FINAL DEGREE PROJECT
DEGREE IN INTERNATIONAL RELATIONS (ENGLISH)
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EXTRAORDINARY CALL

CONTESTED HYDRODIPLOMACY IN CENTRAL ASIA:
FRAMING THE CONFLICT-COOPERATION NEXUS IN THE ARAL SEA BASIN

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ABSTRACT

The Aral Sea Basin's water governance is hampered by a complex trade-off between upstream hydropower generation and downstream agricultural irrigation, among five different states, with different water interests. On both a domestic and inter-state basis, this paper thus seeks to review the ongoing incompatibilities governing basin politics and, at the last stage, regional political dynamics. To this end, we will struggle to prove to what extent this multi-stakeholder cooperation model has loosened the likelihood of a water-related conflict, by also being aware of the leverage of the social and environmental externalities on the basin-wide hydric stress. Under the lens of liberal institutionalism and conflict transformation theory, we will approach the nexus linkages which would unveil a positive momentum that should lead to further confidence-building, socio-economic development and regional security.

KEYWORDS

Aral Sea Basin, water, environmental peacebuilding, conflict, cooperation.

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ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
ASB	Aral Sea Basin
BRI	Belt and Road Initiative
BVO	Basin valley organizations
CAMP4ASB	Climate Adaptation and Mitigation Program for Aral Sea Basin
CAPS	Central Asian Power System
CAREC	Regional Environmental Centre for Central Asia
CASA-1000	Central Asia-South Asia 1000 KV Project
EU TACIS	Technical Assistance to the Commonwealth of Independent States
GWANET	Gender and Water in Central Asia Network
ICAS	Interstate Council for the Aral Sea Basin
ICSD	Interstate Commission on Sustainable Development
ICWC	Interstate Commission for Water Coordination
IFAS	International Fund for the Aral Sea
IWRM	Integrated Water Resources Management
LUCA	Land Use, Ecosystem Services and Human Welfare in CA
OECD	Organisation for Economic Co-operation and Development
OSCE	Organization for Security and Co-operation in Europe
PCCP	UNESCO's Potential Conflict to Cooperation Potential program
SABAS	Scientific Advisory Board on Aral Sea Basin Problems
UN/ISDR	United Nations Office for Disaster Risk Reduction
UN PPHSTF	UN Multi-Partner Human Security Fund for the Aral Sea Region
UNECE	United Nations Economic Commission for Europe
UNEP	UN Environment Programme
UNRCCA	UN Regional Centre for Preventive Diplomacy for CA
WARMAP	Water Resource Management and Agricultural Production in the Central Asian Republics.
WUFMAS	Water Use and Farm Management Monitoring System

"Si asumimos que el conflicto es un proceso interactivo, una construcción social y una creación humana que puede ser moldeada y superada, y que por tanto no transcurre por senderos cerrados o estancos en los que la fatalidad es inevitable, hemos de convenir también que las situaciones conflictivas son tambien depositarias de oportunidades, y lógicamente, de oportunidades positivas, en la medida que la situación de conflicto sea el detonante de procesos de conciencia, participación e implicación que trasformen una situación inciial negativa en una oportunidad positiva"

Fisas, V. *Cultura de paz y gestión de conflictos*. 1998:229

‹‹ *Là encore, on voit comment ce principe de Clausewitz que la guerre, "c'est la politique continue", a eu un support, un support institutionnel précis qui a été l'institutionnalisation du militaire. La guerre, ce n'est plus une autre face de l'activité des hommes. La guerre, ça va être, à un moment donné, la mise en œuvre d'un certain nombre de moyens que la politique a définis et dont le militaire est une des dimensions fondamentales et constitutives* ››

M. Foucault, *Sécurité, territoire, population*. Cours au Collège de France, 1977-1978, Paris, Gallimard – Seuil (Hautes études), p. 313.

INTRODUCTION

I. Justification

"Anyone who can solve the problems of water will be worthy of two Nobel prizes – one for Peace and one for Science."

John F. Kennedy (1917-1963)

Hydrodiplomacy is a concrete subset of International Relations (IR) that fosters the achievement of established foreign policy goals by promoting the containment, prevention, and settlement of conflicts to facilitate regional integration and transboundary water cooperation (Schaap, 2019).

According to UNESCO (2009), there are 286 transboundary basins and over 468 groundwater aquifers worldwide. Approximately, 40% of the world's population lives in surface water[1] basins that comprise two or more states (UNGA, 2010). Overall, 148 states have part of their territory in international basins and 30 countries lie entirely within them (UNDP, 2006).

Divergences between riparian countries, in terms of socio-economic development, institutional capacity, infrastructure and political orientation as well as legal contexts, pose challenges to effective and coordinated development as well as to the joint management and protection of transboundary water resources. In other words, "Water ignores political boundaries, evades institutional classification, and eludes legal generalizations" (Wolf and Dena, 2011). In conjunction with the above, the relative risk of hydric stress such as those mentioned is high or very high in 41 of the 286 basins; 218 of the 286 watersheds show a high or very high relative risk of nutrient pollution or wastewater pollution; and extinction risk is moderate to very high in 70% of the areas occupied by transboundary river basins (PNUMA, 2016).

The existence of *risk* is a hallmark always present in definitions of "water security". This is due to the fact that, by nature, water resources are variable resources, in temporal and spatial terms, and subject to social and environmental externalities that likewise affect the demand, supply and management of water resources. In the field of economic and environmental studies, this dilemma is regarded as a "tragedy of the commons", which entails that individual acting independently and rationally according to each's self-interest behave contrary to the best interests of the whole group by depleting some common resource (Anukwonke, 2015).

The choice of this theme lies in the rising relevance that hydrodiplomacy is garnering in the International Relations' arena and in Academia. By consulting a wide set of resources on hydro-diplomacy, we noted that certain lacunas are frequently repeated in this academic field, most remarkably: 1) assumption of a generalized zero-sum approach, without considering that original drivers for conflict can turn into drivers of cooperation. 2) understanding of hydric stress as a result of climate externalities, giving little focus to the social construction of discourses over water scarcity and hydraulic potential; 3) great study on the impact of economic, social and environmental stresses, leaving little room for assessing the political

[1] Surface waters include streams, rivers, lakes, reservoirs, and wetlands.

sphere of this basin politics.; and 4) excessive reliance on the world's hottest basins, excluding further of comprehensive approach.

In consonance with the above, we[2] considered it would be disruptive to fill those voids in a case study on an instructive hotspot for hydro-political tensions of current interest, but lacking all-encompassing research, with the challenge of moving beyond a "techno-centric approach", and also considering the socio-political factors and the different existing levels of activity within water governance.

In addition, another peculiarity is that this study aims at overcoming the traditional "conflict resolution" and "conflict management" focus, and rather sample a "conflict transformation" approach through the lens of environmental peacebuilding, in order to transform the potential risk of compelling freshwater demands into a gateway for cooperation and new partnerships on a mid-to the ong-range horizon.

Admittedly, my motivation for conducting this research stemmed from my mobility programme in Mexico, where I completed a short case study on the imbalances in the spatial distribution of water raised in the course of the Río Grande between the US and Northern Mexican states, and their institutional framework for wáter cooperation.

The object of this project is to conduct a baseline assessment of how the conflict-cooperation spectrum operates in the Aral Sea Basin and to what extent equitable water diplomacy would act as a "game-changer" in fostering confidence-and-security building measures (CSBMs) in Central Asia, particularly, within the Five "Stan" Countries of the Silk Road: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

On closer examination, tensions are focused on the region's two main rivers, the Syr Darya, which flows from Kyrgyzstan through Uzbekistan and Kazakhstan, and the Amu Darya, from Tajikistan through Uzbekistan and Turkmenistan. Increasing competition over freshwater resources is aggravating tensions in a region where diplomatic relations are, in itself, uneasy.

Prior to the collapse of the USSR, 85% of the Basin's water and energy resources were freely exported across administrative borders, and the Ministry of Reclamation and Water Management provided the funds and management for infrastructure construction and maintenance. The sudden emergence of recently formed new republics fragmented its central authority into seven states, though none of these could dictate management policy for the basin on its own terms (Micklin, 2002).

The new borders disregarded any historical or national legacies, leaving large minorities of one nation within another republic and creating convoluted borders which undermined political relations and hampered economic development. As a consequence, management of these resources has been highly politicized (Karaev, 2005), and these friction lines have generated potential scenarios that could become sources of conflict.

Water resources abound in the region, albeit over 90% of them are concentrated in Kyrgyzstan and Tajikistan's mountains. Nonetheless. the largest consumers, Uzbekistan and Kazakhstan, can only supply 14 and 45 per cent of their water demands, respectively, as they request more freshwater to meet the needs of their expanding agricultural sectors and populations. While upstream states have more leverage over turbine flows from hydroelectric power plants during peak electricity demand periods in the Winter (Atwood, 2002), their

[2] I would like to thank Prof. Dr. Javier del Valle and Prof. Dr. José Antonio Peña Ramos for their valuable advice for choosing an adequate basin of study.

downstream neighbours are rather focused on Spring and Summer flows to nurture extensive cotton crops – the "white gold".

Strategically, the region lies at the crossroads of several rival powers -China, Russia, Iran, Pakistan and India- all of which are vying for expanding their sphere of influence. This makes the Aral Sea Basin a potential battleground of the world's powers for the control of oil minerals, especially when coupled with endogenous problems that include disputed borders, rising poverty, social discontent at the non-democratic regimes, and the emergence of militant Islamist groups (Karaev, 2005).

Among the others, weak institutional capacity has been listed as the main driving force of fragile water governance in the Aral Sea Basin. Most notably, identified loophole-comprise es inadequate legislation, lack of strategy, excessive informality, unwillingness of stakeholders to cooperate, limited financial mechanisms, an unarticulated participation of civil society, private sector, academia and Government.

In this vein, the following study will be theoretically conducted through the lens of *liberal institutionalism*, since we take as a benchmark that these uncoordinated actions are embedded in a collective action problem containing a social dilemma, which could be overcome through the provision of "selective benefits".

