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Adaptive water governance in Central Asia: Un-puzzling the concept

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ABSTRACT

This article aims to introduce different views regarding the concept of adaptive capacity in water governance and unpack it in the Central Asian context, specifically. The desk study research built on the recommendations provided by the academia, policy papers and by experts on enhancing adaptive water governance. The juxtaposition of the three sets of recommendations demonstrates that the further strengthening of IWRM, as well as experimental approach to resource management, improved access to climate knowledge and disaster risk reduction mechanisms can consolidate the adaptive capacities of Central Asian water governance systems. The research was limited by the specific set of selected opinions and should be expanded in the future. As a practical outcome, the analysis aimed to provide the decision-makers in Central Asian states with better science-based avenues to planning adaptation measures ensuite the water sector. Thus, the study can be considered a stepping stone in the discussion on the adaptive capacities of water governance in the Central Asian region.

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1. Introduction

The crisis of water governance is becoming more prominent in changing climate (Hill, 2012). The expected weather extremes caused by climate change, including droughts and floods, cannot be addressed adequately, unless the governance structures effectively tackle adaptation in their policies (Hurlbert & Gupta, 2016). Although adaptation is a strategic approach for application at local, national and international levels (Adger et al., 2004), the majority of ongoing policy efforts tend to be fragmented, hindering the adaptive capacities (Hurlbert & Gupta, 2016). This tendency might be explained by various reasons such as non-prioritization at the country level, imperfections of national policies, lack of human and financial capacities, etc. Despite the existing vast literature on the topic, the authors argue that there are several reasons why the concept of adaptive water governance needs additional clarification for the decision-makers and practitioners in the Central Asian states (CAS).

Firstly, building the adaptive capacities in water governance is not a straightforward process for countries due to the context-specific features requiring careful consideration. Therefore, it is pivotal to explore the impacts of climate change on water resources in the Central Asian (CA) context to develop suitable water governance responses sensitive to the needs of specific basins avoiding blueprints.

Secondly, although there have been studies investigating the region-specific climate change impacts on water resources (Siegfried et al., 2012; Bernauer & Siegfried, 2012; Mannig et al., 2013; Sorg et al., 2012; Reyer et al. 2017; Zhang et al., 2019; Barandun et al., 2020), agriculture (Christmann et al., 2009; Sommer et al., 2013; Li et al., 2015; Jiang et al., 2017), and ecosystems (Schluter et al., 2013, Reyer et al., 2015), there is still a major lack of literature on adaptive water governance in Central Asian region (CAR). Moreover, there are very few case studies looking at water governance in terms of its ability to adapt to climatic changes.

Thirdly, as pointed out by Sehring (2020), "[t]he discourse on water in Central Asia is still mainly a discourse on water management and not on governance". Partially this can be explained by the prevalence of technical and engineering expertise and approaches in dealing with water (also referred to as "hydraulic mission") dominating during the USSR times (Abdullayev & Rakhmatullayev, 2013) and still influencing water management and governance practices today. Other reasons for this ongoing unequal distribution of academic knowledge include the specific agendas of organizations funding the research and authoritarian political regimes not favoring the emergence of governance-related science – both previously during the Soviet times and nowadays (Sehring, 2020).

Fourthly, in the realities of developing countries of the Global South as in Central Asia, adaptive water governance might be puzzling. The framework has been introduced as yet another "western" water management concept barely finding proper translation to local languages and application in the CAR, usually confused with good water governance, Integrated Water Resources Management and others.

And, finally, there are multiple sources of information providing various recommendations in relation to strengthening adaptive capacities in water. With that, considering the diversity of the terms used, it appears necessary to shed light on the differences and similarities of the omnifarious suggestions coming from many sides.

As the design and implementation of water governance is a domain of state-level actors, the authors consider it crucial that decision-makers and practitioners understand the peculiarities of the concept in the realities of Central Asia. Hence, this article's intent is to answer the question of how the adaptive capacities of CAS can be amplified, taking into account the spectrum of existing views and approaches, and in the light of the previously introduced reforms in water governance. By replying to this question from the political science perspective, the authors hope to contribute to bridging the existing gap in literature on water governance indicated by Sehring (2020) and its adaptive capacities. Likewise, the study endows the growing body of academic literature on adaptive water governance by expanding the comprehension of the region-specific adaptive capacities and practices in the Global South.

