



Transboundary Water Management in Central Asia and the Iberian Peninsula: Path Dependence Approach

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ABSTRACT. *This article examines the historical background and the state of the art of transboundary water management in the Central Asian region, which includes the republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, on one hand, and the Iberian Peninsula, which consists of the Kingdom of Spain and the Republic of Portugal, on the other hand. These distances from each other regions are studied for the reason that both of them are located in arid landscapes and further climate change is posing grave challenges to transboundary water security. By highlighting the differences and similarities in the water management practices of Central Asia and the Iberian Peninsula, this article employs a path-dependence approach to shed light on new perspectives on good water management. As a result of identified opportunities, the Central Asian states could enhance their policy in the water management system and adopt new measures based on positive foreign experience.*

KEYWORDS: *water security, transboundary water management, Iberian Peninsula, Central Asia*

INTRODUCTION

Since the 1950s, the world population has tripled and reached 8 billion people (UN, 2023). According to the latest calculations, it is expected to reach up to 10 billion people by 2050 (UN, 2015). The constant rise of the global population comes with serious challenges in providing basic human needs. As a result of this, on a larger scale, water, food, and energy security are in jeopardy. Thus, creating food, water, and energy nexus has become a global challenge. It is becoming crucial to comprehend how these resources are interdependent as demand for them is constantly rising (de Amorim et al., 2018).

Moreover, climate change is posing another challenge. Alongside political, economic, and social factors, it is severely impacting the intensification of the rupture of the water,

food, and energy nexus (Miralles-Wilhelm, 2016). Among these, water plays a crucial role for the reason that lack of access to water resources may have an impact on economic development, geopolitics, and social stability.

As the global economy races forward and regions clash, the pressure on natural resources is reaching a breaking point. Regionally, water resources have become a focal point, with nations vying for control of this vital driver of economic development and national security. While the peaceful division of transboundary water resources is possible in water-abundant regions, the same idea cannot be said with certainty for the regions located in arid areas such as Central Asia and the Iberian Peninsula. Despite being situated in distant areas from each other, these two historically and geographically defined regions share similar problems regarding water security. Whereas the Aral Sea has been shrinking for half a century now, the Iberian Peninsula for decades has been a hotspot of climate change (Soares et al., 2023).

Both Central Asia and the Iberian Peninsula consist of upstream and downstream countries. In the latter region, Spain is the upstream country whereas in Central Asia, consisting of the Aral Sea basin, Kyrgyzstan, and Tajikistan hold 80% of water resources. The legal and institutional frameworks governing water rights and allocation differ significantly between Central Asia (former Soviet republics) and the Iberian Peninsula (European Union member states). This comparison can offer insights into the effectiveness of centralized versus more decentralized water management models.

The countries of both regions have signed agreements on fair water distribution among them and have implemented or are still implementing the principles of integrated water resources management (IWRM). The IWRM plays a crucial role in preventing the water crisis and securing sustainability. According to the definition of the Global Water Partnership, the IWRM is “a process which promotes the coordinated development and management of water, land, and related resources, to maximize the resultant economic and social welfare equitably without compromising the sustainability of vital ecosystems” (Nagata et al., 2021).

Nevertheless, why do states as actors achieve such different outcomes even when wielding the same instruments for managing shared water resources? Should the water management at the regional level be centralized or decentralized? How have certain historical events altered the course of water cooperation? Should the water interests of downstream countries be considered? These questions highlight the importance of considering factors beyond the tools themselves.

This article conducts a historical comparative study of how regional actors in Central Asia and the Iberian Peninsula have cooperated in managing shared water resources. This study can identify successful strategies and policies implemented in one basin that could be adapted and applied in the other. For example, if the Iberian Peninsula has a

well-functioning water allocation framework through agreements and institutions, these could be studied and potentially modified to fit the Central Asian context.

