Institute of Irrigation
STT	small transboundary tributary
SDC	Swiss Agency for Development and Cooperation
TWM	transboundary water management
UN	United Nations
UNECE	United Nations Economic Commission for Europe
USSR	Union of Soviet Socialist Republics
WUA	water user association

Summary

Rapid Assessment Process (RAP) is widely applied in fields ranging from public health to information security but is not commonly applied in the field of water management. This research report describes an application of RAP to assess the state of transboundary water cooperation in the Ferghana Valley of Central Asia. The focus is on two small tributaries—Akburasai and Isfayramsai, shared between Kyrgyzstan and Uzbekistan—where cooperation is shaped by a complex mix of historical agreements, practical cooperation, and evolving governance challenges. As is in many transboundary contexts, the prioritization and identification of challenges are strongly influenced by prevailing political, economic, and social conditions. Differences in assessment methodologies and analytical foci often lead to varying interpretations of the root causes. To address this, we designed a novel framework for a transboundary waters RAP and populated it through standardized RAP methodologies—namely, team-based inquiry, triangulation of data, and an iterative approach—that aimed to balance consistency, comparability, and credibility with efficient use of time and resources. For this research, the RAP was designed to generate a preliminary but objective understanding of current cooperation from the perspectives of water practitioners in both countries.

Results of the RAP application in the Akburasai and Isfayramsai rivers revealed a dual reality: strong operational cooperation exists on the ground, but this is not matched by formal institutional coherence or inclusive governance structures. Both rivers are covered by formal agreements, including Soviet-era water allocation protocols (circa 1980s) and more recent bilateral accords from 2022. However, these frameworks are outdated or narrow in scope. In practice, cooperation is largely sustained through informal (personal) connections, technical collaboration—including harmonized measurement standards, regular data exchange—and joint infrastructure management. This functionality is rooted in Soviet-era institutional legacies, which enable technical compatibility but have also led to inertia in adapting to contemporary governance needs.

Major governance gaps persist, notably the absence of joint river basin plans and formal stakeholder engagement mechanisms. Institutional responsibilities are poorly defined, and cooperation often depends on informal relationships or external donor facilitation rather than clear mandates. A key divergence in stakeholder perspectives emerged between upstream Kyrgyz and downstream Uzbek actors. Uzbek respondents—who are more vulnerable to upstream water decisions—expressed a stronger demand for legally binding agreements, structured coordination, and institutional safeguards.

In sum, while technical collaboration between the two countries is broadly effective, it remains inherently fragile in the absence of complementary progress in legal, institutional, and participatory dimensions. RAP highlights this moment as a critical opportunity to modernize transboundary water governance frameworks. Drawing on consultations with stakeholders from both Uzbekistan and Kyrgyzstan, the assessment identified three priority areas for action:

1. Strengthen legal and institutional cooperation.
   - Revise outdated agreements, especially Soviet-era water allocation protocols.
   - Establish a new legal foundation that reflects current hydrological and climate realities.
   - Improve data transparency through joint databases and interoperable monitoring platforms.
   - Invest in shared infrastructure and facilitate cross-border access for water personnel and materials.

2. Advance collaborative basin planning and technical coordination.
   - Form a joint commission and technical working group to lead basin planning.
   - Complete an inventory of hydraulic structures and enhance data exchange.
   - Develop joint infrastructure projects and early warning systems.
   - Upgrade hydraulic (monitoring) posts with real-time monitoring technologies.

3. Enhance stakeholder engagement.
   - Institutionalize public participation in river basin governance.
   - Define stakeholder roles and responsibilities within existing commissions.
   - Organize inclusive planning events, roundtables, and seasonal coordination meetings.
   - Expand stakeholder representation to include civil society, local governments, and water user groups.

The Ferghana Valley stands at a governance crossroads. While day-to-day technical cooperation remains functional, its long-term sustainability is uncertain without deeper institutional, legal, and participatory reform. The RAP has demonstrated clear value in this context by providing a timely, low-cost, and practitioner-informed diagnosis of both strengths and gaps in transboundary cooperation, while simultaneously creating space for dialogue and trust-building among stakeholders. The findings and jointly developed recommendations offer a practical pathway for transforming existing technical collaboration into more durable, equitable, and climate-resilient water governance both in the Ferghana Valley and, potentially across the many transboundary river systems of Central Asia.

Rapid Assessment as a Tool for Transboundary Water Governance: Proof-of-Concept Evidence from the Ferghana Valley

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1. Introduction

This research report presents the application of the RAP to evaluate the current state of transboundary water cooperation in the Syr Darya Basin, with a particular focus on two small transboundary tributaries (STTs)—Akburasai and Isfayramsai—shared by Kyrgyzstan and Uzbekistan in the Ferghana Valley. RAP is a qualitative, team-based, and iterative methodology that generates timely, meaningful insights by triangulating findings from literature, policy analysis, and stakeholder interviews. In this context, it functions both as a diagnostic tool and a vehicle for learning (Beebe 2000): illuminating obstacles and successes in cooperation, unpacking enabling and constraining factors, and identifying actionable pathways to strengthen transboundary governance.

Developed as part of the Global Partnership for Sustainable Cooperation on Shared Waters (GPSCSW) project, the RAP was designed to produce an objective, transferable, and comparable overview of cooperation. This RAP application is timely and relevant given the rapidly evolving political, hydrological, and climatic dynamics in Central Asia. The Ferghana Valley—despite its relatively modest hydrological scale—serves as a partial microcosm of the broader Syr Darya Basin. By focusing on small but strategically important tributaries, this study offers insights into how localized cooperation can contribute to basin-wide resilience. The lessons drawn here can inform similar efforts in other transboundary settings, especially those where formal mechanisms remain underdeveloped or politically sensitive. In this regard, the RAP not only reflects on the current situation but also supports the long-term vision of equitable and adaptive shared water governance in the region.

1.1 Why the Ferghana Valley?

The Ferghana Valley (22,000 km²)—shared by Uzbekistan, Kyrgyzstan, and Tajikistan—is one of Central Asia's most densely populated, agriculturally productive, and geopolitically sensitive regions. The Valley is a vital agricultural center supporting more than 13 million people living in the valley and beyond (CGIAR Research Program on Dryland Systems, n.d). It is also hydrologically complex and ecologically fragile, with water resources that are heavily relied upon for irrigation, domestic use, and energy. The Valley's transboundary character, combined with legacy infrastructure and overlapping ethnic geographies, makes water governance particularly challenging (Toktomushev 2017).

While many positive changes have occurred in terms of improving the overall efficiency of the system, there is room to enhance on-farm water use efficiency and address transboundary allocation challenges. Persistent issues including sub-optimal water management and deteriorating irrigation and drainage infrastructure continue to hamper performance (TIES 2016). Increasingly, water managers in the Ferghana Valley recognize the importance of cross-sectoral coordination, and how the lack of such coordination hinders integrated planning (Holmatov et al. 2026). Population growth and climate change impacts are poised to exacerbate these existing stressors; the need for improved inter-state and inter-sectoral coordination has become urgent. The RAP described in this research report seeks to address these existing and emerging gaps.

Much of today's institutional landscape and physical infrastructure was inherited from the Soviet era, during which water resources were managed centrally and allocated according to a coordinated regional plan. Under the Union of Soviet Socialist Republics (USSR), administrative borders were fluid, and water was considered a shared resource across republics, coordinated through inter-republican ministries. However, with the dissolution of the Soviet Union in 1991, these administrative boundaries hardened into international borders, and the unified water management system fragmented. During the early post-independence era, countries immediately committed to cooperation but the absence of robust agreements, coupled with divergent national interests like hydropower production for upstream versus irrigation for downstream, led to a vacuum in transboundary coordination[1]. Infrastructure systems such as canals, pumps, and reservoirs, now often span political borders without the corresponding

[1] Abdullaev, Iskandar, Jonathan Lautze, Barbara Janusz-Pawletta, and Bunyod Holmatov. 2025. D2.4 – Towards a standardized template for enhancing climate resilience in Shared Tributaries: Assessing the effectiveness of transboundary legal frameworks in the Shakhimardansai and Naryn rivers [Version 1.0 Report to Donor]. European Union.

institutional mechanisms for joint oversight or maintenance. This legacy has left a patchwork of uncoordinated management regimes, especially at the sub-basin level, where tensions over water allocation, access, and infrastructure upkeep periodically flare (Toktomushev 2017). Despite these difficulties, some form of cooperation has persisted or emerged in recent decades. Bilateral and regional dialogues, such as those facilitated by the International Fund for Saving the Aral Sea (IFAS) and other projects supported by international donors, have contributed to improvements in joint water scheduling and allocation. Yet, much of this cooperation focuses on the main rivers and larger infrastructure, and remains ad hoc, top-down, and vulnerable to political shifts. In the Ferghana Valley—which is home to dozens of STTs—water is deeply intertwined with local livelihoods (Kazbekov and Yakubov 2010), agricultural cycles (Wegerich et al. 2012), and community-level governance. At the STT level, there is a pressing need to understand the existence and implementation of formal agreements and complement them with more grounded, trust-based, and operationally relevant approaches to provide a complete picture of cooperation dynamics.

The Ferghana Valley is partially representative of transboundary river systems across Central Asia, as it exhibits many of the region's structural governance challenges, most notably upstream–downstream asymmetries, continued reliance on Soviet-era allocation frameworks, functional yet informal technical cooperation, weak basin-level institutions, and increasing climate-driven hydrological variability (Dukhovny and de Schutter 2011; Sehring 2009). At the same time, the Valley displays distinctive characteristics that limit full generalization, including high population density, intensive irrigated agriculture, a dense network of STTs, and a highly fragmented political geography shaped by complex borders and enclaves (Zinzani 2015). These features amplify coordination challenges and make institutional weaknesses more visible compared to larger, centralized basins such as the Amu Darya or mainstem Syr Darya (Bernauer and Siegfried 2012; World Bank 2004).

Hence, the Ferghana Valley provides an effective test case for transboundary water governance in Central Asia, magnifying systemic issues that are common across the region while also demonstrating how pragmatic, operational cooperation can persist despite legal, institutional, and participatory fragility. Applied here as a proof-of-concept, RAP offers a structured, flexible, and cost-effective methodology capable of generating timely, actionable insights into the state of cooperation, while identifying practical entry points for institutional and governance reform. Lessons from the Ferghana Valley—particularly concerning legacy institutions, informal coordination mechanisms, and the limitations of outdated agreements—are broadly relevant but require careful adaptation when applied to other Central Asian basins with differing hydrological scales, political economies, and governance contexts.