To respond to the main research question, the study juxtaposes the existing views of adaptive water governance, retrieving the information from practitioners and the academia advancing the adaptability topic. Precisely, the article summarizes the recommendations specified within the three tracks: academia (Track 1), policy papers (Track 2), and individual expert opinion (Track 3). The selection of these three groups is based on the assumption that there is a significant breach between the academic and policy-making processes – policy papers and policy advisors seem to better communicate science to decision-makers in contrast to peer-reviewed research papers as a language of the academia. The data for the analysis was harvested from open internet sources; all the materials used are secondary data.

2. Climate change in Central Asia

As mentioned above, very few authors have actually studied water governance responses to climate change in CA. For instance, Krysanova et al. (2010) identified several elements hindering adaptation strategies within the Amudarya River Basin. These included the lack of a regulatory framework, vertical management, poor transboundary collaboration, and insufficient stakeholder engagement. Lioubimtseva

& Henebry (2009) contributed by specifying the socio-cultural challenges of the post-Soviet countries in adapting to climate change in general.

2.1. Geographic and economic contexts

The geographical and economic features of the CAR give rise to multiple challenges related to the governance of its natural resources at local, national, and regional levels. The high dependency of populations and economies on the two major transboundary rivers – Amudarya and Syrdarya – puts enormous pressure on the water, energy, and food security of individual states.

The region's water resources are characterized by the high rate of snow and glacier contributions to annual river flows. Referring to Hoelzle et al. (2017), Barandun et al. (2020) states that glaciers already constitute around 50% of the discharge, with an expected drastic increase due to continuous rising temperatures. It is anticipated that the flow of CA rivers will shrink between 7-40% in the second half of the XXI century (Siegfried et al., 2012; Bernauer & Siegfried, 2012; Mannig et al., 2013; Sorg et al., 2012; Reyer et al. 2017; Zhang et al., 2019; Barandun et al., 2020). Keeping in mind that the Aral Sea crisis and its rapid ecosystems' degradation, due to the shortage of water resources has exposed critical socio-economic impacts, one can only imagine the consequences of the two transboundary rivers dropping in level or desiccating. The factors of high demographic growth in CAS and their rapid economic development add stress to the already pressured water resources, scaling up the risk of unregulated migration and political tensions in the CAR in the near future.

2.2. Water governance and management practices in Central Asia

The Soviet legacy had left tangled relations among the Central Asian states both at the national and regional levels, all connected via the previously established water infrastructure and intrastate regulations. Entirely dependent on regional cooperation, the water-energy sector has been affected by the still ongoing nation-building processes (Menga, 2013). The Soviet time water management was distinguished by the state-centric approach, i.e. all water-related decisions were made by the main decision-making body in Moscow, and regional water managing bodies were responsible only for implementing them (Wegerich et al., 2012). After the dissolution of the USSR, each independent country had to decide who would make water-related decisions, at which level or scale, which institutions would implement them, and who would be responsible for the results. Therefore, the water governance paradigm per se became relevant in CA only after the newly emerged states gained their independence, exacerbated with the remaining water sector planning approach.

The commitment and transition of the Central Asian states to Integrated Water Resources Management (IWRM) hallmarked the most important milestone in their water management and governance evolution. The IWRM paradigm constitutes a set of principles: managing water bodies based on hydrographic boundaries considering a conjunction among all water types (surface, groundwater, atmospheric) and public participation in decision-making. Two more concepts introduced in the 1992 Dublin Principles – women playing a major role in water management, and economic value of water – have received a much meager attention in the CAS's national agendas compared to the former two.