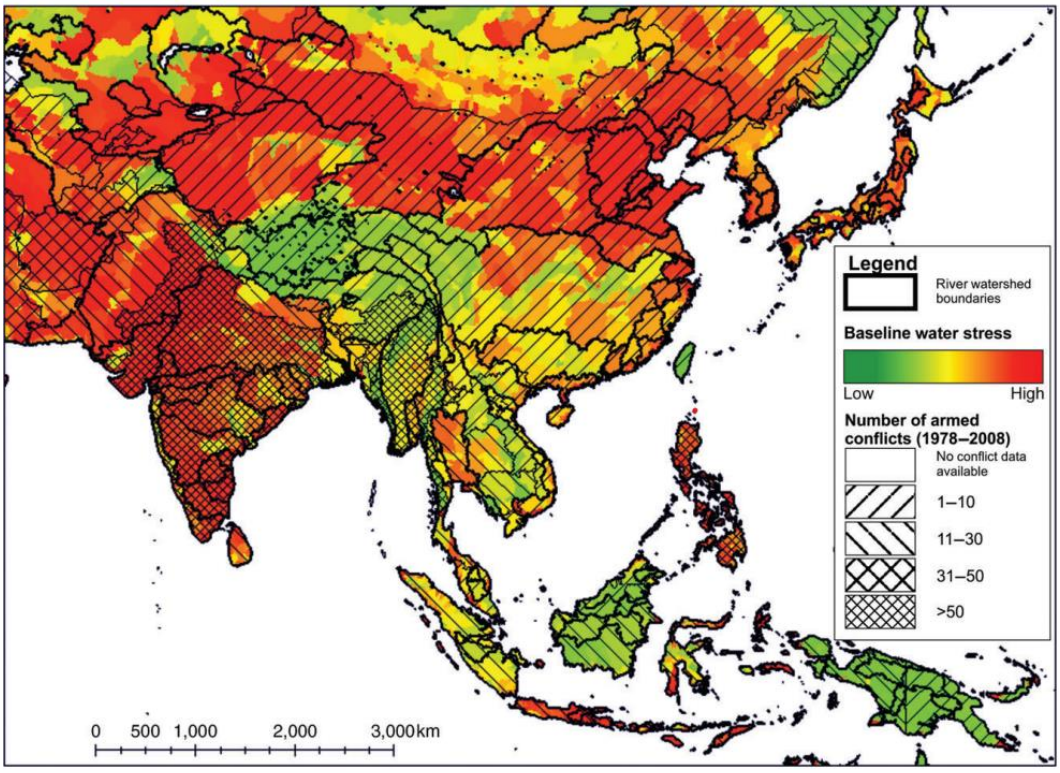


Figure 0: Illustration of baseline water stress in river basins and country-based armed conflicts since 1978 in Central and Southeast Asia. Note that the simultaneous occurrence of water stress and conflict in the same location does not imply a causal relationship between the two phenomena. Source: Research Group Climate Change and Security, University of Hamburg.

II. Object of study

Broadly defined, *geopolitics* "combines a geographical schematization of diplomatic-strategic relations with a geographic economic analysis of resources, with an interpretation of diplomatic attitudes as a result of the way of life and the environment (sedentary, nomadic, agricultural, seafaring)" (Aron, 1966). Scarcity -tangible or perceived, transitory or permanent- is the attribute that confers to *water* its geopolitical dimension. The compelling theory in the field of strategic studies has emphasized that low freshwater availability increases the risk for interstate disputes.

Nevertheless, cross-case studies exploring historical trends in transboundary water conflicts have begun to conceive hydraulic resources as a catalyst for cooperation since the UNESCO's Potential Conflict to Cooperation Potential (PCCP) program registered that cooperative water-related incidents outnumbered conflicts by more than two to one from 1945-1999 (Wolf, Yoffe, & Giordano, 2003), Under this prism, water has also proven to be a productive pathway for confidence building, cooperation and, arguably, conflict prevention.

To validate this "paradigm shift", case studies have been chiefly conducted focusing on the world's "hottest basins" (vastly, the Nile, Jordan, la Plata, Tigris-Euphrates, and Indus), excluding further comprehensive approaches over Central and South Africa, or the Far East and Central Asia. This is partly explained by the MENA region's worth exploring biophysical, socioeconomic, and geopolitical layers, to which scholars have notably drawn major attention. In our view, their significance could have been generalized and a wider spectrum of basin case studies, depicting a gradual upward movement in water cooperation, would increase the validity and reliability of this emerging theory.

Taking this into consideration, the main research question of this essay would be expressed as follows: *Does this "paradigm shift" obey a "one-size-fits-all" approach, or could it be inconsistent with other case studies beyond the Middle East and North Africa (MENA)-related hydro-politics, particularly the Aral Sea Basin in Central Asia?*

For this reason, the axiom taken as a benchmark suggests that the good governance of hydric and hydrographic resources in a regional basin would act out as a *concomitant* agent during confidence-and-security-building processes, whose scope would be necessary to evaluate.

Overall, the object of this thesis is to gain a richer understanding of how political power dynamics operate within this transboundary river basin, taking into consideration state and non-state actors' conflictive/cooperative interactions, and to deepen our knowledge of this vast and complex branch of Public International Law. The specific purpose of my dissertation research was threefold:

- To underscore driving forces which, when they coalesce, provide conditions for a greater likelihood of hydric stress and 'acute' conflict in the Aral Sea Basin, through the lens of the two-level game theory.
- To assess, both theoretically and empirically, the degree to which complex interdependence in the management of shared watersheds affects human and environmental security in this hotspot basin.
- To pursue a reference framework for conflict resolution and conflict transformation for other current and future freshwater disputes.

The working hypothesis, which we tested, then, regards the causal link between the potentiality of water conflict likelihood and the degree of cooperation in watershed management, as follows:

> *Multi-stakeholder engagement in active water cooperation in the Aral Sea Basin might help in successfully reducing the likelihood and intensity of warfare and water conflicts in this region and moving towards full-fledged cooperation among riparians, thus creating stability of expectations.*

From this initial assumption, we will formulate our derived hypothesis one step beyond. As we will frame inter-state nexus linkages within the liberal institutionalism theory, we will assess whether this notional atmosphere of full-fledged cooperation among riparians has engendered an eventual water regime, with the utmost degree of interlinkages.

III. Methodology

The proposed methodology for discussing the scope of this paradigm will be a hypothetico-deductive method, regularly employed in the field of experimental sciences. H-D methods operate on the following basis: formulate a hypothesis, deduce empirical consequences from that assumption, and verify to what extent obtained results suit the intended forecast, though it could be the case for the falsifiability of the postulates proposed.

For testing our main and derived hypotheses, our independent variable regards the level of cooperation intensity in watercourse management, and we will assess its influence on our dependent variable, the degree of potential water conflict likelihood in the basin, by acknowledging whether cooperative events aggravate or alleviate the conflictive ones. By building on Warner's and de Man's (2020) conceptualization, its rating will be contingent upon the control variables systemic drivers of watercourse management, which comprises the drivers for conflict, conflict maintainers and conflict escapers. Since changes in the environmental performance take place within very distinct physical units, we use the *Aral Sea Basin* as a fundamental unit of analysis, rather than states.

The following study draws on qualitative research approaches. Qualitative methods examine actors' behaviours, social structures, and shared beliefs. Besides, the dissertation includes qualitative diagrammatic modelling, in the form of influence diagrams (ID), which are used as an analysis tool to capture the relationships between key variables for each scenario gamed. The application of IDs to military experimentation is similar to their traditional uselead-instead in step for defining equations and relationships for quantitative system dynamics models in that they are used to generate conditions for the design of focussed studies. Influence diagrams are deeply rooted in centres for military and security studies. Thus, military strategic planning requires an understanding of the key factors and characteristics of the range of potential future scenarios and the likely areas of friction (Tailby, Geoff et al., 2003). To this end, we will also conduct a short semi-structured interview with the OSCE Project Co-ordinator in Uzbekista Mr. MacGregor, in order to obtain first-hand relevant information for our research.

On the other hand, we rely on the two-level theory as our study framework when analyzing each stakeholder's interests, roles and networks. This insight will provide us with a deeper understanding of multilateral water negotiations interweaving domestic constraints and regional politics, by analysing water consumption patterns and water bargaining dynamics, respectively. However, we will not delve into game theory by adding numerical values to inter-state interactions, nor propose a negotiation model. Another reference framework that we will build on is conflict transformation. This horizon, theorised by Lederach and Galtung, aims at modelling the ground causes of a conflict into new gateways for cooperation, projecting at the longer term.

The collection of primary data has been retrieved from public statistics and open databases strongly present in research methodologies in the fields of social and human sciences. These include the Foreign Broadcast Information System (FBIS), the Transboundary Freshwater Dispute Database (TFDD), the Conflict and Peace Data Bank (COPDAB), and the Falkenmark Index. To explore historical and projected climate information for different watersheds, gathered from the World Banks's Climate Change Knowledge Portal and reports from the United Nations' Intergovernmental Panel on Climate Change (IPCC).

Secondary data comprises a thorough literature review of academic journals, policy briefs and other publications on 'hydrodiplomacy' conceptualizations compiled from environmental studies, international relations, geography, peacebuilding and conflict transformation theories, and International Water Law. Overall, more than 100 bibliographic references are included in this Final Degree Project.

IV. Structure

The remainder of this final degree project is composed as follows. First, Chapter I divides the theoretical framework into a conceptual approach to the water-security-conflict nexus, illustrated by an overall picture of worldwide hotspot basins, followed by the rationale for applying liberal institutionalism as the most supportive epistemological framework for this analysis.

Second, Chapter II carefully examines the level-playing scenario to gain a deeper understanding of terrain conditions: its hydro-meteorological features; its socio-economic and geopolitical realities; and the international, regional, inter-state and national legal context for water cooperation *in situ*.