1.2 The Rapid Assessment Process (RAP)

Ferghana Valley, a prime example of a region with complex and historically rooted challenges, was chosen as a testing ground for applying the RAP to transboundary water cooperation. As a region marked by deep historical legacies, constrained data sharing, often fragile trust between riparian states, and complex border dynamics, it provides a critical setting to examine whether the RAP can generate useful insights while also serving as a confidence-building process. In this application, the RAP was deployed as both a diagnostic and a facilitative tool, capable of surfacing governance and technical gaps, while also opening space for dialogue among stakeholders.

Drawing on methods proven in other disciplines, the RAP's value lies in producing timely, low-cost situational awareness. Through a combination of literature reviews, policy analysis, and stakeholder interviews, RAPs can uncover critical local dynamics prevailing at the time of assessment. Such insights are especially valuable in contexts where formal monitoring systems and data transparency are weak or politicized.

In the context of the Ferghana Valley, the RAP was expected to not only identify entry points for cooperation but also foster dialogue and trust across borders. By engaging stakeholders from both countries—including water managers, technical experts, and local officials—it enabled participatory engagement, greater transparency, and a shared understanding of the challenges at hand. This inclusive approach helps lower the political stakes of cooperation and supports the identification of entry points for practical collaboration.

Moreover, the RAP offered a platform to explore pragmatic and scalable solutions, including quick-win interventions such as installing canal lining, farmer training, and piloting green-grey infrastructure better suited to the valley's socio-ecological realities. It also provided a lens to assess the resilience of current systems under climate stress, positioning cooperation not only as a necessity but as an opportunity for adaptive governance.

The results of the RAP may be of strategic value to development partners and regional actors. In Central Asia, its insights can help organizations such as Central Asia Regional Economic Cooperation (CAREC),

European Union (EU), Swiss Agency for Development and Cooperation (SDC), United Nations (UN) agencies and IFAS to prioritize investments, support peacebuilding efforts, and design shared governance mechanisms that are responsive to the Valley's complex hydro-political context. As a proof-of-concept, the RAP also has the potential to be adapted and used beyond Central Asia.

The Ferghana Valley is not only a hotspot of water stress and institutional fragmentation but is also a critical testing ground for bottom-up, trust-based, and politically feasible approaches to transboundary water cooperation. By offering a rapid yet rigorous overview of the current situation, the RAP provides a potentially useful tool for scaling cooperation and resilience in this strategically important area.

2. Method

2.1 Study Site

The Ferghana Valley is one of Central Asia's most densely populated and agriculturally intensive regions. The Valley hosts approximately 25 small transboundary rivers (Wegerich et al. 2012), which are tributaries of the Syr Darya River and cross international borders. These STTs originate primarily in the mountainous regions of Kyrgyzstan and Tajikistan before flowing into Uzbekistan (see Figure 1).

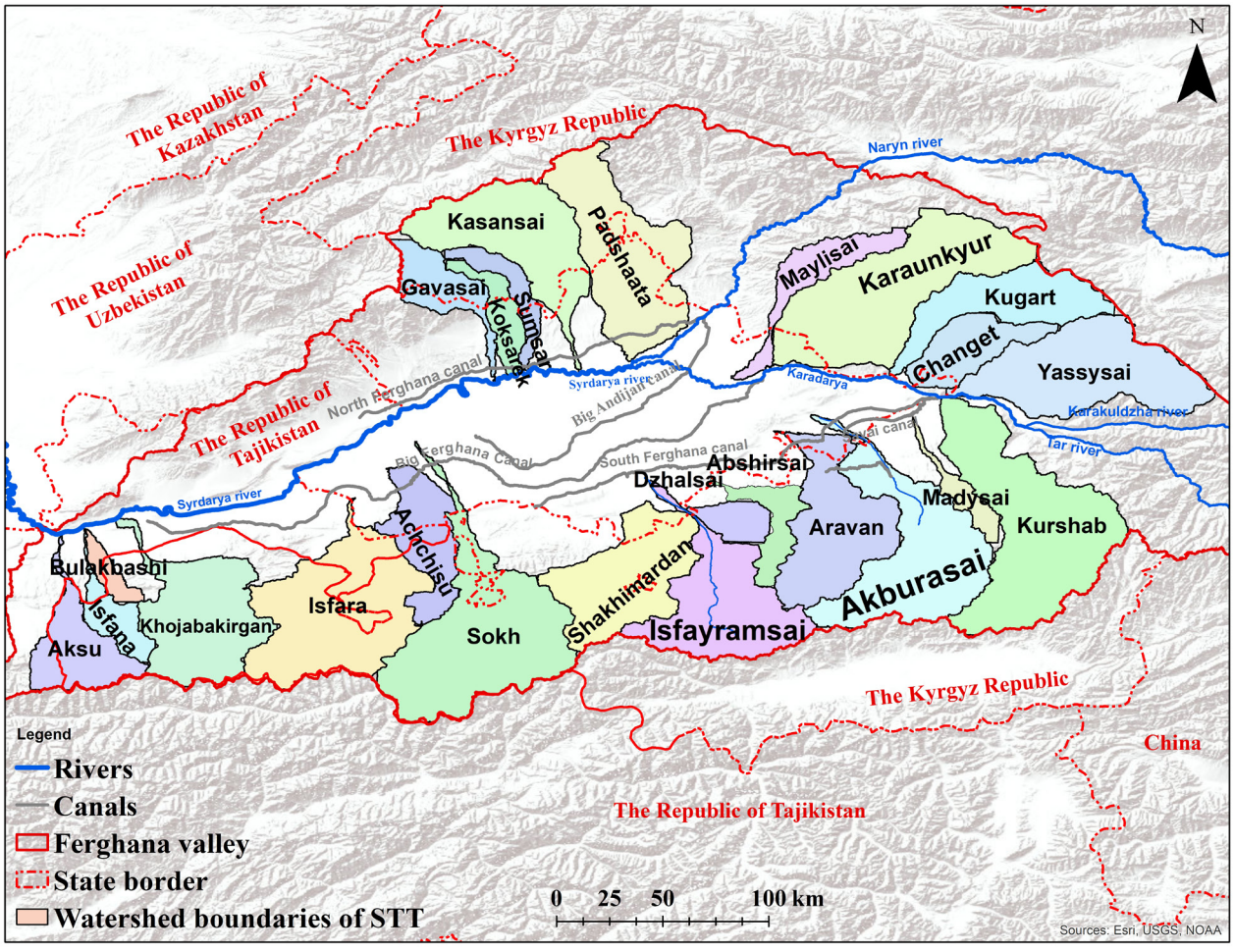

Figure 1. Watersheds of STTs in the Ferghana Valley
Source: Sardor Khamidov/IWMI

The Syr Darya is formed by the confluence of two rivers; the Naryn and the Kara Darya, which meet near Uzgen in the eastern part of the Ferghana Valley. It is the largest river in the basin and traverses four countries: Kyrgyzstan, Uzbekistan, Tajikistan, and Kazakhstan, before emptying into the Northern Aral Sea. The basin covers an area of approximately 462,000 km² of which roughly 223,000 km² lies in mountainous terrain. The total length of the river is about 2,200 km (SIC ICWC, n.d.), with an average annual flow of 40.8 km³ or ~1,294 m^3s^{-1} (ICWC, n.d.-a).

Within this broader basin, the two tributaries examined in this RAP—the Akburasai and Isfayramsai—are of particular importance. Both originate in Kyrgyzstan and flow into Uzbekistan. Akburasai is 148 km long, with a catchment of 2,540 km² and an average perennial flow of 21.4 m^3s^{-1}. Isfayramsai stretches 122 km, draining an area of 2,220 km², with an average flow of 21.1 m^3s^{-1} (The Great Soviet Encyclopedia, n.d.).

2.2 Background on RAP and Application in Central Asia

Over the last few decades, several variations of methods emerged as a response to the need for timely, actionable insights in complex, data-scarce, or rapidly evolving environments (McNall and Foster-Fishman 2007). These include rapid evaluation methods, rapid rural appraisal, rapid ethnographic assessment, rapid feedback evaluation, and RAP, among others. Despite the distinct differences, they all aim to achieve a balance between trustworthiness and speed (McNall and Foster-Fishman 2007). Originally developed by Beebe (1995, 2000; Harris et al. 1997), RAP has gone through different names and is conceived as a pragmatic alternative to conventional ethnographic methods; faster than traditional fieldwork yet more nuanced than large-scale surveys. It offers a flexible and iterative approach that relies on triangulating diverse sources of evidence and engaging multiple perspectives through team-based inquiry.

In the water sector, RAP has increasingly been adopted to assess governance dynamics, community-level water use practices, and the political economy of water access. Notably, RAP has been used by the International Water Management Institute (IWMI) and CGIAR in several studies on irrigation performance, farmer perceptions, and informal water markets in South Asia and Sub-Saharan Africa (Shah et al. 2002; Meinzen-Dick and Appasamy 2002). These studies highlight how informal water sharing practices, power asymmetries, and institutional fragmentation could either support or undermine formal water governance structures.

More recently, RAP-style approaches have been incorporated into participatory assessments of climate resilience and water governance under donor-funded programs, including GIZ's Integrated Water Resources Management projects.[2] These adaptations of RAP often blend qualitative interviews, policy analysis, and stakeholder mapping to surface underlying bottlenecks and support the co-design of interventions. For instance, Conservation International developed a Rapid Assessment Program, where they deploy teams of expert scientists to threatened or poorly known areas to quickly survey biodiversity and ecosystem health using standardized, cost-effective methods supported by innovative technologies and state-of-the-art analysis (Conservation International, n.d.).

The RAP applied in this study was designed specifically to evaluate the state of water cooperation in the Akburasai and Isfayramsai tributaries. At its core, the RAP sought to understand the depth and quality of cooperation between the two countries. Rather than merely documenting the existence of agreements or projects, the process aimed to probe beneath the surface, exploring what enables or constrains collaboration and where opportunities for more effective, inclusive, and resilient cooperation may lie. This involved a systematic examination of the historical context, existing policy frameworks, institutional arrangements, and the future priorities of stakeholders at multiple governance levels.