The Central Asian states have been facing similar issues as the other countries of the Global South, e.g. limited financial and human resources, lack of domestic ownership of the concept, and mismatches between national governance and management mechanisms . More specifically, the scholars studying water governance in CAS have identified a number of limitations in IWRM implementation in the region: water users associations (WUAs) not able to perform as per the initial idea of local self-governance (Zinzani, 2015, 2016; Wegerich, 2008; Sehring, 2009), challenges in coordinating parallel management scales – administrative and hydrographic (Dukhovny, Sokolov & Ziganshina, 2013; Zinzani, 2014), and multitude of institutions with overlapping functions (Abdullaev & Rakhmatullaev, 2014). However, in the light of the inequalities as to distribution of scientific knowledge about water in Central Asia (see Sehring, 2020), certain aspects of water governance (e.g. WUAs, transboundary cooperation) and case study areas (e.g. Ferghana Valley, Uzbekistan) have been investigated deeper than others. The findings of the aforementioned research enrich the ongoing global debate on the effectiveness and feasibility of IWRM in the context of developing countries, seriously questioned in the last decade.

Dukhovny & Sokolov (2006), Abdullayev & Mollinga (2010), Zinzani (2015) highlight the importance of contextual factors affecting sustainable water management in Central Asian countries. Therefore, below the authors highlight several socio-economic contextual factors with significant implications for adaptive water governance in the basin.

2.3. Lack of resources – financial, human, institutional, and technical

Both water management and water governance clearly relate human capacities to the productivity of water systems and determine the viability of institutions already in place (Alaerts & Kaspersma, 2009). For CAS, the human factor became one of the cornerstones of inefficient water use, lowering the general adaptive capacities of local economies to climate change. The recent developments have shifted the paradigms, by introducing new concepts (i.e. good water governance, IWRM, Water-

Energy-Food NEXUS, etc.) to the water sector, focused more on human interactions than purely technical tools and solutions. These frameworks are supposed to stimulate the development of the cross-sectoral capacities of water managers, engagement of civil society, and to demonstrate the existing interdependency among sectors. Development actors have embarked on numerous interventions in terms of building local capacities, but their long-term outcomes are yet unclear (Gerlitz, Vorogushyn & Gafurov, 2020; Sehring et al., 2019). The technical and financial gaps have expanded since the CAS obtained their independence (Abdullaev & Rakhmatullaev, 2014) against the backdrop of limited state investment in the water sector across the region relying mainly on old infrastructure and outdated agricultural practices (Adelphi & CAREC, 2017).

2.4. Policy response to climate change

Upon acceding to the United Nations Framework Convention on Climate Change (UNFCCC), the Central Asian states have committed to the Paris Agreement – coherent with the Agenda 2030 – to reduce greenhouse gas (GHG) emissions and keep the global temperature trends way below 2°C. Doing so, the governments had to engage in the process of developing nationwide adaptation and mitigation measures that should "increase resilience and reduce vulnerability to climate change within the context of sustainable development" (FAO, 2018:17). Considering their land-locked developing status, CAS were considered as the Non-Annex I Parties imposing additional reporting peculiarities and improved data exchange practices. The global framework, in this case, requested more accurate planning, implementation, and reporting, pushing countries to accept unified standards incentivized by the economic boost supported by the substantial foreign investment promised to CAS.

Among the plethora of policy responses to climate change accepted by Central Asian states, the specific mechanism of (Intended) Nationally Determined Contributions (INDCs or NDCs) has an outstanding status affecting general policy-making (FAO, 2018). The NDCs were proposed to trigger both developed and developing countries to accelerate innovative governance and management practices simultaneously at all levels and in all economic sectors. In general, the NDCs represented the non-binding obligations of countries that targeted planning and implementation of national climate actions in the first place. The Parties agreed to increase their ambitious targets every five years and reassess old governance frameworks.

CAS submitted their first NDCs in 2015-2017, and are currently in the process of raising their climate ambitions by setting new targets in their second NDCs (due 2021-2022). The first NDCs demonstrated the varying levels of Central Asian states as to their acceptance of new responsibilities. Some were clear on the sectors that they assessed as vulnerable, while others were vague. Yet, the prioritization of

sectors still varies among the countries, with the unified preference given to energy and agriculture by all states (Amponin & Evans, 2016). Overall, the overview of the submitted NDCs demonstrated that water was implicitly included via other water-consuming sectors, but was not prioritized as a standalone sector.

3.Mastering the complexity: engaging with the myriad of climate adaptation measures in water governance

This section reviews the recommendations provided by the different groups under the three tracks.