Third, Chapter III explores the power dynamics within the Aral Sea Basin, under the motion of 'hydro-hegemony' and through the lens of multi-track diplomacy. For this purpose, we will outline the state and non-state actors engaged in this collective action problem, their roles, interests, networks and discourses.

Fourth, Chapter IV depicts the collaborative scenario process, making use of current state analysis, to assess the wide array of anthropogenic interactions which sow tensions and hamper security in the Aral Sea Basin. This section covers a range of areas, such as economic reliance upon freshwater resources, migratory flows, and other social and environmental externalities. As a subtheme of human development, possible intersectionality will be conducted through feminist IR theories in order to assess the existing gender gap in this transboundary basin`s power dynamics.

Fifth, Chapter V sets forth the 'control variables' of the working hypothesis by dint of the potential pathways for watershed cooperation and systemic drivers that modulate the likelihood of water conflict. These -biophysical and socio-economic- variables have been classified into 'drivers of conflict', 'conflict maintainers' and 'conflict escapers'. At the end of this section, the leverage of these in the Aral Sea Basin is graphically represented on an Influence Diagram, depicting their leverage as game changers in the Aral Sea Basin.

Finally, the conclusion section lays out the key findings of our study, followed by a brief discussion of its outcomes, and determines whether the hypothesis being tested has been proven valid or not. If positive, it would be useful to evince the scope to which this explanatory model would be appropriate for drawing conclusive results on how power dynamics behave in the Aral Sea Basin, and consider whether these theoretical aspects could be extrapolated to further scrutiny on other hotspot basins. Provided that the assumption has been tested as invalid, it would be adequate to delve into the grounds of its dismissal, and to conclude that this 'paradigm shift' does no longer obey a "one-size-fits-all" approach beyond previously supported case studies. A second part of this section includes an insight of the potential future scenarios for the ASB hydrodiplomatic interactions, and provides our final remarks, including the observed shortcomings, resource limitations, and further recommended research projects to be conducted.

CHAPTER I: THEORETICAL FRAMEWORK

I. Conceptualizing the water-security-conflict nexus

The de-ideologization of conflicts in the post-Cold War represented a turning point in the discourse on water -from being recognized solely as a human rights and development issue, to being increasingly perceived as a salient tenet of peace and security.

Different schools of International Water Relations have examined the linkages between geographical features, natural resource scarcity, and spatial relationships, with intra- and inter-state conflict (UNEP, 2015). The first wave of scholars in the early 1990s were swayed by the shift in International Security Studies from state-centred traditional approaches towards a broader notion of security mainstreaming "human" and "environmental" dimensions. Their rationale suggested that "the strategic essence of water -as an essential, nonsubstitutable and increasingly shared resource-, coupled with increasing pressures on such resources and the socio-economic tensions igniting over competition, make transboundary basins the perfect setting for local and international conflicts" (Jalilov, 2010; Bretháut et al., 2022). In other words, low freshwater availability naturally increases the risk of interstate disputes.

The second wave of scholarship contested the role of water as a sole casus bello of the so-called "water wars", but rather viewed it as a compounding variable that fuels existing social, economic and political tensions (McElroy, 2018: 34). For them, "cooperation over water is more rational than conflict since it is more cost-effective at ensuring long-term access to water supplies, yields a broad range of advantages and is resilient to turmoil in the basin (…) making transboundary water basins an ideal situation for win–win cooperation" (Bretháut et al., 2022).

The third wave of theorists turned the spotlight onto the interactive process involved in the construction, reproduction and legitimation of discourse hydro-politics, By taking *discourse* as a valuable object of study, these scholars examined how the interplay between dominant/institutionalized/sanctioned discourses and the deployment of metanarratives lead to policies and practices (Bretháut et al., 2022) in transboundary water governance. In addition, some authors (Farnum, 2018: 448) criticize the state-centric focus on the water-security nexus, opting for multitrack diplomacy approaches across multiple layers of policy action as a more rigorous study framework, since they underscore that "violence over water generally takes place on a sub-state level in non-armed scenarios" (Wolf, 2000).

In most of the environmental peacebuilding literature, the traditional focus on water-issue negotiation is based on a zero-sum understanding of conflict, in which there is a fixed amount of common pool resources that must somehow be allotted (Graf, 2006: 5As 8). As opposed to this, some authors stress that strict conflict-cooperation dichotomies can be misleading, especially the if conflict is framed in negative terms, while cooperation is judged as positive per se. In Link's words (2016: 505):

> Firstly, conflict can be an important catalyst of progressive social change such as democratization or more fair and sustainable use of water resources (Mouffe 2005), while cooperation can obscure severe water-related inequalities or forms of political domination (Cascão 2008). Secondly, forms of conflict and cooperation can exist in parallel. In such cases, cooperative actions can mask or even accelerate existing water conflicts and vice versa.

The nature of watercourse conflict does not obey historical laws nor remains identical in all latitudes, but certain variables appear recurringly where a water conflict is generated. Both to prevent and solve disputes, it is necessary to underscore which variables are present in the dynamics of the conflict, what are the ranges in which they are innocuous and at what moment they begin to spur drivers for conflict.

Among them, population growth, economic expansion, material construction of infrastructure (dams, canals, irrigation diversions, etc.), severe and prolonged drought, climate change and lack of effective institutional capacity have been addressed as major factors that drive such conflict and instability (Wolf et al., 2017:11; Iceland: 2020). Another such a driver implies a rapid change in the basin's political environment- for example, the disintegration of a nation, when the rivers that are known as "national" become "international".

For the OECD (2013), *water security* entails the maintenance at acceptable levels of four indicators associated with water: (1) risk of scarcity; (2) risk of inadequate quality for a given purpose; (3) risk of excesses; and (4) risk of deteriorating resilience of freshwater systems, exceeding the assimilation capacity of surface or groundwater sources and their interactions with the eventual exceeding of acceptable thresholds. Most international institutions (UN-Water, 2007) have defined *water stress* if a country having less than 1700 m^3 per person of renewable freshwater. Instead, if this figure falls below 1000 m^3 per capita, it is facing *water scarcity* (Biswas, 2019).

Nevertheless, "whether increasing water stress and dissatisfaction raise security concerns also depends on the associated value perceptions, vulnerabilities, and security conceptions of the respective agents" (Link, 2016: 504). Accordingly, water can have multiple symbolic dimensions, for instance, religious ideas such as purity (in the case of the Ganges), national development (in the case of the Mekong), or state-building (in the case of the Jordan) (Link, 2016: 505). Water discourses have progressively gained scholarly attention to fathom the power relations that underpin hydro-politics. Developed by the Copenhagen School (Buzan et al., 1998), securitization[3] implies a process by which *securitizing actors* label an *existential threat* to a *referent object* and target an *audience* that must acknowledge that issue as securitized before securitization is considered successful. In the making, linguistic mechanisms are the rhetorical tools used to portray urgency and justify *securitizing moves* (Octavio, 2017). In exploring discourse hydro-politics, securitizing practices are commonly deployed by states' elite to legitimize large-scale hydraulic infrastructure or to justify a threat to one's own existence or the loss of power (Bréthaut, 2022: 470: Prigge-Musial, 2019).

In this vein, Octavio (2017) agrees that the securitization of water has moved from the political realm to the public imaginary, spreading a narrative of 'water wars' that seeks to disseminate a sense of urgency through fear and anxiety. Nonetheless, the myth of 'water wars' has been dispelled (Barnaby, 2009), since in the last five decades, no formal declarations of war over water have been reported. Yet, Wolf et al. (2013:30) note that "there is ample evidence showing that the lack of clean freshwater has led to intense political instability and that acute violence has occasionally been the result".

[3] "*An articulated assemblage of practices whereby heuristic artifacts (metaphors, policy tools, image repertoires, analogies, stereotypes, emotions, etc.) are contextually mobilized by a securitizing actor, who works to prompt an audience to build a coherent network of implications (feelings, sensations, thoughts, and intuitions) about the critical vulnerability of a referent object (...) by investing with such an aura of unprecedented threatening complexion that a customized policy must be undertaken immediately to block its development*" (Balzacq, 2011, p.3)

In the first decade of the millennium, at least 220 conflict-prone transboundary waters were recorded (The Pacific Institute), but only 38 'acute' disputes involving violence[4].(Wolf, 2017: 5). On a global scale, water basins in South Asia, the Middle East, and East Africa have become major hotspots with a high rate of hostile events and weaker institutional structures to mitigate them. Among them, the Basins at Risk project (2013) has identified the Tigris-Euphrates, Ganges-Brahmaputra-Meghna, Indus, Mekong, Nile and Salween basins.

On the other hand, case studies of successful water management, through the establishment of joint management commissions, include cooperative efforts of European countries concerning the Rhine and the Danube, or treaty arrangements between the United States, Canada and Mexico (McCaffrey, 2021).