To support this inquiry, the RAP team drew on three primary sources of evidence: legal and policy documents (including water laws, bilateral agreements, and basin strategies), peer-reviewed and grey literature, and semi-structured interviews with key informants (water professionals, officials, and policy actors from both countries). These interviews provided lived experiences and operational knowledge that often elude formal documentation. Triangulation was operationalized by systematically comparing findings across these sources at each stage of engagement. In the first round, documents and literature reviews identified formal structures, policies, and historical precedents. In the second round, key informant interviews and validation workshops were used to validate these findings, reveal gaps between formal rules and practice, and surface context-specific operational insights. The third round—stakeholder seminar and final validation—served to cross-check preliminary conclusions, resolve discrepancies between sources, and refine interpretations. Any inconsistencies that emerged, such as differing accounts of stakeholder roles or the implementation of agreements, were flagged, discussed with multiple informants, and reconciled through iterative consultation and if possible, corroboration with documentary evidence.

[2] MWI (Ministry of Water and Irrigation). 2020. *Rapid Assessment of the Consequences of Declining Resources Availability and Exploitability for the Existing Water Supply Infrastructure.* Ministry of Water and Irrigation, Jordan. https://www.mwi.gov.jo/ebv4.0/root_storage/ar/eb_list_page/rapid_assessment1.pdf

This layered approach ensured that insights were grounded in multiple perspectives and reflected both the legal-institutional framework as well as on-the-ground realities of transboundary water governance in the Ferghana Valley.

The analysis of cooperation was guided by a conceptual framework developed by Saruchera and Lautze (2015). This approach suggests ten measurable indicators of transboundary water cooperation (Table 1). While other approaches exist, they were deemed less applicable to the small tributary scale which was the focus of this study. For instance, Subramanian et al. (2014) identified five categories of risk that play a key role in decision-making: capacity and knowledge, accountability and voice, sovereignty and autonomy, equity and access, and stability and support. Sara et al. (2021) focused on World Bank-financed projects and tracked success by gauging improvements across information (new or enhanced data management and sharing), institutions (strengthened economic or legal instruments), and investments (tangible improvements in financing).

Saruchera and Lautze's indicators were categorized into two main classes: paper indicators, which reflect the presence of formal mechanisms (such as legal agreements or basin plans), and practice indicators, which measure how those mechanisms are implemented (Table 1). For example, a paper indicator like the existence of a basin-wide agreement was verified through document review and interviews with basin representatives. A practice indicator, such as regular data exchange, was confirmed through stakeholder accounts and evidence of operational procedures.

Table 1. List of indicators and means of verification developed by Saruchera and Lautze (2015)

#	Indicator (class)	Methods of verification
1	Basin-wide transboundary water agreement (paper)	• Collect agreement documents • Interview basin representatives
2	Reference to transboundary cooperation in national water legislation (paper)	• Review national legislation for the existence of a reference to transboundary water management (TWM)
3	Existence of a basin plan (paper)	• Interview basin/government personnel • If the plan exists, obtain the document
4	Existence of information management systems (paper)	• Interview basin/government personnel • If a system is in place, obtain evidence
5	Evidence of regular data exchange (practice)	• Interview basin/riparian government representatives to confirm frequency and formats
6	Harmonized standards and units of measurement (practice)	• Interview technical personnel from riparian governments/ basin organizations to get the units of measurement used • Compare units utilized across countries to confirm harmonization
7	Joint water resources monitoring programs (practice)	• Interview representatives from basin organizations/riparian governments to confirm joint monitoring • Review documents that provide evidence of joint water monitoring
8	Riparian financing for transboundary institutional activities (practice)	• Interview representatives from basin organizations/riparian governments • Review budget figures (if available)
9	Existence and effectiveness of mechanisms for stakeholder participation (paper)	• Interview representatives from basin organizations/riparian governments and triangulate with representatives of various stakeholder groups • Review documentation or reference to institutions that prove the existence of such platforms
10	Specified roles and responsibilities for stakeholders in basin management institutions (paper)	• Interview representatives from basin organizations/riparian governments and triangulate with representatives of various stakeholder groups • Review documents that show the involvement of stakeholders in basin management

2.3 Step 1: Document Review

The first step of the RAP involved a systematic review of legal, policy, and institutional documents related to transboundary water governance in the Syr Darya Basin, the Ferghana Valley and the selected STTs. This included bilateral agreements, national water legislation, regulations of joint water commissions, and technical protocols. The goal was to establish a foundational understanding of the formal frameworks governing cooperation between Uzbekistan and Kyrgyzstan, identify references to key governance indicators, and inform the development of targeted interview questions.

2.4 Step 2: Key Informant Interviews (KIIs) and Validation Workshops

To gather first-hand insights, the research team conducted 20 semi-structured KIIs (10 from each country) between February and March 2024. Key informants were selected for their direct involvement in transboundary water governance or their experience with international cooperation initiatives. The KIIs were primarily held in person across sites in Uzbekistan and Kyrgyzstan, with two conducted online due to scheduling constraints. Each interview followed a structured protocol (Appendix A) aligned with the ten indicators and designed to surface both enabling conditions and persistent challenges. All participants gave informed consent, and discussions were conducted in a confidential, non-attributable manner to encourage openness. Appendix B contains the list of questions asked in the interviews.

Following the completion of the KIIs, six targeted validation meetings (three in Kyrgyzstan and three in Uzbekistan) were organized with a total of six water sector experts who had not participated in the initial interviews. The purpose of these meetings—each of which involved talking to one expert—was to critically assess and validate the preliminary findings generated through the interviews and document review.

The invited experts—representing a cross-section of basin-level technical and policy experience—broadly confirmed the accuracy and relevance of the synthesized results, while also highlighting additional concerns and institutional blind spots. Insights from the validation meeting were integrated into the KII synthesis to enhance accuracy and better reflect operational realities that interviews alone might miss, including implementation gaps and uneven policy operationalization. While this approach reduces transparency regarding the exact source of each observation, the benefits of improved contextual accuracy and the identification of institutional blind spots were considered to outweigh the loss of source-specific clarity.

2.5 Step 3: Stakeholder Seminar and Final Validation

To confirm findings from the previous steps and conduct a final assessment on both the challenges and opportunities for strengthening transboundary water cooperation a stakeholder seminar was held in the city of Ferghana on March 26, 2024. This event, organized jointly with the United Nations Development Programme (UNDP), was titled *Transboundary Water Cooperation: Identifying Problems on the Path to Expanded Cooperation in the Ferghana Valley.*

The seminar brought together 20 water management professionals—10 from Uzbekistan and 10 from Kyrgyzstan—a mix of 6 new and 14 previous participants from Step 2 (these numbers were not disclosed at the time). Participants validated the key findings from RAP interviews and expert consultations, confirming the relevance of the indicator-based assessment framework. Particular attention was given to the identified implementation gaps, and participants collaboratively developed a set of joint proposals and recommendations during the workshop's interactive brainstorming session.

We found that the RAP's methodological approach of blending conceptual rigor with field-level insights allowed the team to capture a nuanced and grounded picture of cooperation in one of Central Asia's most complex transboundary settings.

3. Results

3.1 Step 1: Document Review

3.1.1 Post-Soviet fragmentation and institutional transitions

Under the Soviet Union, STTs in the Ferghana Valley were managed as part of a unified hydrological and infrastructural system. Water infrastructure routinely crossed internal republican boundaries, and water allocation decisions were centralized. Following the collapse of the USSR, newly established international borders transformed intra-republican water systems into transboundary concerns. With increasing restrictions on border crossings from the late 1990s onward, the management of shared water resources became more fragmented and politically sensitive (Wegerich et al. 2012).

To address the emerging governance gap, Central Asian countries have signed a series of agreements aimed at improving cooperation over shared waters–particularly in the Syr Darya and Aral Sea basins. A landmark agreement was the 1992 Almaty Agreement on *Cooperation in the Joint Management, Use and Protection of Water Resources from Interstate Sources*, signed by Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, and Turkmenistan (SIC ICWC 2011). This agreement outlines general principles for cooperation as well as the allocation of water and eventually led to the creation of the Interstate Commission for Water Coordination (ICWC): the region's only body with a mandate to make binding decisions on interstate water allocation (ICWC, n.d.-b).

In 1993, as a response to the deteriorating Aral Sea crisis, the same five countries signed the *Agreement on Joint Activities in Addressing the Aral Sea and the Zone Around the Sea Crisis Improving the Environment, and Ensuring the Social and Economic Development of the Aral Sea Region*, which established the Interstate Council on the Problems of the Aral Sea Basin and endorsed IFAS (EC IFAS, n.d.).

Despite this progress at the basin scale, sub-basin and tributary-level agreements have remained scarce. Bilateral cooperation between Kyrgyzstan and Uzbekistan only began to improve measurably after 2020. Key developments include the establishment of a Joint Water Management Commission in August 2022 (today.kg 2022) and new agreements on border demarcation and water cooperation signed in November 2022 (Consulate General of the Republic of Uzbekistan in Kazan, n.d.). This included the joint management of reservoirs, shared monitoring, and maintenance responsibilities (Box 1). The 2022 Agreement was signed with the intention of improving bilateral relations and reflects a more trust-oriented, depoliticized approach. It aligns with recent trends toward regional rapprochement, particularly after transitions in leadership in Uzbekistan and Kyrgyzstan. It also reflects a growing political will to resolve long-standing water governance issues through practical mechanisms.

Box 1. Provisions of the 2022 Agreement between Uzbekistan and Kyrgyzstan

Under the *Agreement between the Ministry of Water Management of the Republic of Uzbekistan and the Water Resources Service of the Kyrgyz Republic on water cooperation, signed on November 3, 2022*, the parties committed to strengthening bilateral cooperation in several key areas and began a shift to a more dynamic and responsive management regime than the Soviet-era water allocation arrangements from the 1980s (Box 2). Key elements include:

- Commitment to coordinating water intake limits from shared channels based on currently valid, mutually recognized documents and regulations (Article 3).
- Joint implementation of measures to improve water management, particularly in low-water years, with the aim of enhancing reliability and resilience in transboundary water availability (Article 3).
- Joint actions to ensure the proper operation, maintenance, and safety of water management infrastructure located within their respective territories (Article 4).
- Provisions for coordinated efforts in managing floodwaters, mudflows, and other water-related emergencies, as well as mutual support through technical, informational, and other forms of assistance (Article 5).
- The establishment of the Joint Water Management Commission to facilitate institutional coordination and oversight of these collaborative activities (Article 7).