RESEARCH MATERIALS AND METHODS

This study employs a comparative historical approach centered on the *path dependence theory*. Path dependence posits that past decisions, policies, and institutional frameworks create a trajectory that shapes future choices and outcomes. By comparing two regions facing similar water resource challenges – Central Asia and the Iberian Peninsula – this research investigates how historical legacies and institutional development influence transboundary water management practices.

The research also employs a *similar systems design* for the comparative study. This approach focuses on two cases (Central Asia and the Iberian Peninsula) that share similarities in terms of water resource challenges (transboundary rivers, upstream-downstream dynamics) but differ in their historical and institutional contexts. This allows for isolating the impact of these contextual factors on water management outcomes.

The data for this study will be drawn from a variety of sources aligned with the historical and path dependence focus:

Historical documents: Official records, treaties, and agreements related to water management in both regions are analyzed.

Official statements: Policy documents, speeches, and reports from government agencies will be examined to understand current water management policies and objectives.

International agreements: Treaties and agreements between stakeholders in each region will be reviewed to understand the existing legal framework for transboundary water management.

RESEARCH RESULTS AND DISCUSSION

Transboundary Water Management in Central Asia in Historical Retrospective

The water usage in Central Asia for agriculture purposes dates 8,000 years back (Suleimenova, 2021). Nevertheless, the first documented attempts to administer the transboundary water resources in Central Asia trace back to the 19th century. The Turkestan Governorate within the Russian Empire consisted of all territories which are now so-called the Aral Sea basin (Figure 1). At the given period, the economic consequences of the Crimean War (1853-1856) and the American Civil War (1861-1865) jeopardized the import of cotton to the Russian Empire, thus the new frontiers in Central Asia represented an opportunity for decreasing the dependence on foreign cotton materials (Azimzhon, 2023).

Figure 1. *Turkestan Governorate in the 1900s within the Russian Empire, CC BY-SA 3.0 DEED*



The water resources management in the Turkestan Governorate was mentioned for the first time in the “Regulations on the administration of Turkestan” dated 1886, in which Article 256 stated: “Water in the main ditches, streams, rivers, and lakes is provided to the population for use, according to existing local custom” (Polozhenie ob upravlenii Turkestanskogo kraja, 1886). The Governorate studied the water division issues between upstream and downstream areas and various recommendations for developing irrigation systems were made.

However, Alimdzhanov A. argues that not a single irrigation project was implemented by the Russian Empire in the region for the reason that the administration was reluctant to develop a legislation basis and implement a water code regarding water resources management (2015). Meanwhile, Bochkareva I. states that the Russian Empire’s policy was directed at consolidating its influence and strengthening its security in the region due to the new threat of competition with the British Empire in Central Asia (2021). She also notes that with the beginning of the World War I the irrigation system plans in the Turkestan Governorate were abandoned and eventually lost its priority.

Following the fall of the Russian Empire, the Communist Party of the USSR continued the initial ideas of the Tsarist regime on expanding the cotton fields and developing the irrigation systems in the now-renamed Turkestan Autonomous Soviet Socialist Republic (TASSR) and directed financial resources from the central funds (O’Hara, 2000). Nevertheless, the water management in TASSR in the 1920s was characterized by the intensification of water shortage problems, reduced crops, mutual water issues, and, in particular, transboundary water conflicts with Iran, which required the diplomatic intervention of the Russian Soviet Federative Socialist Republic (Choriev, 2014).

The solution to these problems required a more systemic approach. Thus, in 1922, the Water Law of the TASSR was accepted by the Decree of the Central Executive Committee of the TASSR Councils, where Chapter 6 stated that “using water basins, which are common with bordering countries, are regulated by special decrees” (Vodnyj zakon Turkestarskoj Respubliki, 1922). Later, in 1971, the High Council approved the “Fundamentals of Water Legislation of the Union of the SSR and the Union Republics” where Part 2 Article 36 stated that “Water use in the border waters of the USSR is carried out based on international treaties. To the extent that water use in the Soviet part of the border waters is not regulated by international treaties with the participation of the USSR, it is carried out per the legislation of the USSR and Union Republics” (Zakon ob utverzhenii osnov vodnogo zakonodatel'stva SSSR, 1970). Thus, all transboundary water resources in Central Asia, despite having developed national water regulations, became the subject of all-union Soviet law. Meanwhile, it is interesting to note that according to this law, the Soviet Command of the border troops had also competency in dealing with the border waters. Later on, in 1987, Syrdarya and Amudarya Basin Administrations for inter-republican distribution of water resources were created (O sozdanii Uprvodhoz «Syrdar'ja», 1987).