Track 1: the academia perspective

The current understanding of adaptive water governance varies. A number of scholars stress the importance of building institutions and regulatory frameworks incorporating flexibility (Huitema et al., 2009; Pahl-Wostl et al., 2012; Chaffin et al., 2016); others advocate for general democratization of the water governance processes (Pahl-Wostl et al., 2012; Hill, 2012). Another group of scholars point to human capacities as a crucial prerequisite to fighting climate uncertainties (Akamani, 2016); while others define institutions as the primary agents of adaptability (Janssen & Ostrom, 2006). The overall consensus was reached on the fact that there is no blueprint in building and developing adaptive capacities. Below, the authors summarize the mechanisms mentioned in academic literature, which might help majority of water governance systems to better adapt to altering climatic and water risks:

i. polycentric governance systems;
ii. public participation;
iii. management at bioregional scale;
iv. experimental approach to resource management.

The first three characteristics have clear parallels with the IWRM principles. Although they appear similar, these concepts serve slightly different but complementing goals. IWRM creates institutionalized conditions for acknowledging and incorporating the variety of waters and uses across scales and levels. Here, the concept of adaptive water governance suggests a complementary vision, considering that “features of IWRM and adaptive water governance comprise a number of synergies and tradeoffs, which play out differently in different combinations and contexts” (Herrfahrdt-Pähle, 2013, p. 551). The concept of IWRM does not directly address the need for accessing climate information as IWRM was developed and formalized in the early 1990s, when climate adaptation, its water dimension included, was still a weak and

an unrecognized issue (Gain, Rouillard & Benson, 2013; Halbe et al., 2013).

Track 2: policy recommendations

Track 2 highlights the recommendation developed by the Alliance for Global Water Adaptation (AGWA) with the support of several scholars and international development partners. This living policy document – also known as "Watering the NDCs: National Climate Planning for 2020 and Beyond" – serves to provide policy recommendations on how to design better national-level climate adaptation measures with a focus on the water sector. The experts argue that mentioning water in adaptation measures within NDCs is not enough to aim for resilient water management, and mitigation measures have to be closely assessed for these purposes. The precise recommendations on better incorporation of national climate plans and water strategies are indicated in Table I. below.

Track 3: policy expert opinion

Additional recommendations on climate-resilient measures were provided by Dr. John Matthews[1] in the interview ("How to prepare for unpredictable climate events to ensure water sustainability", December 23, 2020) to the Observer Research Foundation.

The expressed views focused on the statistical term of "stationarity" usually attributed to future predictions built on a series of historical observations that can be compared to climate uncertainty. Dr. Matthews affirmed that the ongoing climate fluctuations make "water stationarity" a "weak point" in all the critical economic sectors. This potential stationarity puts the ambitious obligations that countries set in their NDCs at risk.

3.1. Same-same but different?

The summarized recommendations under the three tracks are presented in Table I. below.

1 With the background in behavioural ecology, Dr. Matthews has over 10 years of experience in advising national policy-making on climate resilience and adaptability, and has collaborated with various international, public, non-governmental and academic organizations in more than 20 countries. For this paper, the recommendations by Dr. John Matthews are considered as an opinion of a prominent water governance adaptation expert

Table I. The correspondence among the three different tracks of adaptive water governance recommendations.

Track 1 Adaptive capacities according to the academia	**Track 2** Adaptive water governance according to policy recommendations	**Track 3** Climate-resilient water governance, according to expert opinion
1. Polycentric governance systems	1. Analyze explicit and implicit water commitments across and within sectors at national level, and determine how to systematically evaluate water consumption, allocation, and tradeoffs; 6. Enforce sustainable and cooperative water allocation within and across basins	1. Ensuring that the IWRM process is in place and is inclusive enough; 2.Water governance is coordinating
2. Public participation	5. Respect and enhance integrated ecosystems, particularly for vulnerable populations, most of whom are directly dependent on ecosystem services for livelihoods	1. Ensuring that the IWRM process is in place and is inclusive enough; 2.Water governance is coordinating
3. Management at bioregional scale	3. Integrate national and transboundary basin-level mechanisms to evaluate the robustness and flexibility of water commitments within and among catchments	(Although, not explicitly saying that, this aspect is incorporated in Recommendation 1. – IWRM, therefore, is considered as covered)
4. Experimental approach to resource management	-	-
5. Access to climate information necessary for decision-making	-	-
-	2. Invest in design and management policies and systems for water-intensive energy infrastructure that enable energy system resilience	-
-	4. Introduce measures to monitor and manage water demands and to buffer increased unpredictability in water availability due to climate change	3. Ensuring there is a disaster program in place distributing water among sectors in case of scarcity; 4. Making future predictions for water; 5. Measuring and monitoring mechanisms are in place