Water allocation in the Syr Darya's major tributaries continues to be governed by the ICWC's regional quotas. In contrast, allocation from small tributaries like the Akburasai and Isfayramsai remains guided by Soviet-era protocols like the 1980 *Protocol on the Inter-Republican Distribution of the Flow of Small Rivers in the Ferghana Valley*, approved by the Deputy Minister of Land Reclamation and Water Management of the USSR (Pak et al. 2014; Wegerich et al. 2012; Stucker et al. 2012). This protocol allocated flow percentages for STTs like Akburasai and Isfayramsai (Box 2).

According to Rsybekov (n.d.), the protocol remains a de facto governing document for water allocation post-USSR and is still referenced in operational practices. It is still considered valid by the riparian states and serves as the default legal basis for STT management. This assumption is questioned by Wegerich et al. (2012) who writes "...the protocol was implemented neither during the Soviet Union nor after independence in 1991." Even if the protocol remains valid, it is based on outdated hydrological data and political boundaries, and it no longer fully reflects current demand or infrastructure changes.

Box 2. The 1980 Protocol on the Inter-Republican Distribution of the Flow of Small Rivers in the Ferghana Valley

The inter-republican allocation of runoff from the small rivers of the Ferghana Valley continues to be guided by the Protocol of the USSR Ministry of Land Reclamation and Water Management, agreed upon by the relevant parties on April 10, 1980, and remains an important reference point in current water allocation practices (Rysbekov, n.d.). This allocation framework is based on land use and irrigation data from 1980, reflecting the planning assumptions of the *Scheme for the Complex Use and Protection of Water Resources of the Syr Darya River Basin*. Agricultural water demand calculations were derived from a unified irrigation regime developed by *Sredazgiprovodkhlopok* (a design and research institute), as stipulated in Protocol No. 60 (dated April 23, 1969) and approved by the Scientific and Technical Council of the USSR Ministry of Water Resources. Irrigation efficiency coefficients—which underpin water consumption estimates—were adopted from Central Asian Scientific Research Institute of Irrigation (SANIIRI) research and fixed at 0.66 for the Uzbek SSR and 0.62 for the Kyrgyz SSR.

This trend of formal cooperation increasing at the basin scale while stagnating or regressing at smaller scales mirrors global patterns. Holmatov and Lautze (2016) observed that transboundary water agreements are more commonly concluded at larger basin scales in regions such as Asia and Africa, compared to Europe or the Americas, where sub-basin or localized agreements are more frequent.

3.1.2 Informal local level collaboration

Despite the lack of updated formal agreements, local-level cooperation in the Ferghana Valley remains active. A study of meso-level cooperation found that while national-level politics and tight border controls have created obstacles—especially since the ethnic violence and revolutions in Kyrgyzstan in the 2000s—practical cooperation between local water managers has persisted (Wegerich et al. 2012).

Border-related issues, however, continue to constrain water infrastructure operations. For instance, engineers and water specialists often face difficulties crossing borders for routine maintenance due to limited border crossing hours or when moving equipment. Nevertheless, informal cooperation at the village level, such as jointly clearing canals or resolving minor disputes, remains a critical part of day-to-day water governance (Wegerich et al. 2012).

A study of cooperation on the Isfara River, another STT in the Ferghana Valley, highlighted key challenges such as the lack of measurement infrastructure, unclear allocation mechanisms, and ambiguities in border demarcation (Pak et al. 2014). This study emphasized that simply having agreements in place is insufficient; the institutional feasibility and socio-political context also matter.

Similarly, Wegerich et al. (2016) noted that even during the Soviet era, disputes over STT allocations were common. After independence, demands for increased shares by upstream states (notably Kyrgyzstan) and the expansion of irrigated areas in Uzbekistan led to further tensions. In response, the two countries concluded a verbal agreement in 2001 to share three STTs—Sokh, Shakhimardansai, and Isfayramsai rivers—equally on a 50/50 basis.

In recent years, project-based water diplomacy initiatives led by international donors and organizations have played a crucial role in enhancing technical cooperation, trust-building, and informal dialogue (Table 2), which has helped to sustain cooperation despite major political changes in the region (i.e., presidential power transfers in Kazakhstan, Kyrgyzstan, and Uzbekistan in the last ten years).

Table 2. Project based promotion of transboundary cooperation at the basin level: trust building and collaboration efforts

Project/Initiative	Implementing agency	Timeline	Geographic focus/STTs	Specific contributions to water diplomacy
UNECE Water Convention Projects	United Nations Economic Commission for Europe (UNECE)	2002–present	Amu Darya, Syr Darya, Chu-Talas, Isfara, others	· Development of hydrology and environment cooperation · Joint assessment missions · Stakeholder dialogues · Data sharing mechanisms
GIZ Transboundary Water Management (TWM)	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ, Germany)	2009–2021	Amu Darya, Syr Darya, others	· Fostering regional institutional cooperation · Dialogue facilitation at STT level · Technical support (e.g., gauging stations) · Capacity building of local officials
Blue Peace Central Asia (BPCA)	Swiss Development Cooperation (SDC)	2014–present	Syr Darya, Isfara, Akbura, others	· Small Basin Council support · Peacebuilding dialogues · Multi-stakeholder platforms · Civil society engagement
OSCE Environmental Security Projects	Organization for Security and Cooperation in Europe (OSCE)	2002–present	Chu-Talas, Cross-border water points	· Conflict prevention training · Joint water quality monitoring · Border-level cooperation on water emergencies

3.2 The State of Cooperation in the Two STTs: Applying the RAP Framework

Cooperation in the two STTs provides a similar picture—strong practical collaboration alongside institutional and participatory deficits—highlighting the need for a more integrated and inclusive framework for managing STTs. Indeed, both STTs satisfied 7 out of 10 indicators, at least nominally (see Table 3). Nonetheless, despite notable positives in several key areas such as agreement presence, cooperative gaps emerged on basin plans, stakeholder participation, and the definition of roles and responsibilities. Digging beneath the surface of the satisfied indicators revealed opportunities for improvement; for example, while agreements exist, their quality is open to debate.

Table 3. State of Cooperation

№	Indicator	Akburasai	Isfayramsai
I	Existence of a basin-wide transboundary water agreement (*paper*)	Evidence: Soviet era protocols	
II	Reference to transboundary cooperation in national water laws (*paper*)	Broader reference exists	
III	Inclusive completion of a basin plan (*paper*)	-	-
IV	Existence of information management systems (*paper*)	Exists at the broad scale, e.g., for the hydrometeorological data	
V	Evidence of regular data exchange (*practice*)	Limited data sharing occurs and was reported	
VI	Harmonized standards and units of measurement (*practice*)	Both countries continue using harmonized standards and units of measurement, legacy of the Soviet-era	
VII	Joint water resource monitoring programs (*practice*)	Broadly carried out by the Joint Water Management Commission (JWMC) (not specific to these STTs)	

Continued >>>

Continued >>>

№	Indicator	Akburasai	Isfayramsai
VIII	Riparian financing for transboundary institutional activities (*practice*)	Falls within the purview of the JWMC	
IX	Mechanisms for stakeholder participation (*paper*)	-	-
X	Defined stakeholder roles/responsibilities in basin institutions (*paper*)	-	-

3.2.1 Basin-wide transboundary water agreement for STTs

The *Protocol on the inter-republican allocation of the runoff of small rivers in the Ferghana Valley*, adopted in 1980 under the USSR Ministry of Water Resources system, continues to serve as the de facto basis for water allocation, but respondents indicated that it is outdated and insufficient. According to interviews, 13 respondents (9 from Uzbekistan, 4 from Kyrgyzstan) stated the protocol is no longer adequate to manage today's shifting water demands and supply conditions. Only 6 (mostly from the Kyrgyz side) believe it remains sufficient, and one declined to answer.

From the 20 respondents, 19 pointed to changes since 1980—such as population growth, expanded irrigation, and shifts in hydrometric zones—as the main reasons for the agreement's inadequacy. Other concerns included (Figure 2):

- Climate change impacts on flow volumes (11)
- Disagreement over the Protocol's legal status (7)
- Lack of data transparency at source (7)
- Allocations misaligned with national interests (6)
- Existence of informal cooperation mechanisms that need formalization (5)
- Diminishing water supplies not matching agreed volumes (2)

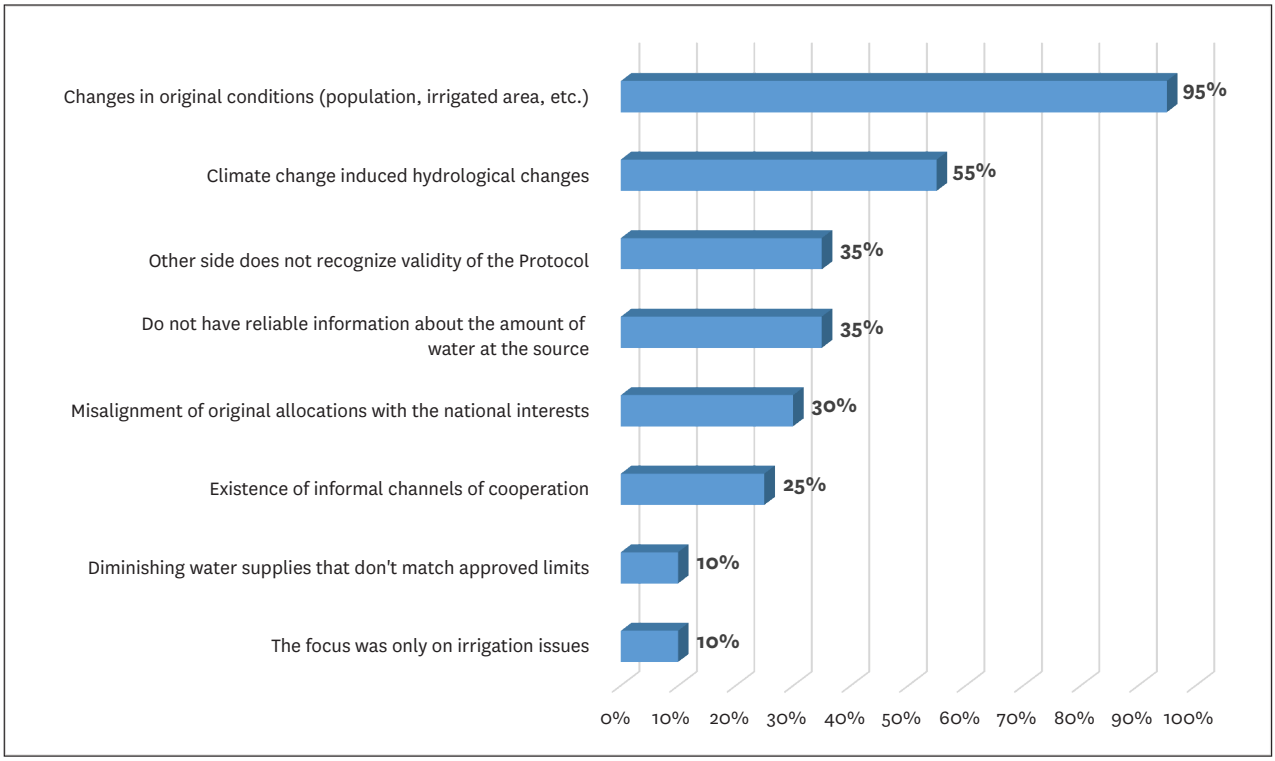

Figure 2. Constraints in the existing agreement

Source: authors' creation

Since the establishment of the JWMC in November 2022, respondents have observed improvements; 13 respondents (10 from Uzbekistan, 3 from Kyrgyzstan) cited growing trust, enhanced communication, and more frequent joint discussions as positive developments. However, 4 (Kyrgyz side) noted no change, while 3 did not respond.