After the dissolution of the USSR in 1992 the five newly-created states of Central Asia signed an agreement “On cooperation in the field of joint management of the use and protection of water resources from interstate sources”, in which Article 1 recognized the commonality and unity of the region's water resources (O sotrudnicestve v sfere sovместnogo upravlenija, 1992). This agreement set the framework for further cooperation. Having held many other bilateral and multilateral meetings, the states decided to create the International Fund for Saving the Aral Sea and defined its status in 1999 (O statute MFSA, 1999). This was the last document that was signed by all members of the Aral Sea basin. While numerous other agreements exist in the sphere of regional water management, none encompass all Central Asian nations, i. e. each multilateral agreement lacks at least one signatory country of the region.

Meanwhile, the Central Asian states continued to face problems such as border conflicts, uneven distribution of natural resources, lack of electricity, etc. For instance, Kyrgyzstan and Tajikistan were rich in water resources and poor in energy, while Kazakhstan, Turkmenistan, and Uzbekistan were rich in energy resources, but water-poor. This could lead to mutual exchange by “water-for-energy” and “energy-for-water” formulas (Gleason, 2003). Carius A. states that “dependence on the same water resources can... create communities of diverse users and stakeholders, fostering cooperation”, which eventually leads to a win-win sum (2006).

However, the existence of interstate structures that were created during the Soviet Union and many agreements on water management between the Central Asian states could not solve the transboundary water management problems and the old system was collapsing (Ormysheva et al., 2016). Moreover, Sharipova (2023) argues that the transboundary water cooperation in the Aral Sea basin is not prospering to its full potential and the problem may lie in the lack of trust and mistrust dimension between the upstream and downstream countries.

Thus, it is stated necessary to rethink the cooperation in the sphere of transboundary water management in the Aral Sea basin involving a wide range of specialists such as energy engineers, ecologists, economists, international lawyers, and water specialists (Kabilov, 2012). One of its first conditions is that all countries must join the 1992 and 1997 UN Conventions on the protection and use of transboundary watercourses and international lakes, and the right of non-navigational uses of international watercourses, thereby demonstrating the will and recognition of fairness and equal rights to the use of water, as countries of downstream did. As for now, two upstream countries – Kyrgyzstan and Tajikistan – have not yet signed these conventions.

Furthermore, the exclusion of any party from the negotiation process leads to the failure of a whole system. For instance, Afghanistan was not a signatory of the 1992 agreement on joint management of transboundary waters in Central Asia. Afghanistan's population is growing rapidly, which will lead to a rising demand for water resources within the country. Recently, the Taliban government has built a new channel on the watercourse of Amudarya. This could potentially lead to disputes with downstream countries that rely on the Amudarya. Thus, the Afghan factor is challenging the prospects of peaceful management of water resources in the Aral Sea basin. Engaging Afghanistan in regional water management discussions and assisting with infrastructure development could foster cooperation and trust.

Transboundary Water Management in the Iberian Peninsula in Historical Retrospective

In the Iberian Peninsula, the Kingdom of Spain and the Republic of Portugal had shared a common history in all spheres. In terms of water divisions, five river basins cross the national borders of Spain and Portugal. They are Miño, Limia, Douro, Tajo, and Guadiana River basins (*sorted by north to south*) which cover around 45% of the land mass of the Iberian Peninsula (Figure 2) (Lopes, 2012).