The first three positions in Table I. demonstrate a strong correlation among polycentric governance systems, public participation, and management at bioregional scale across all three tracks. On the contrary, the two aspects of experimental approach to water management and access to information and knowledge, highlighted in the Track 1. recommendation, do not gain enough attention in the policy paper and expert recommendations. At the same time, various aspects of informed decision-making, introduced in Track 2. and Track 3, advocate for better access to climate information and climate monitoring, making them intrinsic to adaptive water governance. Interestingly, energy system resilience introduced in Track 2. is not reflected elsewhere. Simultaneously, measuring and monitoring, predictions (as actions designed to buffer unpredictability) are well-reflected in both Track 2. and Track 3. The disaster program availability is present in Track 3 only, calling for more integration of climate and disaster risk reduction (DRR) frameworks.

Based on the analysis of the three tracks, it is possible to conclude a slight discrepancy observed in the insights by academicians and policy experts, leading to two mutually non-exclusive interpretations of these findings. The authors speculate that neither the agents of policy recommendations (Track 2) nor the expert community (Track 3) regularly incorporate new scientific findings in their guidelines. Another assumption is that academicians (Track 1) do not always keep pace with the needs of decision-makers for climate knowledge. In the latter case, the difference might come in response to the needs of decision-makers, as policy recommendations are supposed to point to an answer to the "How?" question, in contrast to the "Why?" question prevailing inside the academia.

4.Adaptive capacities of Central Asian countries

The short overview of existing adaptive capacities of CAS allows deepening the analysis of adaptive water governance in Central Asia.

4.1. Polycentric governance systems

According to the recommendations of the International Institute for Sustainable Development, sub-national levels can demonstrate better adaptable strategies rather than these created at the national level (Parry & Terton, 2016). This leads to an opinion that to bring sound effects the overall framework of climate adaptation should be reinforced via polycentric governance systems.

Pahl-Wostl et al. (2012, p.27) recognize polycentric governance as "complex, modular systems where differently sized governance units with different purposes, organizations and spatial locations interact to form together systems characterized by many degrees of freedom at different levels.". According to a comprehensive

research of 29 cases, a polycentric model of decision-making – in contrast to a centralized system with a high rate of context-dependency – demonstrates better performance (Pahl-Wostl et al., 2012). Polycentric water governance enables better response to the needs of a particular basin by developing an individual set of measures instead of a unified and non-specific approach.

In their research on the polycentricity in the Syrdarya River context, Wegerich et al. (2012) argue that micro-level water management in CA is more important than macro-level decisions. Meanwhile, the heritage of the Soviet monocentric decision-making system heavily hinders the shift to polycentric water governance in a relatively short period of sovereignty. This principle does not seem to be in place in the water governance practices in the CAR.

4.2.Public participation

The World Bank (1996, p. 3) defines participation as "a process through which the public influence and share control over development initiatives, decisions and resources which affect them." Therefore, "management of water at the lowest appropriate level" is considered as one of the fundamental principles of IWRM (Briscoe & de Ferranti, 1998), and is also vital for adaptive water governance, as it incorporates the flexibility of water systems and a plethora of opinions.

Stakeholder involvement has been ingrained in institutional settings via IWRM plans in most of Central Asian states. However, the shortcomings of the current situation with public participation in the target countries due to the top-down decision-making political culture inherent in all CAS undermine a full-fledged implementation of the model. Nowadays, the three major visible entry points for civil activism in water governance are participation in water councils, WUAs, and youth networks. Regarding river basin councils, Kazakhstan is considered as the advanced example for the rest of the region. Yet, Zinzani (2015) mentions that there is still no clarity, knowledge, and capacity in basin councils in Kazakhstan, which were supposed to ensure public engagement in water-related decision-making. Similar processes, although to a varying progress degree, are taking place across the CAR.