When asked whether a new agreement is necessary, 14 respondents (evenly split between countries) answered yes. Yet, there were differences in responses between the two STTs:

- Respondents from Andijan/Osh (Akburasai) generally felt a new agreement was not needed, possibly because water storage in the Papan Reservoir ensures that water demands can currently be satisfied most of the time.
- Respondents from Ferghana/Batken (Isfayramsai) stressed the urgency of a new agreement, citing persistent seasonal shortfalls in water delivery.

3.2.2 Reference to transboundary cooperation in national water legislation (paper)

A total of 15 respondents (10 from Uzbekistan and 5 from Kyrgyzstan) confirmed the existence of legal references to TWM in national water legislation. These references typically acknowledge the need for bilateral agreements, joint management of shared water bodies, and the coordination of water use across borders. However, two respondents from Kyrgyzstan stated that transboundary cooperation is not mentioned in the national legislation, and 3 from Kyrgyzstan indicated they were unaware of any such provisions. This discrepancy in responses, particularly among Kyrgyz stakeholders, may reflect uneven dissemination of legal reforms, limited stakeholder engagement in legislative processes, or gaps in institutional awareness.

While both Uzbekistan and Kyrgyzstan have signed bilateral agreements on the joint use and management of reservoirs (e.g., Andijan), the integration of these agreements into the broader national water governance framework remains partial. Legal texts may include general clauses on international cooperation, but without detailed implementation mechanisms or clear mandates for coordination bodies.

The findings suggest that while formal reference to transboundary cooperation exists on paper, it lacks operational clarity or visibility among relevant stakeholders.

3.2.3 Development of a basin plan (paper)

Transboundary basin-level plans are a major gap. In response to whether such a plan exists, 18 respondents (10 from Uzbekistan and 8 from Kyrgyzstan) stated that no plan is in place, while two (both from Kyrgyzstan) indicated they were unaware. This finding is supported by the literature, which confirms that neither the Syr Darya nor the STTs of the Ferghana Valley are managed according to hydrographic or basin-wide principles (Box 3).

Regarding the existence of a joint inventory of infrastructure, 16 respondents (9 from Uzbekistan and 7 from Kyrgyzstan) reported that no such practice currently exists. The remaining 4 (1 from Uzbekistan and 3 from Kyrgyzstan) said they did not have sufficient information. Since the dissolution of the USSR, many water infrastructure assets—including canals and reservoirs—straddle the newly established international borders. According to the respondents, each country independently carries out inventory, repair, and maintenance activities for infrastructure within its territory. Nevertheless, in practice, the two sides often provide mutual support for shared or cross-border facilities. Joint inventories of water bodies are mainly undertaken in the context of shared reservoir management, rather than through a structured or institutionalized basin-wide approach (Box 3).

Box 3. Lack of basin management bodies in the Ferghana Valley

One key reform in Kyrgyzstan's water governance system is the establishment of basin management bodies (basin councils) that oversee water resources based on the boundaries of major river basins. These bodies are tasked with managing water in an integrated manner that considers multiple uses—including drinking water supply, agriculture, energy production, industry, tourism, and recreation (Ministry of Justice of the Kyrgyz Republic 2023). However, the small rivers of the Ferghana Valley are managed solely within fragmented administrative and basin-based structures rather than fully integrated hydrographic units, despite the presence of broader systems such as Talas, Chu, Issyk-Kul–Tarim, Naryn–Syr Darya, and Kara Darya–Syr Darya–Amu Darya. As a result, the current system does not align with hydrographic boundaries, and the STTs in the Ferghana Valley remain outside the scope of transboundary, basin-wide water management.

3.2.4 Existence of information management systems (paper)

Information management systems for transboundary water cooperation largely remain paper-based and underdeveloped. When asked about the presence of an early warning system, 17 informants (10 from Uzbekistan and 7 from Kyrgyzstan) reported that no formal system is in place. Only 3 respondents from Kyrgyzstan noted the existence of national hydrometeorological services that provide limited early warning functions. Importantly, although information management systems include the recording and communication of data on the timing and volume of flows, these aspects were not explicitly addressed in the interviews.

In the context of STTs, informal practices such as mobile phone alerts to warn of mudflows or extreme weather events do occur. However, these practices are reactive, fragmented, and not embedded in a coordinated or systematic framework.

Despite the absence of a formalized, basin-wide information system, some operational data are shared through national hydrometeorological centers. Additionally, both Uzbekistan and Kyrgyzstan are signatories to multilateral agreements on emergency preparedness and response (Box 4). A significant step forward is the bilateral agreement between the Government of the Republic of Uzbekistan and the Cabinet Ministers of the Kyrgyz Republic on cooperation in the field of prevention and liquidation of emergency situation signed on January 27, 2023, focused on enhancing cooperation in emergency prevention and response that sets an active crisis response framework.

Box 4. Multilateral cooperation in the field of hydrometeorology

According to Article 3 of *the Agreement between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, and the Republic of Uzbekistan on cooperation in the field of hydrometeorology* dated 17 June, 1999 (Bishkek), national hydrometeorological services must ensure the necessary accuracy and timeliness of obtaining comparable hydrometeorological information; obtaining operational hydrometeorological information during natural hydrometeorological events; exchanging operational and routine information, including the primary traditional observation periods (daily, decadal, monthly, annual) at stations of the hydrometeorological network; plan, organize and carry out joint measures to prevent natural hydrometeorological phenomena (inspection of outburst-prone lakes, monitoring glacier melt, mudflow-prone areas; and also grant each other the right to use the data of the network of hydrometeorological stations free of charge when performing operational and production work and transmitting information to state/interstate bodies without the right to transfer data to third parties.

3.2.5 Evidence of regular data exchange (practice)

Data exchange is fragmented and inconsistent across national boundaries. While limited information is shared between certain national agencies, there is little evidence of systematic or regular data exchanges among water management specialists at the operational level.

When asked whether data exchange actually occurs, 17 respondents (10 from Uzbekistan and 7 from Kyrgyzstan) stated that no such exchange takes place. Only 3, from Kyrgyzstan, acknowledged limited data sharing, primarily through national hydrometeorological services rather than direct cooperation between water management institutions (Box 4). These exchanges include real-time and forecasted hydrological and meteorological information, such as flow measurements, reservoir discharge levels, and weather warnings. However, such mechanisms remain confined to specific institutions and do not constitute a comprehensive or integrated data-sharing framework. Our questions were not designed to capture and gauge effectiveness of data exchange practices.

3.2.6 Harmonized standards and units of measurement (practice)

Uzbekistan and Kyrgyzstan currently maintain harmonized standards and units of measurement for water resource management, primarily due to the continued use of legacy Soviet-era systems. These include standardized hydrological terminology, flow measurement units, and water accounting procedures. As a result, technical interoperability between the two countries remains functional, particularly in the context of reservoir operations and flow monitoring across the STTs.

However, respondents stressed that harmonization in practice does not equate to coordinated modernization. While Soviet-era protocols provide a baseline for consistency, they have not been formally updated or jointly endorsed through modern bilateral or regional technical agreements. Hence, this legacy-based harmonization risks becoming obsolete as countries modernize their systems independently. For instance, Uzbekistan is currently introducing telemetered monitoring infrastructure (hydroposts), while

Kyrgyzstan's upgrades remain more limited (still mostly depend on conventional, physical observation). Without coordination, this divergence in data collection and format could erode harmonization and undermine data comparability.

Moreover, the absence of institutional mechanisms to jointly revise or update measurement standards and protocols limits the potential for adapting to emerging challenges such as climate variability, changing hydrological regimes, and the integration of digital technologies. In this context, harmonization remains static. It is maintained by inertia rather than sustained by active cooperation and disconnected from broader institutional reform processes.

3.2.7 Joint water resource monitoring programs (practice)

This indicator reflects limited implementation of formal joint monitoring activities, though cooperation is evident in shared reservoir management.
While 17 respondents stated that there are no systematic joint monitoring or assessment mechanisms in place, collaboration does occur in practice—particularly through joint reservoir operations and technical assistance across borders.

Since 2022 water withdrawal schedules for select STTs continue to be developed annually under the oversight of the JWMC, following historical Soviet-era allocation protocols (including those of 1980, 1981, and 1989). As of February 2024, 12 water schedules have been approved, including those for the Andijan Reservoir, several STTs, and key canals. Informants' views on this were very divergent.

Reasons given for developing annual schedules for some STTs but not others:

- 10 respondents (9 from Uzbekistan, 1 from Kyrgyzstan) attributed it to regulated flows that require periodic renegotiation of allocations.
- 2 respondents (from Kyrgyzstan) pointed to high flow variability.
- 2 respondents (from Kyrgyzstan: cited water scarcity as the key factor.

Perceptions of implementation trends:

- 9 respondents (2 from Uzbekistan, 7 from Kyrgyzstan) had no information.
- 8 respondents (7 from Uzbekistan, 1 from Kyrgyzstan) preferred the continuation of annual schedule approval.
- 2 respondents (one from each country) expressed skepticism about the effectiveness of current practices.
- 1 respondent (from Kyrgyzstan) supported reliance on the fixed limits of the 1980 Protocol.