Figure 2. Transboundary river basins in the Iberian Peninsula, CC BY-NC-ND 4.0



In terms of actual water resources, these five basins account for 45% of the peninsular water (surface and aquifers), with Portugal yielding 32% and Spain 68% of the water (Lopes, 2012).

One of the first agreements on transboundary water regulation was “Treaty on boundaries between Spain and Portugal from the mouth of the Minho River to the junction of the river Caya with the Guadiana” signed at Lisbon in 1864, Article 28 of which stated that “In consideration of the fact that in various parts the international line follows water courses or the direction of roads and touches some springs, it is agreed that such roads, water courses, and springs shall be for common use by the peoples of both kingdoms” (Treaty on Boundaries between Spain and Portugal, 1864). In addition to this agreement, many protocols were signed and official notes were exchanged to clarify or add specific topics in 1866, 1912, 1951, 1976, and 1980 (Lopes, 2012).

Between 1864 and 1968, four international instruments were signed to promote hydroelectric power production. However, significant steps towards bilateral cooperation in transboundary river basin management were only taken from 1994 onwards (Council of the EU, 2008). After some negotiations, in 1998, Spain and Portugal decided to sign the “Convention on Cooperation for the Protection and Sustainable Use of Waters in Portuguese-Spanish River Basins” or the Albufeira Convention, which entered into force two years later in 2000.

The Albufeira Convention was a breakthrough document on the background of the transboundary water crisis in the Iberian Peninsula. In 1993, Spain attempted to adopt the National Hydrological Plan (PNH), which included large projects on altering the water flow within the country thus changing the water amount of the transboundary rivers unilaterally, without consultations with Portugal. By the downstream country, immediate actions were taken which led to bilateral cooperation. Moreover, the Iberian Peninsula suffered from a severe drought and the mass media showed Spain as “stealing the water” that belongs to Portugal too (Thiel, 2004).

Bukowski J. reveals that the negotiations between Spain and Portugal over the transboundary water crisis were covered by initial mistrust and disjuncture in solving the problem (2011). She highlights that in Portugal the question of downstream waters that had been affected by Spain was discussed at the highest state level and was a part of the 1994-1995 and 1999 electoral campaigns. Meanwhile, she compares, that in Spain the water shortage in Portugal was not considered a serious problem (Bukowski, 2011).

At the same time in Europe in the 1990s, the negotiations on adopting a common water regulations policy kicked off as well. Thus, Spain and Portugal participated in the 1996 to 1998 consultations on the European Water Framework Directive (WFD). It is stated that Portugal used this opportunity to put into force the political leverage of the European Commission “to informally pressure” Spain to negotiate based on Portuguese concerns about transboundary water resources management (Bukowski, 2011). Thus,

Portugal secured the Spanish guarantees on water amount and consumption, as well as the ecological condition of transboundary water.

On the other hand, the Albufeira Convention initially set out a minimum yearly flow of water from Spain to Portugal for each river basin, but this proved inadequate for meeting downstream requirements. Consequently, in 2008, the agreement was updated to include minimum flow standards on a quarterly and weekly basis. Additionally, it introduced a drought exception clause, allowing Spain to be exempt from adhering to the specified minimum flow levels during periods of drought (Martínez-Fernández et al., 2020).

The WFD, along with supplementary legislation such as the Groundwater and Floods directives, has served as a catalyst for reform in water policy and institutional frameworks in the Iberian Peninsula. For two nations sharing river basins, the implementation of the WFD required coordination and alignment with the pre-existing bilateral Albufeira Convention and needed adjustments to conform to the new pan-European water management standards.

Lopes P. wonders about the stable character of the water relations between Spain and Portugal. She states that for some, upstream Spain dictating the conditions, and downstream Portugal complying with them is the reason for water relations stability. In contrast, others argue that this is the outcome of neighborly good water cooperation based on both sides' national goals of developing agriculture and increasing hydro-energy production (Lopes, 2012).