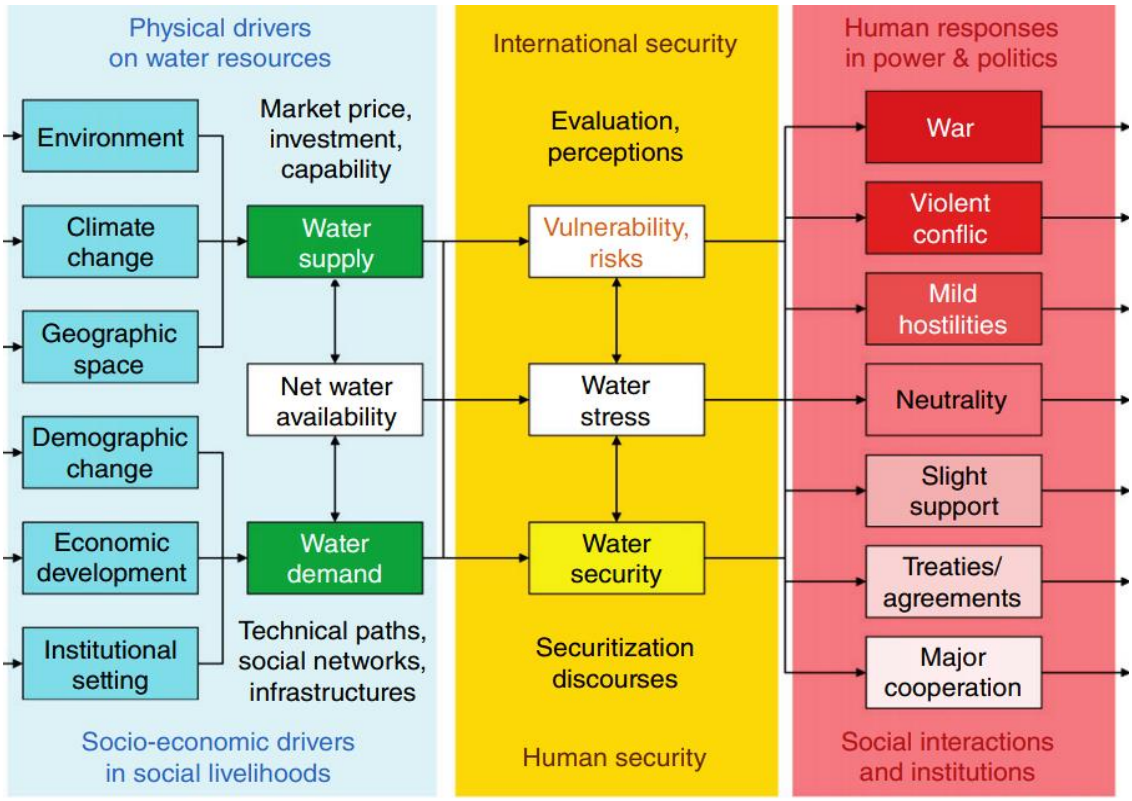


Figure 2: Integrative conceptual framework for the water-security-conflict nexus. Source: Link, 2016.

II. Liberal institutionalism as an integrated approach

The study of transboundary water dynamics draws upon diverse analytic traditions and impacts the broad range of International Relations scholarship. The present case study is embedded in a "tragedy of the commons", since, through the lack of regulation, people begin to take more than their share and the resource becomes over-exploited (Reader, 1988: 51).

[4] 31 of which were reported between Israel and or more of its neighbours (Wolf, 2017: 5).

Common pool resource allocation, such as freshwater, often leads to coordination disputes, inequality or instability of the collective outcome. In Mancur Olson's *The Logic of Collective Action*, the author encompasses these scenarios as "collective actions problems", defined by "situations where rational individual actors are trapped to produce collectively sub-optimal results in terms of aggregated welfare". For other authors (Taylor 1987: 19), collective action dilemmas spur "where rational individual action can lead to a strictly Pareto-inferior outcome, that is, an outcome which is strictly less preferred by every individual than at least one other outcome". Further to this, Olson was a member of the neo-institutional economics (NIE) tradition, which delved into institutions that underlie economic activity, embracing that institutions stem from individuals' bounded rationality (Obińska-Wajda, 2015:2) as an effective motion to deal with transaction costs.

Institutions can be defined as "rules, enforcement characteristics of rules, and norms of behaviour that structure repeated human interaction" (North, 1987:6), or "particular human-constructed arrangements, formally or informally organized" (Keohane, 1988:383). According to North (1991) and Lazzarini (2006), these can be classified into:

- *Formal* institutions: Sets of codified rules, that are determined and executed through formal position, such as authority or ownership. Examples of these include laws, regulations, legal agreements or contracts.
- *Informal* institutions: Sets of non-codified rules based on implicit understandings, being in most part socially derived and therefore not accessible through written documents or necessarily sanctioned through formal position. For instance: sanctions, taboos, customs, traditions, and codes of conduct.

Besides, *organizations* are the material expressions of institutions circumscribed by 'groups of individuals bound by a common purpose' (Harper, 2012, p. 15). In North's words (1990, p. 3), "organisations are shaped by institutions, and in turn shape institutional change".

One of the main challenges with transboundary water negotiations is that they often entail multiple issues that must be jointly resolved (Ert, 2016), which is coined as *issue linkage*. For Haas (1990:76), *issue linkage* is a bargaining tactic that (1) increases the likelihood of states reaching a negotiated agreement and (2) motivates governments to remain committed to an agreement. Within the international cooperation literature, the former aspect is part of a more general concept called *side-payments*, while the latter is tightly confined to schemes of *path dependence*.

Path dependence occurs since the relative benefits of the current activity compared with other available choices increase over time. In other words, the costs of switching to some previously plausible alternative -the so-called '*increasing returns'*- rise (Pierson, 2000: 252).

Clearly, averting disputes is often a strong political driver for initiating cooperation on transboundary waters since riparian States recognize that they must safeguard their greater common interests. Since institutions provide continuity and expectations of stability (Nye, 1993, p. 39), these encourage cooperation between states for mutual gains. This aspect of liberal theory has been elaborated by R. Keohane in his so-called *neoliberal institutionalism*.

The argument of institutional liberals (Keohane et al., 1993) is that a high level of institutionalization significantly reduces the destabilizing effects of multipolar anarchy identified by Mearsheimer. This anarchy is mitigated by institutional cooperation and ruled-based regimes, which bring higher levels of regularity and predictability to world politics (Burchill et al., p. 67). For these authors, institutions diminish states' fear of each other, provide

a flow of information and opportunities for negotiation between stakeholders, and enhance the ability of governments to monitor others' compliance and implementation (Oxford University, 2005). In the words of Keohane (1984, pp. 51-52), cooperation occurs "when actors adjust their behaviour to the actual or anticipated preferences of others, through a process of policy coordination".

The mainstream international regime theory (IRT) is defined as a "sets of implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations" (Krasner, 2005, p. 57). Regimes help to overcome the problem of anarchy and reduce the likelihood of free-riding, on the assumption that "*regimes* are, by definition, instances of international cooperation" (Drew, 2014: 34). Moreover, international regimes fulfil the essential functions of lowering the costs of legitimate transactions, while raising the costs of illicit ones (Orban, 2003: 98). Regimes comprise formal treaties and national laws, but they can also abide without the subsistence of formal organizations, through relying on informal norms and networks to develop and enforce standard behaviour in an area of global policy (Benedict, 2015).

Throughout the second half of the twentieth century, the adoption of International Regimes shaped the dynamics of states' foreign policy. A few examples include the *security* regime, to control the spread of nuclear weapons during the Cold War (NPT); the *economic* regime, which relied on the General Agreement on Tariffs and Trade (GATT) for the regulation of international trade; or the *environmental* regime, most remarkably, the Ozone regime (1985, Vienna Convention or 1987, Montreal Protocol).

According to Nye and Keohane (1984), international regimes take place under the realm of *complex interdependence*, a concept which illustrated the growing and deeper interdependence among states through the lens of the international political economy. Both authors (1984:27) argue that "interdependence affects world politics and the behaviour of states; but governmental actions also influence patterns of interdependence".

Complex interdependence relies on three main hallmarks that give rise to distinctive political processes and translate power resources into power as control of outcomes. First, multiple channels -interstate, transgovernmental, and transnational relations- connect societies, including informal ties between governmental elites as well as formal foreign office arrangements. Second, "the agenda of interstate relationships consists of multiple issues that are not arranged in a clear or consistent hierarchy", without distinction between 'high' and 'low' politics. Third, military force consequently declines within the region when complex interdependence prevails.

Water-sharing agreements are a regular means of de-escalating such conflicts, provided that they create value and build trust. After the end of WWII, more than 200 water-sharing agreements have been signed (Milne, 2021). As shown in *Annex 1*., several normative studies have developed their own Norm Evolution Theory in the field of International Relations (IR). If we concentrate on the first model, it is worth noting that different stakeholders, social processes and logics of action may be involved at different stages in a norm's "life cycle" (Finnemore, 1998: 895).

CHAPTER II: SETTING THE LEVEL PLAYING FIELD

I. Biophysical, socioeconomic and historical layers

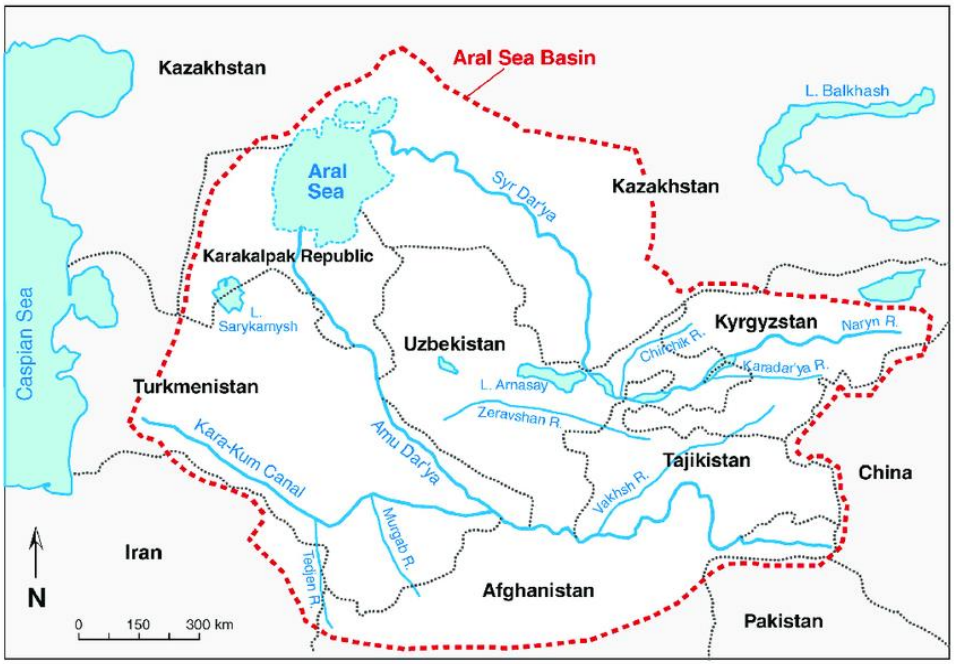


Figure 3: Geographic location of the Aral Sea Basin. Source: Micklin, 2007.