Their views on the need for a permanent joint working group under the JWMC also varied:

- 7 respondents (2 from Uzbekistan, 5 from Kyrgyzstan) considered the current Commission functions sufficient.
- 8 respondents (7 from Uzbekistan, 1 from Kyrgyzstan) favored the creation of a dedicated working group.
- 5 respondents (1 from Uzbekistan, 4 from Kyrgyzstan) did not respond.

3.2.8 Riparian financing for transboundary institutional activities (practice)

This indicator reveals a disconnect between institutional frameworks and stakeholder awareness. While the *Regulations of the Joint Water Management Commission* explicitly state that financing for the operation and maintenance of interstate water facilities is one of its key functions, most respondents were unaware of this provision. Specifically, 13 respondents (7 from Uzbekistan, 6 from Kyrgyzstan) stated that no financing mechanism exists, four (3 from Uzbekistan, 1 from Kyrgyzstan) confirmed its existence, and 3 from Kyrgyzstan were unsure.

In practice, financing of transboundary activities occurs, most practically through cost-sharing arrangements related to joint reservoir management (Box 5), even though this is not formally institutionalized or widely understood by stakeholders.

Box 5. Joint reservoir management as a platform for cooperation and joint financing

Joint management of shared reservoirs provides the main operational framework for transboundary water cooperation between Uzbekistan and Kyrgyzstan. It enables the implementation of key practices such as information exchange, early warning, joint monitoring and inventory, and riparian financing, all coordinated through legally mandated bilateral commissions.

Key legal frameworks underpinning this cooperation include:

- *Agreement between the Government of the Kyrgyz Republic and the Government of the Republic of Uzbekistan on the interstate use of the Orto-Tokoy (Kasansai) Reservoir* (Articles 2, 3, 4)
- *Agreement between the Government of the Republic of Uzbekistan and the Cabinet of Ministers of the Kyrgyz Republic on joint management of water resources of the Andijan (Kempirabad) reservoir* (Articles 2, 6, 7)
- *Agreement between the Ministry of Water Resources of the Republic of Uzbekistan and the Water Resources Service under the Ministry of Agriculture of the Kyrgyz Republic on cooperation on water management issues*, with detailed roles and procedures outlined in the Regulations of the Joint Water Management Commission.

These frameworks support:

- Joint development of flood and mudflow response plans
- Creation of early warning systems and real-time data exchange
- Allocation of financial resources for the operation and maintenance of shared water infrastructure, including across national borders
- Engagement of technical experts and access to donor and external funds for Commission operations

Although formal mechanisms for basin-wide financing remain limited, joint reservoir management serves as a de facto financing arrangement, particularly for the upkeep of infrastructure like dams and canals that cross the border. This includes shared contributions in-kind (e.g., repairs, staff support) and budgetary allocations discussed under the auspices of the JWMC.

In the absence of a comprehensive basin-wide governance structure, joint reservoir operations remain a critical entry point for deepening institutional collaboration and shared investment.

3.2.9 Mechanisms for stakeholder participation (paper)

No clear or formalized mechanisms exist for stakeholder participation in transboundary water governance within the Ferghana Valley. While five respondents (1 from Uzbekistan and 4 from Kyrgyzstan) believed that some form of stakeholder engagement mechanisms were in place, none could provide concrete evidence or documentation to substantiate this claim. This suggests that any existing practices are informal, ad hoc, or poorly institutionalized.

Conversely, 15 respondents (9 from Uzbekistan and 6 from Kyrgyzstan), reported having no information about mechanisms for stakeholder participation, reflecting a significant lack of awareness or communication regarding participatory processes in TWM. This disparity in responses underscores a broader institutional challenge: insufficient transparency and limited inclusion of non-governmental actors such as local communities, water users, civil society organizations, and private sector stakeholders.

The absence of formal stakeholder participation frameworks constrains opportunities for more democratic, accountable, and effective water governance. Without inclusive mechanisms, decisions tend to be made within closed bureaucratic circles, which can weaken legitimacy, reduce trust, and hinder conflict prevention or resolution efforts. Moreover, this gap restricts the ability to incorporate local knowledge, address diverse water needs, and foster collaborative problem-solving, all critical for managing complex transboundary water systems.

3.2.10 Specified roles and responsibilities for stakeholders in basin management institutions (paper)

There is currently no formal documentation outlining the specific roles and responsibilities of stakeholders within transboundary basin management institutions in the Ferghana Valley. While 12 respondents (9 from Uzbekistan and 3 from Kyrgyzstan) acknowledged that certain stakeholder roles exist in practice, they emphasized that these arrangements are informal and lack legal or

institutional codification. These de facto roles (such as the local government representatives or the local police playing roles of mediators when water sharing conflicts arise between the different water users) are typically shaped by custom, operational necessity, or historical precedent, rather than being defined through official mandates or governance frameworks.

The remaining eight respondents (1 from Uzbekistan and 7 from Kyrgyzstan) reported that they had no information on this issue, reflecting a broader lack of transparency and awareness within the system. This uncertainty about roles and responsibilities is symptomatic of the weak institutional architecture currently governing transboundary cooperation on STTs in the Ferghana Valley.

The absence of clearly defined and documented stakeholder roles leads to several governance challenges. First, it undermines accountability by making it difficult to track responsibilities and performance across agencies, jurisdictions, and user groups. Second, it creates confusion and overlap in decision-making, particularly during periods of water stress or infrastructure maintenance, when coordination is most critical. Third, the lack of formal recognition of stakeholder roles—especially for non-state actors such as water user associations (WUAs) in Kyrgyzstan, NGOs, and private sector actors—limits the inclusivity, legitimacy, and effectiveness of basin management efforts.

Formalizing these roles within the regulatory frameworks and institutional charters of bodies such as the JWMC would enhance transparency, help streamline operations, clarify mandates, and improve cooperation. Doing so could also serve as a foundation for future participatory reforms and facilitate greater stakeholder engagement.

3.3 Priority Interventions to Enhance Cooperation

Despite challenges identified above, most respondents viewed cross-border cooperation as effective. Over 55% rated cooperation greater than 5 out of 10, with the Akburasai case averaging 8.6 and the Isfayramsai case at 5.0, reflecting differing local dynamics and satisfaction levels. The overall average score was 6.6 (Figure 3). For the overall cooperation, the average score provided by the respondents from Kyrgyzstan was higher; 7.3 (range 2-10) than those provided by the respondents from Uzbekistan; 5.7 (3-8). In Kyrgyzstan, three respondents rated current cooperation as ten, one as eight and three as seven; two respondents rated it as a five and a two. In Uzbekistan, one respondent rated as eight, two as seven and four respondents rated as six, five, four, and a three. Interestingly, both the lowest and the highest scores were provided by the respondents from Kyrgyzstan. Five respondents (3 from Uzbekistan and 2 from Kyrgyzstan) felt the existing informal collaboration worked well and feared a new agreement might reduce operational flexibility, while four respondents (3 from Uzbekistan and 1 from Kyrgyzstan) could not rank the current cooperation.

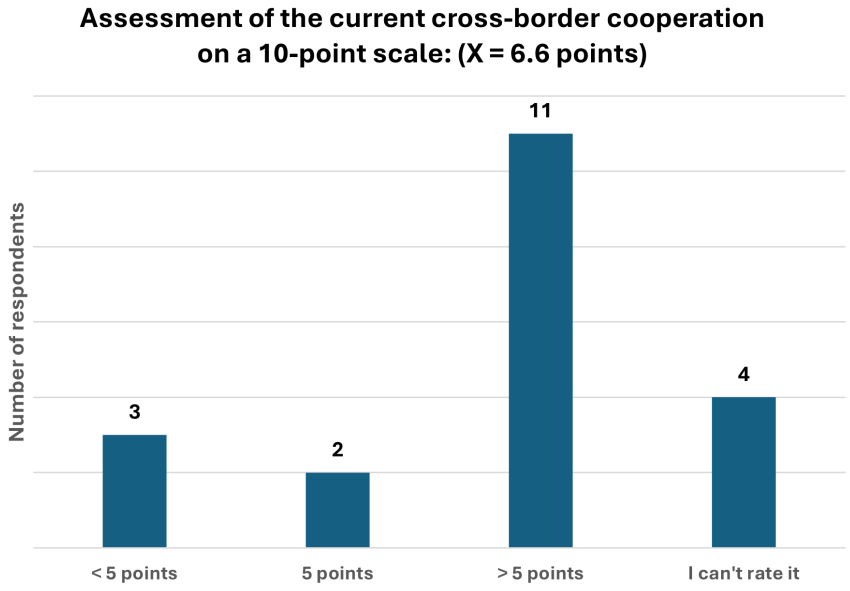

Figure 3. Responses to what is the level of current cross-border cooperation on a 10-point scale (1 nonexistent; 5 acceptable; 10 excellent).

Source: authors' creation

When asked what would improve cooperation, respondents were clear about pathways for improvement. Most frequently cited options were:

- Joint planning and development of Commission activities (14 respondents)
- Updating or replacing the existing agreement (10 respondents)
- Better data sharing and transparency (8 respondents)
- Adopting integrated water resources management (IWRM) approaches (9 respondents)
- Simplifying border/customs procedures for water-related equipment and materials (9 respondents)

Respondents proposed a number of specific measures to improve collaboration (Table 4).