Establishing and supporting WUAs have clashed with reality and resulted in either their closure or in reshaping them to serve the ongoing water practices. Similarly, some youth-led climate activism signs can be indicated in Kyrgyzstan, Kazakhstan, and Tajikistan. Due to the lack of local ownership, though, the majority of such initiatives represent donor-driven networks not sustaining after project completion. There is a growing recognition of the importance of public participation among young people, but the weak understanding of the importance of civicmindedness and general reluctance common to post-command governance countries seriously inhibit the process in all sectors, water governance not being an exception.

4.3. Management at bioregional scale

Management of water at bioregional level (also referred to as hydrographic principle) manifests another approach officially adopted by the majority of CAS. According to scholars, similar to how water bodies are interconnected as systems, a bioregional structure of governing water bodies enables better integrating and linking water users and governance elements. Thus, it is believed that this approach would enable the elaboration and efficient execution of decisions in an integrated manner, and increasing adaptive capacities.

However, the deployment of the principle in reality is not easy due to administrative challenges. A basin unit usually contradicts administrative boundaries raising issues resolved on an ad hoc basis (Zinzani, 2015; Dukhovny, Sokolov & Ziganshina, 2013; Zinzani, 2014).

4.4. Experimental approach to resource management

A number of scholars specifically stress the importance of experimental approach in water governance (Huitema et al., 2009; Gupta, Pahl-Wostl & Zondervan, 2013; Hill, 2012), arguing that before implementing large-scale pervasive interventions and/or projects, it is better testing them on a smaller scale, i.e. piloting. The close monitoring of such an piloting results would enable producing recommendations for better performance of the further larger-scale efforts and simultaneously saving resources in case of failure.

Overall, the unwieldy bureaucratic rigidity of governance systems in Central Asian states raises challenges for implementing this approach in practice. At the same time, the number of pilot projects executed with the support of development partners has enabled introducing the approach across the CAR, calling for sensitivity for each case and downscaling the analysis units.

4.5. Access to climate information necessary for decision-making

Although not (yet) recognized and widely accepted as a prerequisite for adaptivity, this aspect of water governance has been gaining momentum. For instance, Lemos et al. (2018) deem access to climate information an essential factor for effective water governance adaptation, as freely available data and information for decision-makers at all levels (Lemos, 2015), and likewise for the public (Moss et al., 2013), enable faster and better reactions to the emerging risks associated with climate change.

The countries of Central Asia mostly fall short in their attempts to close the existing gap between data and research producing organizations and decision-makers. Additionally, climate-related observations are not usually exchanged at

the intrastate level "due to regional data protection laws and interstate political tensions" (Gerlitz, Vorogushyn & Gafurov, 2020) sustaining the information vacuum.

4.6. Adaptability of water governance by countries

Although referred to jointly as Central Asian states, in fact the five countries sharing the region represent a great variety of water governance approaches stemming from the high dependence of water governance on political systems, including, but not limited to, government culture, operating formal and informal institutions, civil society engagement in decision-making, etc. Some country-specific institutional water and climate interlinkages are briefly discussed below.

Kazakhstan. There is a consensus that compared to its CAR neighbours the country has significantly progressed in implementing IWRM at all levels, adjusting its legal and institutional setup. Yet, the active Water Code (2003) – incorporating the provisions on water use, management, protection, and responsible agencies – excludes the provisions on climate change and adaptation measures. Concurrently, water resources are indicated among the priority areas in Order №170 of the Minister of Ecology, Geology and Natural Resources (MEGNR) of the RK "On Approving the Rules of Organizing and Implementing the Process of Adaptation to Climate Change" of July 2, 2021. The Committee on Water Resources and Department of Climate Policy and Green Technologies both function under MEGNR; the statutes of both bodies however do not demonstrate any intersections – water resources are not the focus of the Department, and climate change and adaptation are not mentioned in the official documents of the Committee.