Central Asia and the Iberian Peninsula: parallels and differences

The formation of transboundary water management in Central Asia and the Iberian Peninsula has been taking place under various circumstances and historical periods. Consequently, the factors which affected the necessity of transboundary water management cooperation were different as well. Nevertheless, it is interesting to identify some similar aspects.

Firstly, considering the path dependence approach in historical retrospectives, we can identify certain stages of transboundary water management in both regions.

For example, the Russian Empire during its presence in Central Asia kept the status quo on transboundary water management in the background of the fear of discontent of the indigenous people. The actions of the Tsarist regime mainly were directed at enforcing its military position in the region and preventing the further occupation of the British Empire in Central Asia. Thus, the type of transboundary water management can be identified as “local management of transboundary water”.

Later on, the Tsarist regime was overthrown and the Soviets continued the previous plans of building irrigation systems in the Central Asian region and, at the same time, faced

transboundary water issues with Iran. The Soviets developed the normative bases for regulating the transboundary water resources at national levels and later they switched to the approach of “union management of water resources” with the participation of the official Moscow.

Nevertheless, after the dissolution of the Soviet Union, the five republics of the Central Asian region developed separate water policies and adopted the approach of “national management of water resources”.

However, considering the commonality of water resources in the Aral Sea basin as well as taking into account the importance of cooperation in the sphere of shared water resources, the countries of Central Asia are transitioning towards the level of “international management of water resources”. The creation of the International Fund for Saving the Aral Sea was the first step in this direction.

Thus, depending on the historical period and various internal and external factors, the states of the Central Asian region come from the local management to the international management of transboundary water resources (Figure 3a).

Figure 3a. *Stages of transboundary water management in Central Asia*



Meanwhile, in the Iberian Peninsula, the Treaty of Lisbon in 1864 demarcated the borders between Spain and Portugal. The agreement between the two nations admitted the commonality of shared water resources and encompassed the clause of common use of transboundary water resources. Thus, the Spanish-Portuguese transboundary water management was at the outset based on “local management of transboundary water”.

Later on, both countries developed national plans for water usage to the end of agriculture and hydropower production. This period can be classified as the “national management of water resources”.

However, the intensification of water usage in agriculture and hydropower generation in both countries led to the compromise of water security in the downstream country of the Iberian Peninsula. Thus, urgent actions were taken and the Albufeira Convention entered into force in 2000. This agreement was the result of discussions that lasted for almost a decade between Spain and Portugal. Thus, this period can be defined as the time of “international management of water resources”.

At the same time, the official Brussels began taking steps to consolidate the water management system at the European level. With the introduction of the Water Framework

Directive of the European Union (WFD) which became the main law for water protection in Europe, water management in the Iberian Peninsula entered the stage of the “union management of water resources”.

Thus, the stages of the transboundary water management of the Iberian Peninsula are slightly different from Central Asia due to historical factors. In particular, Spain and Portugal came to the union management of the transboundary water resources in the 1990s with the beginning of the discussions on WFD, whereas at that time Central Asian countries were switching from union management to national management of transboundary water resources as a result of the USSR dissolution (Figure 3b).

Figure 3b. *Stages of transboundary water management in the Iberian Peninsula*



Secondly, the actions of countries both in Central Asia and the Iberian Peninsula demonstrate that they have switched from a competitive strategy of water resources control to a cooperative one. For instance, in the 1990s the states of Central Asia by developing national strategies for water management allowed the competition in terms of water usage due to the lack of mutual trust. Later on, the need to save the Aral Sea fostered the cooperation. Meanwhile, Spain and Portugal overcame this issue in the 1990s as well by signing the Albufeira Convention and implementing the WFD. It should be noted that this type of cooperative water management is essential for fostering environmental peacebuilding in both regions.

On the other hand, we can see that the states in both regions wield the same set of instruments to deal with water management issues. However, Spain and Portugal could demonstrate a positive outcome in terms of transboundary water management: both of them implemented IWRM, set national hydrological plans, secured national agricultural goals, and ensured ecological aspects.