In the heart of Central Asia, the Aral Sea Basin covers a vast drainage area of approximately 1,874,000 km2, of which the Syr Darya ("*Jaxartes of antiquity*") and Amu Darya ("*famed Oxus of old*") rivers catchments constitute the largest pool. Both rivers flow out of the glaciers and snowfields of the Tien Shan and Pamir Mountain ranges of the Himalayas (Lioubimtseva, 2014, p. 407) and drain northwestwards into the Aral Sea. Whilst in practice it is referred as a *sea*, the Aral is an inland lake which is not linked to any sea or ocean.

The Aral Sea Basin extends across an area of 1,5 million km2 (Elhance, 2007, p. 208), comprising Kazakhstan (12.7 %), Kyrgyzstan (59.2 %), Tajikistan (99 %), Turkmenistan (94.6 %) and Uzbekistan (95 %), as well as parts of Northern Afghanistan, Pakistan, Western China and Northern Iran[5] (Fig. 3). Notwithstanding its 32 million people, population density in the Basin fluctuates from less than 10 inhabitants per square kilometre in the desert plains to more than 300 in the valleys and foothills of the Eastern and Southern highlands (Elhance, 2007, p. 208). If the current trend in population growth continues, the EastWest Institute (2014) estimates that, by 2040, it would reach 70 million.

The Amur Darya is the biggest river in Central Asia. T4% of its flow originates on tin territory of Tajikistan (EC IFAS, 2011). The river then flows along the border between Afghanistan and Uzbekistan, across Turkmenian territory and then again returns to Uzbekistan where it discharges into the Aral Sea.

[5] To enclose our study area, the latter countries will be disregarded in the current analysis due to their limited geo-economic engagement, since both four states control the residual portion of the watershed and contribute (together) no more than 9% of river discharge (Micklin, 2002). Neither none of them are part of the BVOs.

In terms of length, the Syr Darya, is the largest river in Central Asia. About 75.2% of the Syrdarya run-off originates in the Kyrgyz Republic, which then flows across Uzbekistan and Tajikistan and discharges into the Aral Sea in Kazakhstan.

The spatial distribution of their hydrogeology contributes to the preeminent stake of upstream states in basin-wide management issues. Nearly 90% of the territory of the Kyrgyz Republic and Tajikistan are surrounded by mountains, which implies a twofold setting: first, these two states enjoy a de facto "monopoly" on the formation of water within the basin and, second, it constitutes a shortage of arable lands.

By contrast, more than 50% of the territory of Kazakhstan, Turkmenistan and Uzbekistan are covered by midlatitude deserts. The landlocked position of Central Asia determines its sharply arid and semi-arid climate, with contrasting daily and seasonal temperatures, and where evapotranspiration is extremely high. This phenomenon causes the amount of rainfall to remain at very low levels and on an irregular basis throughout the year. Imbalances in the distribution of land have prompted a huge potential for the development of irrigation, which demands additional quotas of freshwater (CAWATER, n.d.).

According to Hiroichi (2010, p. 286) and White (2014, p. 306), variation in temperature and precipitation patterns across a variety of broad climate classifications and elevations "stresses the significance of upstream and downstream relationship and identifies the geographic position as position of power with spatial dimensions". To a large extent, this reflects the diametrically opposed patterns of water-energy usage among riparians, on a seasonal basis (*Annex 2*).

On the one hand, upstream states release water from reservoirs during winter to generate hydropower for heating, though this frequently causes floods in downstream areas (Link, 2010, p. 17). On the other hand, during warmer summer months, upstreamers reduce the flow rates of the rivers to replenish their reservoirs (Link, 2010, p. 17), whilst downstream countries have the most pressing need for irrigation water (Siegfried, 2009), since the production of wheat is vital for regional food security, and cotton is a major cash crop of significant economic clout.

Historically, large-scale cotton manufacture was first introduced in the region in the mid-19th Century, since the US Civil War (1861-5) significantly disrupted the American supply of cotton, forcing Tsarist Russia to develop irrigated cultivation and production of this raw material through the newly acquired Central Asian territories (White, 2016).

From 1917 onwards, Soviet rule, under the aegis of the Ministry of Reclamation and Water Management (*Minvodkhoz*), aimed at achieving self-sufficiency in cotton, through maximizing crop production in the basin by dint of massive water diversion projects. These diverted streams were intended to nourish Central Asia's ancient grasslands, which had historically sustained shepherds and nomads. In Lenin's (1921) words, "*what you need most is irrigation, for more than anything else it will revive the area and regenerate it, bury the past and make the transition to socialism more certain*". Socially, many mountain dwellers were relocated to lower-lying areas and large numbers of Slavic peoples came as immigrants from other regions of the USSR, exposed to forced collectivization (Karaev, 2005). By the late 1950s, the USSR had instituted a cotton monoculture regime. whereby the entire way of life became focused on its manufacturing, prompting the development of large-scale irrigation projects during the following decades. By 1980, Central Asia's production quotas surpassed 9 million tonnes, making it the world's fourth largest cotton producer.

Figure 4: Cotton featured in official Soviet seals of the Kyrgyz, Tajik, Turkmen, and Uzbek republics, respectively. Source: USSR Constitution (USSR Eighth Congress 1972)

The overhaul of desert and semi-desert rangelands into irrigated croplands inflicted by large-scale irrigation, overgrazing, wind erosion and groundwater depletion (Lioubimtseva, 2014, p. 411), prompted many subregions to become particularly vulnerable to varying social and environmental externalities. Among them, Belyaev (2005, pp. 17-21) has identified 4 main zones with very high intensity of watacrossss the Aral Sea Basin: 1) the Fergana valley, 2) the Tashkent oasis and the Golodnaya steppe; 3) the Zerovshan lower part and Amu-Bukhara canal, and finally, 4) the Khorezm oasis.

By far and large, the Aral Sea has become the most affected hotspot, since an increase in net evaporation compared to inflows resulting in fewer water volumes flowing into the Aral Sea caused its shrinkage (Micklin 2010), which induced the decline of its surface area by 50% by the end of the 1980s. Between 1960 and 2000, the Aral's area shrank by 41%, its volume dropped by 67% (Micklin, 2006) and, the level of salinity surged from around 10g/l to more than 100g/l in the remnant Southern Aral (Хатамов, 2014). Within environmental scholarly literature, this catastrophe became known as the *Aral Sea Syndrome* (Bosch et al., 2007).

With the shattering of the USSR, the new Central Asian republics underwent economic transitions from centrally-planned to market economies. Some authors (Sievers, 2013, p. 26) conclude that, due to the region's excessive reliance on former Soviet subsidies, "Central Asia was perhaps the least prepared (region) for liberation from the Soviet Union". The transition from 'centralism' in water management led to imbalances in the distribution of water resources, which sparked political and economic disputes among former Republics (Pawletta, 2015, pp. 195-215).

With growing demands for water resources in all sectors, driven by industrial and population growth, meeting the combined needs of all will be virtually unfeasible in the medium term. Projections based on current consumption trends (FCEA, 2010) indicate that there could be a 14 billion m3 shortage in these resources by 2025.

These polycentric governance structures, coupled with the standing 'securitization' of water and the lack of an inter-state and intra-regional negotiation culture, have spawned an atmosphere of distrust in which "there is little room for cooperation" (Link, 2016), as stated by Smith (1993), "nowhere in the world is the potential for conflict over the use of natural resources as strong as in Central Asia".

II. Legal framework and institutional arrangement

From a legal perspective, collective regulations of the use and protection of Inter-Republican freshwater resources are key for ensuring their respective citizens' water, economic and ecological rights. In fact, more than 300 informal agreements concerning the Aral Sea Basin were concluded between 1991 and 1994. Recent attempts at transboundary cooperation have been proved successful for halting the possible escalation of violence as well as for drawing up water allocation and management schemes which, under no circumstances, could be addressed unilaterally.

Understanding the multi-level governance of the Aral Sea Basin therefore requires assessing the concurrent international, regional and inter-state policy frameworks (Fig. 5, *Annex 3*). To attain this goal, this section explores the evolutive development of negotiating sets for normative and institution building in the Aral Sea Basin.

On a global basis, transboundary watercourses management requires the adoption of fundamental precepts enshrined in a slew of international legal instruments and in customary water laws, as set forth in the so-called "Helsinki Rules" (1966) and "Berlin Rules" (2004). Regarding the international water treaties, only Uzbekistan has adhered to the UN *Convention on the Law of the Non-Navigational Uses of International Watercourses* (1997), which lays down the most important general principles of International Water Law: (i) equitable and reasonable utilisation of waters, (ii) obligation of "no significant harm", (iii) principle of cooperation, (iv) consultation, notification and negotiation; and (v) peaceful settlement of disputes.

The *Convention on Environmental Impact Assessment in a Transboundary Context* (1991), and its *Protocol on Strategic Environmental Assessment*, to which Kazakhstan and Kyrgyzstan are parties, lay out a conflict resolution mechanism through consultations between the concerned Parties, provided that a proposed activity causes a significant adverse transboundary impact.

The UNECE *Convention on the Protection and Use of Transboundary Waters and International Lakes* and its *Protocol on Water and Health* (1992) has only been ratified by the downstream states. The Convention covers provisions on monitoring, research and development, consultations, warning and alarm systems, mutual assistance, and exchange of information, as well as access to information by the public (EC IFAS, 2011).