Table 4. Intervention types and measures proposed by respondents to improve cross-country cooperation

Intervention type	Proposed measure	Number of respondent suggestions
Information exchange	Creating a transparent information exchange system	6
	Conducting joint water measurements	4
	Preparation of joint monthly reports on water distribution	2
	Construction of hydro-posts (gauging stations)	1
	Joint water accounting	1
Joint development of the Commission's activities	Increasing the number of meetings and discussions on a systematic basis	10
	Transfer of the established Commission dialogue to a lower level	7
	Inclusion in the Commission of representatives of regional water farms and irrigation system departments, *khakims* (mayors)	5
	Inclusion of representatives of relevant organizations at the Government level in the Commission	1
Integrated water resources management approach	Involvement of stakeholders in the process of water resources management	4
	Integration of the work of water workers with power engineers	3
	Transition to IWRM	3
	Creation of unified pools	1
	Conducting a comprehensive analysis	1
Improving/updating the Agreement	Conclusion of a new agreement on STT	5
	The new agreement should consider actions in facilities outside the country	3
	Improvements to the agreement	3
	In the new agreement, it is necessary to take into account emergencies and actions on them	2
	Development of water diplomacy	2
	Solving problems at the government level	2
	It is necessary to approve a new agreement at the government level	1
	Harmonization of state water decisions	1
	Consideration of the national interests of the parties	1
	Conclusion of an agreement based on the requirements of international norms and international conventions	1
	Inventory of available documentation	1
Simplification of customs procedures for water management organizations	When transporting across the border: - machinery and equipment - fuels and lubricants - building materials	9
Conducting explanatory discourse among the population	Increasing water productivity through capacity development and trainings (e.g., improving irrigation scheduling)	5
Conducting joint repair and restoration works of water bodies	Carrying out joint repair and restoration works of water bodies	6
	Conducting joint inventories, storage and protection of machinery, fuel, and construction materials outside the state	1
	Drafting and approving defect reports	1
	Compensation between countries for the repair and restoration work carried out on behalf of a neighboring country (e.g., Uzbekistan compensating Kyrgyzstan and vice-versa)	1

The final step of the RAP process was the stakeholder seminar designed to validate findings and co-develop practical recommendations for strengthening transboundary cooperation. The joint proposals that emerged from this workshop, summarized in section 5, reflect a clear and shared consensus on key institutional priorities. These include:

- Updating and revising existing bilateral agreements to reflect current realities and future challenges.
- Establishing formal mechanisms for information exchange and early warning, particularly for droughts and floods.
- Developing joint technical and infrastructure projects to improve the management of STTs.
- Enhancing water accounting systems and securing sustainable financing for operations, maintenance, and rehabilitation of shared infrastructure.
- Organizing recurring roundtables and technical workshops to build capacity and support collaborative basin planning.
- Institutionalizing regular joint meetings to prevent and resolve disputes, and to coordinate transboundary water operations more effectively.

The consistent emergence of these themes across both countries' delegations highlights a strong convergence of views on existing institutional gaps and the need for targeted reforms.

4. Discussion

4.1 Key Findings

The findings of the RAP reveal a nuanced picture of transboundary water governance in the Ferghana Valley, characterized by strong operational collaboration on the ground, yet constrained by institutional gaps, limited stakeholder engagement, and outdated legal frameworks. This mixed reality highlights the need for a more integrated and inclusive governance model to manage the Syr Darya STTs effectively in the future.

Both case study rivers—Akburasai, and Isfayramsai—are currently governed under existing formal agreements. The Soviet-era water allocation protocol remains the primary legal instrument guiding flow allocation in the Ferghana Valley, despite its outdated provisions. These rivers are also covered by the broader 1992 Almaty Agreement and recent bilateral accords from 2022, which incorporate elements of cooperation and border management. While these agreements provide a formal legal basis for joint water management, their implementation often relies more on informal norms and operational practices than on harmonized legal or institutional frameworks.

National water legislation in both Uzbekistan and Kyrgyzstan references transboundary cooperation, indicating partial legislative alignment. However, actual coordination and problem-solving occur largely through bilateral agreements, technical cooperation, and ad hoc mechanisms rather than through unified institutional structures. A notable strength is the robust day-to-day collaboration between the two countries: both parties continue to use harmonized Soviet-era standards for hydrological measurement, engage in regular data exchange, conduct joint monitoring, and support cooperative financing of shared water infrastructure. These practices are reinforced by the work of a formed joint water commission, as well as international donor-led water diplomacy projects that have helped build trust and technical capacity, particularly in politically sensitive STTs.

Nevertheless, significant gaps persist. Chief among them is the absence of formal joint basin planning mechanisms. There is currently no comprehensive basin management plan for the Syr Darya or its tributaries within the Ferghana Valley. Stakeholder engagement mechanisms are also lacking, with no clear institutional processes for public participation, accountability, or transparency in basin governance. Roles and responsibilities within basin-level institutions remain informal and undefined. While informal cooperation continues, it is fragmented and heavily reliant on interpersonal networks or donor facilitation rather than institutional mandates.

The legacy of Soviet water management systems continues to shape these dynamics. The technical compatibility inherited from the Soviet era enables baseline cooperation but also creates institutional inertia, limiting progress on key governance reforms. This includes the modernization of data systems, development of inclusive planning processes, and codification of stakeholder roles in decision-making. This limits the ability to adapt to emerging challenges such as climate change, increasing water demand, and growing calls by diverse stakeholders (local government, civil society, WUAs, etc.) for transparency and participation in governance.

Finally, a divergence in perspectives emerged between upstream and downstream stakeholders. Respondents from Uzbekistan—located downstream—were more likely to call for formalized and enforceable agreements. This reflects their heightened vulnerability to upstream water use decisions in Kyrgyzstan, which controls key infrastructure regulating flow timing and volumes.[3] Consequently, Uzbek stakeholders tend to advocate more strongly for institutional safeguards, legal agreements, and structured data-sharing arrangements to protect their agricultural, ecological, and domestic water needs. In contrast, Kyrgyz respondents—located upstream—placed less emphasis on formal legal safeguards. This difference may be linked, at least in part, to lower awareness of existing legislation and agreements in Kyrgyzstan, suggesting that perceived priorities are influenced by both positional advantages and knowledge of institutional frameworks. These asymmetries underscore the need for equitable governance mechanisms that address both technical and political dimensions of water sharing and highlight the importance of targeted capacity-building to align stakeholder perspectives.

Before concluding this section, it is important to acknowledge two limitations of the RAP and to identify potential areas for improvement. While the RAP is, by definition, intended to be rapid and so is unlikely to capture the full technical and political complexity of a shared watercourse, several aspects should receive greater attention in future applications. First, in the context of the data exchange indicator, data can be disaggregated to move beyond general exchange practices and instead focus on the specific parameters most relevant to a given watercourse. Such a granular approach would enable assessment of whether the most decision-relevant data are being shared within a particular basin context. Second, stakeholder mapping should be undertaken as a specific analytical step so that the constellation of key stakeholders is effectively considered when assessing dynamics and proposing recommendations.

4.2 Role and Value of RAPs

Beyond generating practical insights for enhancing cooperation on the Akburasai and Isfayramsai STTs, this report tested the broader value and role for RAPs in the context of transboundary water cooperation. RAPs are relatively uncommon in the field of transboundary water cooperation, as are other tools that identify best options to advance transboundary cooperation. Academic research, while independent, often lacks operational relevance. Donor or project driven interventions (e.g., by river basin organizations [RBOs]) may be more practically oriented, but frequently enter with pre-selected approaches, limiting their ability to identify the most suitable options for cooperative basin management. Similarly, basin-wide strategies and IWRM plans often produced through RBO platforms, may avoid sensitive issues that are likely critical to unlocking practical cooperation. In this regard, RAPs can provide a distinctive role: generating actionable, context-specific interventions while maintaining independence.

Importantly, RAPs function not only as a diagnostic tool but also as a facilitative process. By structuring interviews, workshops and validation sessions, RAPs help focus cross-country discussions, bridge potential gaps between broad dialogues, and promote convergence around practical solutions. In the Ferghana Valley, proposed interventions for Akburasai and Isfaramsai emerged iteratively through separate interviews and then joint workshops, illustrating how the process itself strengthens dialogue and builds trust, ownership, and shared understanding. These outcomes provide a strong foundation for ongoing cross-country cooperation, helping to ground discussions on practical options.

The relevance of RAP is likely to vary depending on basin context. In highly developed or politically sensitive basins (such as those in this report) with complex histories and legacies of institutions, infrastructure, and tension, RAPs are more likely to be important in helping navigate complex governance and operational challenges. In less developed basins with limited histories of cooperation, the tool may instead support the identification and prioritization of initial steps toward cooperation, overlapping in some respects with strategic actions plans, but retaining its value in grounding discussions in practical realities.

Finally, while the long-term impact of the RAP applied in this report is impossible to determine, the benefits of more coordinated basin management are clear. Hence, even where direct cause-effect attribution may render RAP contributions debatable, there remain soft benefits of RAP implementation such as: identifying feasible interventions, aligning stakeholder perspectives and strengthening cooperation, even if it is only incremental. Together these provide meaningful contributions to enhanced water governance and in the long-term, equity, productivity and sustainability in shared basins.

[3] An exception is the Andijan reservoir which, following the dissolution of the USSR, became a source of dispute between Kyrgyzstan and Uzbekistan, with each country claiming ownership. This dispute was resolved in 2022. As part of the border demarcation deal, Kyrgyzstan ceded control of the reservoir in exchange for agricultural land elsewhere in Uzbekistan.

5. Conclusions

Based on the context and key lessons learned through the RAP, the stakeholder seminar held in Ferghana (see section 3.3) produced a series of detailed and jointly developed recommendations to strengthen transboundary water cooperation in the Ferghana Valley. These are grouped into three core themes reflecting shared priorities across stakeholder groups from Uzbekistan and Kyrgyzstan.

5.1 Updating the Regulatory Environment to Strengthen Tributary Level Water Cooperation in the Ferghana Valley

Participants agreed on the urgent need to modernize the regulatory framework governing STT water resources in the valley. This includes creating a new legal foundation for transboundary water flows and revising existing agreements, particularly the Soviet-era water allocation protocol, to reflect current realities such as climate change and evolving hydrological conditions. Stakeholders emphasized the importance of learning from successful models like the Chu-Talas Rivers Commission—established by Kyrgyzstan and Kazakhstan to coordinate the use and maintenance of transboundary water infrastructure on the Chu and Talas Rivers—and called for operational issues to be addressed at the local level. Key proposals included the development of joint databases for transparent data exchange, integrated platforms for monitoring, and improved water accounting practices. Joint technical projects to enhance infrastructure maintenance and river basin management were also recommended, alongside practical measures such as enabling corridor access for water personnel and materials across customs posts.

5.2 Advancing Basin Planning and Technical Coordination

To support the development of a transboundary basin plan based on hydrographic boundaries, stakeholders advocated for the formation of a dedicated commission and technical working group. A full inventory of hydraulic structures and improved exchange of hydrological and meteorological data were seen as critical. Proposals included developing joint projects such as in the South Ferghana Canal–Karkidon reservoir system (Box 6), establishing an early warning system drawing on international best practices, and ensuring continuous communication through user-friendly digital platforms.

Additionally, the construction and modernization of hydraulic posts—equipped with smart sensors and accessible online to both countries—was identified as vital to improve surface water accounting and increase transparency.

Box 6. South Ferghana Canal (SFC) – Karkidon reservoir system.