Moreover, at the Iberian Peninsula, various historical events and circumstances led to a condition where mutual cooperation in water management was inevitable for Spain and Portugal. Partially, this was due to the interests of the downstream Portugal, which used available political tools at national and supranational levels.

What is more, the countries of the Iberian Peninsula yielded some of their rights in the sphere of transboundary water regulations to the European Union and complied with the WFD. This action improved the cohesion of national, international, and all-union aquatic policy within the European Union. Thus, the transboundary water management is being centralized in Europe. For instance, currently, policies regarding water quality and flood prevention are implemented at the supranational level.

Concerning the states of the Aral Sea basin, since the dissolution of the USSR their cooperation in the sphere of transboundary water management slowed down and to some extent received the form of tokenism. The institutional and infrastructural basis of the Soviet legacy in the sphere of transboundary water management, despite offering a holistic solution at the regional level, became outworn. Only now some of its remains are being renovated, e.g., the United Energy System of Central Asia, which balances the energy deficit and surplus of upstream and downstream states depending on the amount of water resources. Thus, the historic events of the rise and fall of the USSR fostered and slowed down the development of sustainable transboundary water management in Central Asia.

Nevertheless, new problems arise as the states in Central Asia try to cooperate in managing the water resources. The upstream countries of Kyrgyzstan and Tajikistan and the downstream countries of Afghanistan, Kazakhstan, Uzbekistan, and Turkmenistan have not yet developed the dispute settlement mechanism, thus, their interest being non-alignable concerning the access to transboundary water resources.

At the same time, there is no strong institution that could solve the problems with a holistic approach taking into account the interests of all states in the region. Thus, the question of centralizing the competencies of transboundary water management and distribution encounters the problems of the trust and mistrust layer between the upstream and downstream countries.

CONCLUSION

The study of transboundary water management in Central Asia and the Iberian Peninsula revealed both similarities and stark differences. Employing the path dependence approach, the analysis highlighted how historical legacies and political contexts shaped the water management strategies adopted by each region.

While both regions exhibited multi-level governance of water resources (local, national, international, and union), the order and effectiveness of these levels differed significantly. The Iberian Peninsula exemplifies an evolutionary approach, where cooperation gradually strengthened over time. In contrast, water management in Central Asia has been heavily influenced by the shifting political landscape, leading to periods of both progress and regression.

The contrasting experiences of the Iberian Peninsula and Central Asia highlight the complex interplay of factors influencing transboundary water management. While both regions possess similar tools (IWRM, national plans), historical context, political will, and institutional frameworks play a critical role in determining their effectiveness.

The success of the Iberian Peninsula stems from a combination of factors: geographical necessity, shared history, and the unifying influence of the European Union. Centralization under the EU Water Framework Directive fostered cooperation and a cohesive approach.

Central Asia, on the other hand, faces significant challenges. The dissolution of the USSR dismantled existing institutions, leaving outdated infrastructure and unequal water distribution among upstream and downstream countries. This asymmetry fuels tensions, further complicated by the lack of a dispute settlement mechanism. The political instability in Afghanistan and the absence of cooperation put more challenges.

Centralizing water management presents a potential solution, but replicating the EU model might not be feasible. Building trust, revitalizing institutions, and establishing a framework for dispute resolution are crucial steps toward achieving sustainable and equitable water management in the Aral Sea basin. Learning from the Iberian case study and adapting solutions to the specific context of Central Asia offers a path forward for fostering cooperation and securing this vital resource.

Thus, to achieve sustainable water management in the Aral Sea basin, Central Asian countries should consider strengthening cooperation at the regional level. The International Fund for Saving the Aral Sea can serve as a starting point for this endeavor. The inclusion of Afghanistan in the negotiation processes is essential. This environmental peacebuilding effort is necessary to ensure equitable and sustainable water management for the entire region. By implementing these recommendations and fostering a more collaborative approach, Central Asian nations can work towards a future where water resources are managed effectively for the benefit of all.

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