Other global conventions within International Water Law include the *Convention on the Transboundary Effects of Industrial Accident* (1992), of which Kazakhstan is its only member; the *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters* (1998), covering all Republics except for Uzbekistan; and other three legal instruments comprising both five riparian States: the *Convention on Biological Diversity* (1992), the *United Nations Framework Convention on Climate Change* (1992) and the *Convention to Combat Desertification* (1994);

Upon independence, the five-Party *Agreement on Cooperation in Joint Management, Use and Protection of Water Resources of Inter-State Sources* (1992) became the cornerstone for setting the principles for this regional cooperation system. The Agreement codified pre-existing water allocation practices under the Soviet period, despite the new national boundaries,

and laid down the provision for establishing an institutional mechanism for the joint management of water distribution.

This began to materialize in the Interstate Commission for Water Coordination (ICWC), which is entitled to determine and implement water policy in the region, such as the approval of water consumption quotas per Republic or the schedules for the operation of reservoirs. Under the status of an IO, its meetings are held quarterly, and key decisions must be unanimously undertaken, while each Participating State has the right of veto. The ICWC covers two basin valley organizations (BVOs): the BVO Syr Darya and the BVO Amu Darya. These basin organizations are only liable for the administration of infrastructure within their respective principal river channels, not for river basin management (World Bank, 2004).

On the downside, some legal scholars (Janusz-Pawletta, 2017) criticize that the impossibility of adopting additional protocols could become a regulatory void, making this Agreement "archaic" and outdated to new upcoming disputes. Secondly, though a working group was set up to monitor its compliance, the accomplishment of these provisions has been very "limited" (Elhance, 1997, p.215) until the date. Other discerning authors (Kirilenko, Dronin et al., 2008) claim that the ICWC has overstepped its jurisdiction by favouring downstream nations while giving nothing in return to upstream nations, essentially laying the groundwork for interstate disputes over water resources.

One year later, the same States-participants ratified the *Agreement on joint actions to address the problem of the Aral Sea and surroundings, environmental improvement and ensuring socio-economic development of Aral Sea region* (1993), under the compromise of drawing up a coordinated program on the scientific research and activities for mitigating the Basin's environmental damage, covering "most favoured nation" treatment conditions. But most importantly, it establishes the Interstate Council for the Aral Sea Basin (ICAS), comprising a permanent working body -the Executive Committee (EC ICAS)- and the Commission on Sustainable Development (ICSD), while the ICWC became under the aegis of the ICAS. Budgetary contributions and the financing of scientific and environmental program activities became governed by the International Fund for the Aral Sea (IFAS) in 1993.

On a later stage, bilateral and multilateral agreements have been concluded at an intergovernmental level. The *Agreement between Uzbekistan and Turkmenistan on Cooperation for Water Managemen*t (1996) stipulated the payment of the use of the territory of hydro-construction facilities, which would entail land reclamation measures, and rehabilitation of inter-state collectors. Both States agreed upon dividing in equal parts the water flow of the Amu Darya, improvements of irrigation systems and infrastructure, construction of water diversion and water discharge networks (UNDP, 2012, p.13).

The *Intergovernmental Agreement on the Use of Water and Energy Resources in Syr Darya River Basin* (1998), of which Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan are Parties, is the central axis of their regime of water allocation and energy transportation. Under this Agreement, a mechanism of re-distribution guarantees Kyrgyzstani supplies of hydroelectricity and sufficient water flows to the downstream cotton fields, through compensating these quantities by unspecified amounts of coal from Kazakhstan and gas from Uzbekistan (Elhance, 1997, p. 215). Despite the efforts, the overall balance of this Agreement has also received some negative feedback (UNDP, 2012, p.10):

> "Though this Agreement played a positive role in structuring water-energy exchange (…), implementation practice showed that mechanisms included in the Agreement do not satisfy countries where the Syr Darya flow is formed (Kyrgyzstan and Tajikistan) - in average flow years, countries of the middle and lower reaches of the Syr Darya (Uzbekistan and Kazakhstan) - in low flow years, and all countries - in high flow years"

The *Framework Convention for the Protection of the Environment for Sustainable Development in Central Asia* (2006) establishes reciprocal rights and responsibilities with the purpose of harmonizing environmental policies and actions. The Convention, ratified by Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan, institutes a Conference of the Parties and sets out the provision of fostering public participation, by introducing a system of accreditation of NGOs.

In terms of international legal practice, the Aral Sea Basin's policy framework also contains "soft law" instruments, that is, acts of recommendatory nature: *Nukus Declaration of Central Asian States and International Organizations on Sustainable Development of the Aral Sea Basin* (1995); *Ashgabat Declaration* (1999); *Tashkent Statement* (2001); *Dushanbe Declaration* (2002); and *Joint Statement of the Heads of State - Founders of IFAS* (2009).

Nonetheless, as Gubaidullina (2015) suggests, "neither the above-mentioned law precepts, nor the typical legal instruments of cooperation have been fully implemented[6]". The scope of the current legal framework of cooperation still faces several shortcomings, including unclear procedural obligations for exchange of information, overlapping jurisdictions between the ICWC and the IFAS, scarce regulation of groundwater regime, or the lack of non-compliance monitoring programs, among others.

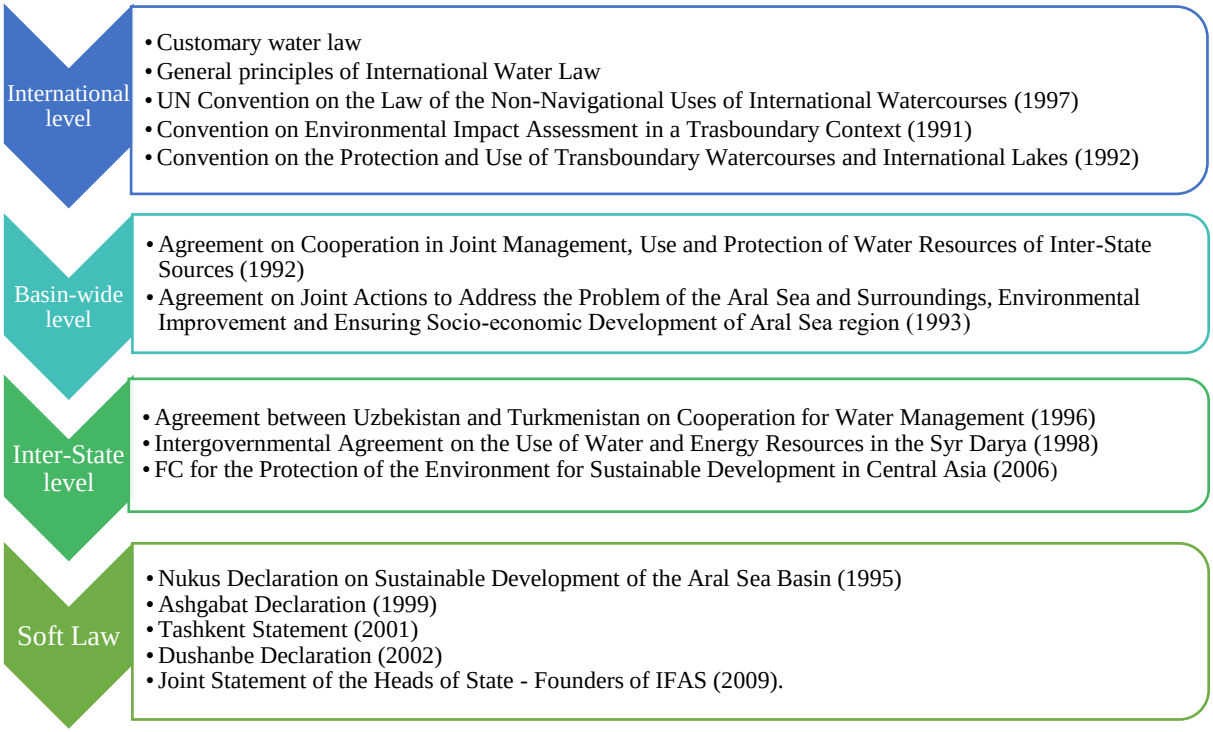


Figure 5: Overview of the Aral Sea Basin legal framework for transboundary water cooperation. Source: Own elaboration.

[6] For more information about states' ratifications, *vid.* Annex 4.

CHAPTER III: LAYING THE MULTI-STAKEHOLDER PARTICIPATION

I. Upstream states

The behavioural patterns of the Aral Sea Basin's state actors are constrained by power asymmetries that unfold the basin-wide unbalanced political dynamics. For the purpose of this analysis, the upper watershed States -Tajikistan and the Kyrgyz Republic- have been identified as the "hydro-hegemon" riparians.

The concept of "hydro-hegemony" can be defined as "hegemony at the river basin level, achieved through water resource control strategies such as resource capture, integration and containment" (Zeitoun and Warner, 2006, p. 435). For Cascão and Zeitoun (2010), the justification for this "hydro-hegemony" framework is underlain by three pillars, which could be applied in our case study as follows:

- *Riparian position*: Biophysical realities unleash the interplay between upstream and downstream States, taking advantage of geography (Warner, 2004) and hydrological cycles. On closer examination, the orography and the altitudinal zonality help determine why mountain ranges in Tajikistan (e.g., the Pamir and the Alay Mountains) and in Kyrgyzstan (e.g., the Tier Shan Mountain and the Zeravshan Range) capture most of the Basin's moisture, which maps out the formation of water and the origin of its flow. Overall, the two nations in the upper reaches of the river basins own a 90% share of the region's water resources (Akhmedov, 2019). Following this, annual precipitation rates in upstream countries are about 100-400mm (Gessner et al, 2013), leading to average annual flow generation (World Bank, 2022) extend the annual amount of withdrawal. Since the deficit in the downstream plains is thus covered by outflows from the well-watered upstream mountains (Micklin, 2013, p. 508), both Tajikistan and Kyrgyzstan can exert their prominent position to carry out "hydro-hegemonic" tactics, such as diversion, overuse, contamination and flow delay (Frey & Naff, 1985, p. 78).