The South Ferghana Canal (SFC) – Karkidon reservoir system is a critical hydraulic link in the southern Ferghana Valley. The SFC, a 120 km long canal, is supplemented by the Karkidon reservoir: a 70-meter-tall earth dam with a storage capacity of 212 Mm^3. Functioning as a compensating reservoir, Karkidon can mitigate the 'lag time' of water delivery by both receiving surplus flow from SFC via the Khamza waterworks and releasing stored water back into the SFC via Khamza and the reservoir valves (Plusquellec et al. 2008).

5.3 Enhancing Stakeholder Engagement in Basin Planning

Effective basin planning requires active and inclusive participation from a broad spectrum of stakeholders, including local communities, technical agencies, and civil society actors. Participants emphasized the urgent need to institutionalize stakeholder engagement within existing frameworks such as the JWMC and affiliated bodies. This includes establishing formal, transparent mechanisms that define stakeholder roles and responsibilities, set clear participation criteria, and ensure meaningful involvement in decision-making processes. Strengthening communication channels and improving the flow of information will be essential to raise awareness, build trust, and facilitate collaborative planning.

Recommended actions include organizing regular roundtables, technical workshops, and joint seasonal planning meetings; establishing dedicated working groups at the intergovernmental and river-specific levels; and expanding stakeholder representation to include local governments, environmental protection authorities, emergency services, and WUAs. By embedding stakeholder engagement into the institutional fabric of basin management, these measures can foster more responsive, equitable, and adaptive transboundary water governance.

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Appendices

Appendix A. Interview Protocol.

Oral/Verbal Consent Talking points:

Who we are: This study is being conducted by Botirjon Abdurakhmanov, in collaboration with Dr. Bunyod Holmatov (International Water Management Institute) and Dr. Jonathan Lautze (International Water Management Institute).

Research study: We are asking you to participate in a research study.

Purpose and/or procedures: The purpose of our research is to develop a methodology for applying the rapid assessment process (RAP) of the level of cooperation in the field of transboundary water resources using the example of the Syr Darya River Basin and two small transboundary tributaries located in the Fergana Valley. We would like to ask 10 questions like these:

(1) What has changed with the implementation of the Joint Water Management Commission's activities and have systematically tracked problems been resolved? Can you give examples?

(2) What is the reason for drawing up water intake schedules for individual small rivers for the growing season at meetings of the Joint Water Management Commission?

(3) Are there practices to ensure access to relevant information on the quality and quantity of water resources?

Answering these questions should take 60 minutes or less. Feel free to ask questions to the research team at any time.

Possible risks: We will not collect or share any information that will identify you to further protect your confidentiality and avoid any potential risk for an accidental breach of confidentiality.

Why subjects were selected: You are being invited to take part in this research because you are/have been involved in transboundary water allocation/negotiations/research in Ferghana Valley.

Voluntary participation: Taking part in this study is voluntary. You are free to not answer any questions or withdraw your consent at any time without any negative repercussions. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study, at which point your data will be deleted.

Confidentiality: We confirm that confidentiality of the research data will be maintained, and your personal information will not be shared with anyone outside the research team. However, the data/information from this interview will be used for writing a report/journal article. If submitted to a journal and upon the journal's potential request an anonymized version of the information collected from you may be shared with them.

Consent: We will continue only if you (the interviewee) are interested and provide your **verbal** consent to participate. Participant's name, date and (dis)agreements are noted in a separate list. No signature of the participant is obtained, but we write down the name of interviewer and a witness.

Contact information: Our contact information is: b.abdurakhmanov@cgiar.org. You can also contact Dr. Bunyod Holmatov (b.holmatov@cgiar.org) or Dr. Jonathan Lautze (j.lautze@cgiar.org) with questions or complaints about this research. IWMI's Central Asia office can be reached at +998 712370445 with questions or concerns about IWMI or your rights as a research participant.

Appendix B. Interview Questions.

№	Questions
1.	**Conclusion of a basin-wide transboundary water agreement**
	1.1 Is the existing agreement sufficient (or sufficiently comprehensive)? What are the key strengths of the existing agreement? What are the limitations of the existing agreement or, in other words, in what ways could it have gone further?
	1.2 What has changed with the implementation of the Joint Water Management Commission's activities and have systematically tracked problems been resolved?
	1.3 Can you give examples of achievements that have been achieved as a result of the Joint Water Management Commission's activities on the STT watershed? How were the issues under consideration resolved before the commission was created and what are the limiting factors if the goals were not achieved?
	1.4 Do you consider it necessary to conclude an agreement on inter-republican redistribution of runoff, comprehensive use and protection of water resources of small rivers of the Ferghana Valley, adapted to changing conditions, which will contain various provisions, such as variability of water resources and related uncertainty, emergencies due to drought or serious accidents in irrigation systems?
	1.5 How would you rate the current cross-border cooperation based on equality and reciprocity on a 10-point scale?
2.	**Reference to transboundary cooperation in national water legislation (paper)**
	2.1 Is cross-border cooperation mentioned in national water legislation? If it is mentioned, is this sufficient or could it be more robust?
3.	**Inclusive completion of a basin plan (paper)**
	3.1 How does the process of managing transboundary rivers in the Ferghana Valley at the basin level take place, taking into account hydrographic boundaries and principles of a basin planning, and have basin plans been developed?
	3.2 Is there a periodic joint inventory of the state of riverbeds and hydraulic structures at transboundary sources? What are the main factors that need to be changed to eliminate existing barriers to full cooperation?
4.	**Existence of information management systems (paper)**
	4.1 Is there an information management system, information platform, or special operational communication network (mechanism/practice) for early warning, used during the passage of flood waters, landslides and flood control, as well as in preventing and mitigating the consequences of other natural disasters and emergencies related to water resources?
5.	**Evidence of regular data exchange (practice)**
	5.1 Are there practices to ensure access to relevant information on the quality and quantity of water resources? If yes, who provides the information, by what means (bulletin, platform, through dispatch services) and how often?
6.	**Harmonized standards and units of measurement (practice)**
	6.1 Do you use same standards and units of measurement in both countries?
7.	**Joint water resource monitoring programs (practice)**
	7.1 Why are water intake schedules for some STTs developed at meetings of the Joint Water Management Commission, whilst for other rivers the established water intake limits are observed (i.e., corresponding to Protocols on the inter-republican distribution of runoff of small rivers of the Fergana Valley)?
	7.2 What trends are observed in the implementation of these water intake schedules compared to the implementation of the established limits of the 1980 Protocol?
	7.3 Are measures for the joint monitoring and assessment of transboundary water resources carried out within this process?
	7.4 In your opinion, is there a possibility of creating a permanently functioning joint working group, accountable to the Joint Water Management Commission, forming an information center in it for monitoring and evaluating the distribution of transboundary water resources in the STT, or do you consider the activity of the Commission sufficient?

Continued...

Continued...

8. Riparian financing for transboundary institutional activities (practice)

8.1 Are there financing mechanisms that allow funding activities outside the country in the context of transboundary water resources management? What difficulties are experienced in identifying and mobilizing the necessary funding and what constraints hinder the processes of cooperation in the field of transboundary waters and basin development projects?

9. Existence of mechanisms for stakeholder participation (paper)

9.1 Are there mechanisms for the participation of other interested parties in the work of the Joint Water Management Commission? Also, what is the role of the public in decision-making on the distribution of water resources?

9.2 Is close cross-border cooperation organized through a joint body (***Joint Water Management Commission***) - between other administrative bodies?

9.3 What are the barriers to more comprehensive stakeholder participation?

10. Specified roles and responsibilities for stakeholders in basin management institutions (paper)

10.1 What roles and responsibilities can various stakeholders (local communities, government bodies, non-governmental organizations, and private companies) play in the management of transboundary basins? are they playing these roles now or if not, what is preventing them?

Appendix C. Affiliations of Interviewees.

№	Uzbekistan	Kyrgyzstan
	Affiliation of experts interviewed in step 1 of the RAP	
1	Ministry of Water Resources	Water Resources Service
2	Ministry of Water Resources	National Water Partnership of the Kyrgyz Republic
3	Naryn-Karadarya Basin Irrigation System Authority	Osh Main Department of Water Management
4	Syrdarya-Sokh Basin Irrigation System Authority	Batken Main Directorate of Water Resources
5	Directorate for Operation of Main Canals of the Ferghana Valley	Kara-Suu District Water Management Department
6	Isfayram-Shakhimardon Irrigation System Authority	Aravan district water management department
7	Kuvasay District Irrigation Department	Kadamzhai District Water Management Department
8	Ferghana District Irrigation Department	Nookat District Water Management Department
9	National University of Uzbekistan named after Mirzo Ulugbek	Kyrgyz National Agrarian University named after K.I. Scriabin
10	UNDP Uzbekistan	UNDP Kyrgyzstan
	Affiliations of experts for validation of the findings, step 2 of the RAP	
1	Information and Analytical Resource Center under the Ministry of Water Resources of the Republic of Uzbekistan	Kara Darya-Syr Darya-Amu Darya Basin Water Resources Management Department
2	Scientific Research Institute of Irrigation and Water Problems	Osh Main Department of Water Management
3	Syrdarya Basin Water Management Organization	Kara-Suu District Water Management Department

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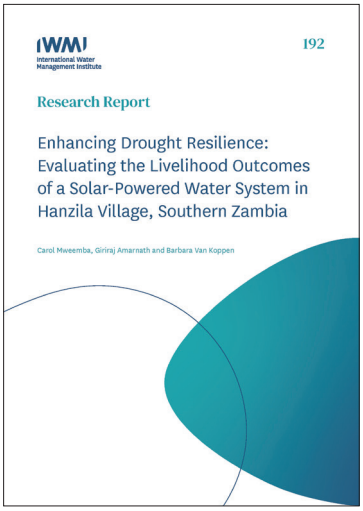

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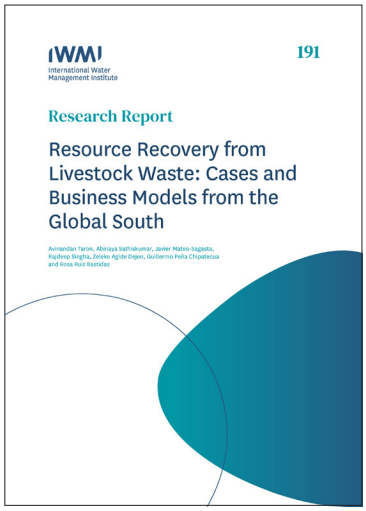

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