Kyrgyzstan. The state has taken steps towards implementing IWRM through delineating basins and conducting, although irregular, basin stakeholder meetings supported by donor projects (Sehring et al., 2021). The Water Code of Kyrgyzstan (2005) envisions the need to consider climate change while devising water governance and management policies. Moreover, the State Water Resources Agency under the Ministry of Agriculture, Water Resources and Regional Development "together with other administrative departments, shall develop and implement adaptation measures related to ensuring the resilience of the national water sector to adverse climate impacts" (Art. 5). Simultaneously, Kyrgyzstan has been struggling with forging an institutional framework for enforcing the above-mentioned provisions and designing sectoral adaptation strategies, as well as coordination and other challenges resulting from the internal political turmoil and socio-economic instabilities.

Tajikistan. The recently adopted Water Code (2020) added a clear IWRM vision to water governance, formalizing five river basins and sub-basins and calling for public participation. The clear water-energy nexus was once again reiterated through the establishment of the Ministry of Energy and Water Resources (Sehring et

al., 2021). Considering that the State Agency for Hydrometeorology (Tajikhydromet) dealing with climate change is a subordinate of the Committee of Environmental Protection under the Government of the Republic of Tajikistan and a separate entity from the Ministry of Energy and Water Resources, the practical liaising between these water and climate agencies is unclear.

Turkmenistan. The latest version of the Water Code (2016) has formally introduced certain IWRM elements, including basin councils and management at bioregional level, but these elements are yet to be implemented in situ. The water governance system has experienced certain reforms in the last decade, while its central managing agency was lowered in status (Sehring et al., 2021). The climate data is generated within the Ministry of Agriculture and Environment Protection and is not readily accessible for decision-makers in the water sector. Certain climate adaptation measures associated with water resource management were introduced by the National Strategy of Turkmenistan on Climate Change (2019), yet its implementation status is unclear.

Uzbekistan. While the long-standing Law on Water and Water Use (1993), with multiple amendments and corresponding bylaws, regulates water governance issues in the country, the development of the Water Code is still underway. As of today, there are ten basin councils along with over 1,500 WUAs, some created in recent years to comply with the IWRM principles (Sehring et al., 2021). Yet, their performance and self-sustainability raise doubts. The Water Sector Development Concept for 2020-2030 refers to climate challenges in the water governance domain.

5. Conclusion

There is no panacea or linear formula for building adaptive capacities in the water sector despite the variety of existing policy recommendations. In this article, the authors have attempted to unfold the concept of adaptive water governance from the political science perspective by linking them to the reality of Central Asian water governance practices.

The main research finding is that further IWRM strengthening in Central Asia furnishes an input into building the adaptive capacities of the states concerned. However, it is not enough – additional measures such as experimental approach to resource management, improved access to climate knowledge and DRR mechanisms should be introduced. Based on the targeted recommendations for the realities of the Global South countries, prioritizing the water sector in adaptation strategies would stimulate the sustainable development of local economies and prepare countries for adverse climate change impacts. Concluding, the following remarks bear mentioning:

- By further promoting IWRM at the national level, countries could expand their adaptive capacities, as the IWRM principles (i.e. public participation, hydrographic management, polycentric governance) contribute to adaptivity.

- Central Asian countries have already taken steps towards boosting the adaptive capacities of their water governance frameworks. Yet, stronger commitments and more resources are required to solidify and further advance them.

- Water should be added as a priority area to national-level policy documents addressing adaptive strategies, and highlighted as a standalone sector in the countries' NDCs.

- Low human capacities, already impeding water governance, might become a serious obstacle for advancing adaptive water governance in the Central Asian region. Hence, education and capacity-building on climate change should be enhanced, including expanding and encouraging interdisciplinary research.

- Central Asian states should convert their interdependencies into a beneficial fortune. By joining forces, CAS could put together their resources and unite as a region to tackle common challenges.

Finally, the recommendations listed in Table I. provide normative solutions to water governance issues. It means that the suggestions by academicians and policy experts should be approached cohesively as a step towards effective adaptation. Traced together, these insights are extremely helpful for understanding the broader scope of underlying adaptive water governance principles capable of ensuring higher robustness and flexibility of water systems in general.

Climate adaptation has become one of the most complicated and highly politicized global phenomena, offering significant international financial investment to the Global South states if certain governance principles are in place. This "carrot-and-stick" approach can stimulate Central Asian states to reassess their water governance frameworks and accept the new rules by bringing positive changes, if guided properly.

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