- *Relative power*: Refers to the "sufficient structural power to coerce asymmetric cooperation" (Weinthal, 2002), though some critical hydro-politics scholars have defined it as the capacity of the hydro-hegemon to "persuade subordinate actors to accept not just the hegemon's authority, but to adopt and internalize its value sand norms intended to impose one solution over others" (Zeitoun & Warner, 2006, p. 438). Stephen Lukes (1974) proposed a three-dimensional subclassification between *bargaining*, *material* and *ideational* power. The first, alludes to the agenda setting and the 'rules of the game' for inter-state negotiation; the second, to the strategic use of hydraulic infrastructure; and the third, to the Governments' securitizing moves and sanctioned discourses. Under this prism, the upstream republics have resorted to unilateralist resource capture strategies, affecting the flow or quality of a resource (Waterbury, 1997, p. 279), and thereby creating new hydro-strategic and hydro-political realities across the Basin, in which upstream states prioritise energy production over downstream irrigation needs (Xenarios, 2019).

- *Exploitation potential*: Regards the States' technological capabilities for exploiting freshwater resources which could alter basin-wide dynamics (Medzini, 2001, p. 138). The construction of large-scale hydraulic works has been decisive in this local context.

> From the outset of their independence, both countries developed a predominantly engineering and "self-sufficiency" approach to water resource management (Valentini et al., 2004), due to the scarcity of fossil fuel resources within their boundaries, resulting in several hydropower development projects. For instance, the Kambar-Ata-1 (anticipated by the Kyrgyz Republic) and the Rogun (intended by Tajikistan) Dams demonstrate upstreamers' technical potential for gaining greater political leverage to influence their downstream neighbours, while acting on behalf of their own national interests.

With 947 rivers across the country, Tajikistan alone represents the 58.2% of all hydro-resources of central Asia, though only 55% of the country's population has access to clean water[7] (World Bank, 2020), and only 31% when it comes to rural households. Coined as its "blue jewel", water resources supply over 95% of the national electricity consumption owing to eight hydroelectric stations across the country, which illustrates the Tajikistani hydropower potential. The collapse of the Usoi Dam poses one hydrologic threat to its government, necessitating the implementation of adaptation measures to ensure the Sarez Lake's water supply. The 91% of the overall water consumption is destined to agriculture, (FAO, 2018), which employs about 43% of the workforce, Economically, Tajikistan remains one of poorest countries in Central Asia (whose annual GDP amounts for $27.80), heavily relying on revenues from exports of aluminium, gold, and cotton. In the recent decades, Tajikistan has lied at a strategic crossroad since China has fostered major investments on infrastructures, framed within the Belt and Road Initiative.

On the other hand, in Kyrgyzstan, over 80% of the electricity supply is provided by hydroelectric power stations. As most of its inhabitants work on the primary sector, more than 60% of the population resides in rural areas. However, these populations have little access to piped water, relying upon contaminated water collected from irrigation canals and saltwater wells (World Bank, (World Bank, 2012, p. 21). For this purpose, Kyrgyzstan strongly advocates for shift in paradigm of IFAS, by laying down compensation mechanism for water storage and by revisiting of water allocation limits. Besides, Kyrgyzstan's fragile energy network makes it rest mostly on oil and gas imports for more than half of its energy needs (IEA, 2020). Being the least developed country in Central Asia (whose annual GDP amounts for $22.74, and with a poverty rate of 22.4%.), weak institutions, corruption and organized crime dominate its political agenda, which is exacerbated by the ethnic, linguistic and economic differences between the Northern and Southern valleys (Coface, 2022). Strategically, Tajikistan acts out as a 'transit corridor' between China, Russia and Europe, is member of China's Belt and Road Initiative (BRI) and has become the lone Central Asian participating State in the World Trade Organization.

Despite their apparent complicity, there lays a clash of interests leading upstream states to low-intensity conflicts. Discussions regarding the reparation works for Golovnoi water intake facility are a vivid illustration of the trigger-hair sensibilities around the Tajikistan-Kyrgyzstan border (Imanaliyeva, 2021). On 28th April 2021, the Tajiks installed surveillance cameras near the Isfara River, motivating anger amongst Kyrgyz dwellers that eventually involved military presence, causing 36 Kyrgyz and 20 Tajik casualties, and the fleeing of more than 10,000 inhabitants (BBC, 2021). As claimed by Kumenov (2021), these recent events "are a troubling

[7] The World Health Organization's (WHO) *Guideline for Drinking-water Quality* (GDWQ) includes numerous physical, chemical, microbiological, and radionuclide standards that define *potable water*.

indicator of how local disputes over water among economically straitened rural border communities have the potential to spiral into something resembling all-out conflict".

II. Downstream states

In this contested hydro-hegemonic setting, the most demanding freshwater consumers coincide with the downstream States -that is, Uzbekistan, Kazakhstan and Turkmenistan. Overall, 90% of their internal water demands are met by imported water from their upstream neighbouring States, partly owing to the fact that the economic productivity model of these countries relies most notably on the primary sector.

Uzbekistan is among the world's top producers and suppliers of certain natural resources, as its subsoil reserves comprise abundant raw materials, such as gas, oil, uranium, gold or copper. Nevertheless, Uzbekistan currently uses three-fifths of the basin-wide water supplies. Out of this overall consumption, an average of 90-91% of water is destined for agricultural irrigation (Alimdjanov, 2020), since more than 90% of crop production takes places in irrigated lands (FAO, 2005). The Uzbek agriculture is heavily reliant upon cotton (36% of its land in 2020, FAO) and wheat (44.8% in 2020, FAO), which are very water-intensive crops, whilst the country still lingers on inefficient and outdated canal networks constructed in the Soviet period (Egamov, 2019). A recent study on potential vulnerability to water stress has reported that 8 out of the 10 most vulnerable flashpoints in Central Asia are set just in Uzbekistan, especially the region of Karakalpakstan and the Ferghama Valley. Among its bargaining interests, Tashkent seeks to instigate afforestation of degraded croplands and to foster global investments on water-saving technologies through the establishment the International Innovation Center of the Aral Sea, under the auspices of the UN Multi-Partner Trust Fund for Human Security for the Aral Sea Region (Kyung-sik, 2021).

Secondly, Kazakhstan under-diversified economy is underpinned by its mining potential, thus providing abundant gas, oil, steel, iron and copper, while being the world's leading country in the production of uranium (35% of global production, FAO, 2020). Besides this, Kazakhstan has considerable agricultural potential since its extensive steppe plains are suitable for both cattle and grain cultivation. Water stress is particularly focalized in the western and south-western areas (Botta, 2018). In 2021, the level of the Syr Darya dropped by almost one-third, thereby threatening to plunge Kazakhstan's South into drought and wreaking havoc on the region's harvests (Kumenov, 2021). To alleviate the negative effects, Tajikistan agreed to divert 315 million cubic meters from its Bahri Tojik reservoir to Kazakhstan, under the Kazakhstan's compromise of granting material and technical support to its Southern neighbour. In 2018, the Kazakh president proposed the establishment of an international water and energy consortium in Central Asia, with the aim of ensuring balance between irrigation/hydropower in the use of transboundary water resources (Trend, 2018).

As the world's tenth-largest cotton producer, Turkmenistan employs the 40% of their workforce for the primary sector (IEA, 2020), making irrigate on indispensable for virtually all agricultural land due to its arid climate. In exchange of freshwater resources, Turkmenistan exports natural gas as the fourth-largest worldwide reserves fall within its territory. Concerning its hydrodiplomatic strategy, the Ministry of Foreign Affairs of Turkmenistan (2019) consistently stands for the adoption of a Special UN Program for the Aral Sea Basin.

These diametrically opposed demand patterns for energy and water resources have given rise to a tense standoff amid upstream and downstream states, as the latters' incompatibilities have been focalized into three areas of constraint which have securitized the inter-state political dynamics over the last two decades: (1) hydraulic facilities, (2) norm implementation and (3) environmental impacts.

First, the ongoing construction of new dams in Tajikistan and in the Kyrgyz Republic poses a 'threat' to downstream states, since upstreamers could decouple themselves from energy deliveries from Khazakhstan, Uzbekistan and Turkmenistan during winter months (Siegfried, 2009). This would entail that upstream states could lose their structural incentives to abide by summer operation rules, causing significant agricultural and economic consequences in downstream countries.

Second, the lack of trust among them has prompted several breaches of international and regional treaties, which vividly illustrate the fragile institutionalization of its joint management in this realm. For instance, Kyrgyzstan began to restrict Southwards summer releases in 2003, as Uzbekistan had previously refrained from providing agreed deliveries of fuel and energy resources. In 2004, both Uzbekistan and Kazakhstan withdrew from the 1998 Agreement and began constructing reservoirs for securing water for summer irrigation (Bechanov, 2019, p. 58). Legal voids are also decisive in this equation. Bearing in mind that the swap agreements do not stipulate the volume of water to be released in exchange for a given tonnage of energy resources nor do they specify how water stored during wet years should be released in dry years, when the upstream Governments fail to meet the targets, they often infringe the volume of water to be received downstream (Lynch, 2007).

Third, upstream countries' water management malpractices annually lead to environmental side effects in downstream effluents, including heavy floods and damages of settlements, infrastructure and irrigated land during winter (Schrader, 2019). In addition, rising river salinization affects mostly the downstream areas, which need to assign large budgets on socio-economic and environmental rehabilitation programmes.

To forestall upstream hydraulic leverage, downstream states have resorted to coercive measures aiming at gaining stronger political clout able to deter their neighbours' unilateral actions. From this perspective, downstreamers has been actively stalling the provision of hydropower construction materials, or have imposed inflated purchase prices and strict payment deadlines, as well as gas supply cuts, inflicting serious energy shortages (Menga, 2017). As a result, regional power dynamics are embedded in national 'security dilemmas' which could be summarized as follows: "upstreamers use water to get more power, downstreamers use power as leverage to get more water" (Warner, 1992).

Figure 6: Two-level theory framed in the Aral Sea Basin dynamics. Source: Own elaboration.

	ACTORS	NATIONAL CONSTRAINTS	REGIONAL POWER DYNAMICS
Upstream	Tajikistan	- Aims at hydraulic development to tap its still unexploited potential. - Seasonal surplus sale of hydroelectricity to become energy-secure. - President Rahmon insists on realising Stage III of the Rogun Dam of such symbolic significance when it comes to raising popular support.	- Proactive at both regional and international organizations, as TAJ has launched several initiatives and exercising leadership in the promotion of basin-wide water cooperation. - Dual-structured legitimation discourse on the Rogun Dam construction: developmental and green paradigms.
	Kyrgyzstan	- Least developed country in CA. - Its fragile energy network makes it rest mostly on oil and gas imports for more than half of its energy needs.	- Vehemently argues for a change in the IFAS paradigm by establishing a compensation system for water storage and by re-examining the water allocation quotas. - Withdrew from the 1992 water agreement. - Began to restrict Southwards summer releases in 2003.
Downstream	Uzbekistan	- Most powerful country in terms of total population and economic and military power. - Currently uses three-fifths of the basin-wide water supplies. - 90-91% of water consumption is destined for agricultural irrigation - 8/10 most vulnerable flashpoints in CA are set just in Uzbekistan.	- Seeks to instigate afforestation of degraded croplands and to foster global investments on water-saving technologies by establishing the International Innovation Center of the Aral Sea. - Refrains from providing agreed deliveries of fuel and energy resources to Kyrgyzstan.
	Kazakhstan	- Considerable agricultural potential. - Rich in fossil raw materials: gas, oil, steel, uranium and copper. - Focalised water stress in the Western and South-Western regions. - Early projects to increase power producing capacity have been abandoned since feasibility studies found that these measures would be more costly than importing electricity from Kyrgyzstan.	- Often acts as mediator in basin disputes. - In 2018, the Kazakh president proposed the establishment of an international water and energy consortium in CA.
	Turkmenistan	- Tenth-largest cotton producer - Owns the fourth largest worldwide natural gas reserves	- Adopts an isolationist policy in regional water issues. - Adoption of a Special UN Program for the Aral Sea Basin

III. Third-party involvement

1. Diplomatic third-party involvement

The multitrack diplomacy for the joint management of the Aral Sea Basin constitutes a large network of state and non-state actors, deeply intertwined among them. Despite the various basin-wide institutions (particularly IFAS, ICAS, ICWC, SDC and BVOs), other diplomatic and political stakeholders have attempted to liaise with state authorities in order to diffuse tensions, thus bringing 'added value' to this horizontal cooperation framework.

Since 1994, the World Bank (WB) has shown active engagement in the region, throughout several assistance programs providing development aid and technical cooperation. Namely, the Aral Sea Basin Program (ASBP) sought to restore the affected environment of the Aral Sea Region, improve the management of water and land resources, and create management structures at all levels for planning and implementation of the Program (IFAS, 2022). More recently, the Climate Adaptation and Mitigation Program for Aral Sea Basin (CAMP4ASB), pursues to enhance regionally coordinated access to improved climate change knowledge services for key stakeholders, as well as to increase investments and capacity building (World Bank, 2022). Furthermore, the WB has financed the construction of dikes across the Basin, and is a key donor at the Central Asia-South Asia 1000 KV project (CASA-1000), which aims at exporting the remaining electricity during summer months from Tajikistan and Kyrgyzstan to Pakistan and Afghanistan, by means of massive transmission lines. The WB also supports analytical work (for example, the 2008-2024 *Feasibility and Environmental and Social Impact Assessment Study*) and fosters environmental education on improved irrigation and drainage management practices (such as project competitions: the *Global Disruptive Tech Challenge 2021: Restoring Landscapes in the Aral Sea Region*).

Over the last few years, the United Nations and its specialized agencies have played a pivotal role in supporting field operations. Most recently, the UNGA adopted the *RES/75/266 on Cooperation between the United Nations and regional and other organizations* in 2021. The United Nations Development Program (UNDP) has disbursed $68.54M (CAWATER, 2019) on training and project implementation for endorsing climate resilient livelihoods in agricultural communities, improving the efficiency of water management or modernizing public facilities, among others. Since 2019, high-level political dialogue has taken place at the UN Multi-Partner Human Security Fund for the Aral Sea Region (MPHSTF), which sets out the guidelines for the Single Programmatic Strategy of assistance to the Aral Sea region based on the identified needs of the population. The UN Regional Centre for Preventive Diplomacy for Central Asia (UNRCCA) holds interstate roundtables aiming at building their conflict prevention capacities (UNRCCA, 2019) through confidence-and-security-building measures (CSBMs). The most significative events are annually outlined at the "Central Asian Water Yearbook", detailing the latest developments. Finally, recommendations for future regional initiatives are provided by the Scientific Advisory Board on Aral Sea Basin Problems (SABAS), which was established by UNESCO in 1998.

The Organization for Security and Co-operation in Europe (OSCE), following its holistic approach to economic and environmental security, serves as a formal platform for regional dialogue and arranges water-related workshops and seminars on a regular basis, which is helpful for discussing States' views on how to address Integrated Water Resource Management (IWRM). The OSCE has financed a network of Aarhus Centres for raising

awareness on the three pillars of the *Aarhus Convention* (1998): (1) Access to Information, (2) Public Participation in Decision-making and (3) Access to Justice in environmental matters.

Both the Asian Development Bank (ADB) and the Asian Infrastructure Investment Bank (AIIB) have provided technical and financial assistance on different areas. The former has invested US $4.4 billion to the date (CAWATER, 2019, p. 182), with deep focus on irrigation rehabilitation projects. Starting in 2016, the latter has co-financed water supply projects in the Ferghana Valley and in other lagging hotspots of the region.

The European Union pays close attention to the latest developments in the Aral Sea Basin and assisted the republics of the former USSR through the Technical Assistance to the Commonwealth of Independent States (EU TACIS) Program until 2006. In the aftermath of the new EU Strategy on Central Asia in 2019, the EU has deployed Water Management and Agricultural Production (EU WARMAP) technical assistance programs for utilization, allocation, and management of the water resources (Boisson de Chazournes, 1997) in the Aral Sea. Regarding bilateral relations, EU-CA High Level Conferences on Environment and Water Cooperation have been regularly held since 2013 (CAWATER, 2019, p. 185).

Other many international partners, bilateral donor institutions and water organizations have also provided considerable support in promoting a policy of regional cooperation, including, *inter alia*, the U.S. Agency for International Development (USAID), the Network of Global Water Partnership (GWP), the Asia Water Council (AWC) or the International Network of Basin Organizations (INBO).

2. Economic third-party involvement

Economic agents are key stakeholders at national and regional roundtable meetings, as guarantors of innovation and prosperity. Ensuring long-lasting dynamic markets must be tightly tied to enhancing their resilience to adjust their financial interests to sustainable development, by being aware of the environmental burden affecting the Aral Sea Basin.

By and large, agrarian labour force accounts for the largest share of employers within the five Central Asian states' productive model, since almost 22 million workers rely on irrigated agriculture for their livelihoods in the Aral Sea Basin (World Bank, 2019).

Farmers who lacked access to modern farming practices, water-saving technologies, pesticides, herbicides, or minimum-quality freshwater have become the most vulnerable communities, as they feel undefended against other large-scale competitors in the agricultural market due to their weak competitiveness (Peachey, 2004). The lack of modernization has been a significantly shifted the market dynamics, as observed by Thompson (2008):

> Governments pressure local farmers to produce a certain level of crops by buying them below the market price. This results in increasing further the reliance of farmers on a large labor force, and prevents them from mechanizing and investing in tractors. The vicious circle in place stimulates a larger family size as it rewards extra hands to work on the field.

Besides water shortages, farmers face other external risks which could jeopardize the production of their agricultural plants: seasonal changes on weather conditions, such as, protracted draughts, or population growth. The ongoing water insecurity has driven up the level

of unemployment and pushed many into subsistence farming (EJF, 2012), as a result of the decline of freshwater availability.

Moreover, patterns of human-induced water contamination have affected the basin-wide economy, most notably, the use of chemical fertilisers and pesticides by upstream farmers to the rivers, without considering the economic effects for their downstream neighbours who rely on the unused water (Gabrish, 1999). To forestall its impact, downstream Governments have been forced to provide subsidies to farmers to help them transition into producing more crops which are not water-intensive.

The Amu Darya and the Syr-Darya BVOs are currently governed by irrigation industry lobbyists (World Bank, 2022). Ongoing incompatibilities between drinking water suppliers and irrigation planners and managers (Demydenko, 2001) pose a serious threat since irrigation managers take crop demands as a benchmark for their water allocation decisions, thus ignoring the needs of domestic water users. To mitigate the harmful effects on human health, broader policies and regulations must be undertaken for supplying irrigation managers with adequate incentives in using water more efficiently (Chitale, 1997).

The demands of the fisheries sector vary according to their geographical setting. The North Aral Sea (NAS) has fuelled a revival of the fishing industry due to the improved water flows since the construction of the Kokaral dam. For these fishermen, the protection of fish and other aquatic biological resources is a matter of utmost importance. In fact, elevating its dike walls by another four metres would help retain an additional 15 billion cubic metres of water in the North Aral Sea, extending its area by another 400sq km (Dene-Hern, 2018). These developments would leave a window of opportunity for innovation, economic growth and the creation of new employments in the fishery industry.

By contrast, as the South Aral Sea is undergoing a rapid drying process, the relocation of former anglers into other sectors appears to be an absolute priority. Yet, as Dene-Hern (2018) holds, natural gas companies could take advantage of the dried-out seabed's exploitation potential by tapping into the resources beneath the desiccated ground.

Tourism associations do also have their say at the national and regional roundtable meetings. Under the auspices of UNDP and UNESCO, revitalisation programs have underscored the ecotourism potential across the Basin States. Despite the low reliance of these countries on tourism, the region is experiencing a growing number of annual visitors -both domestic and foreign-, especially when it comes to ecological and medical tourism destinations like the Kamystybas Lake. Visitors are astonished by this human-induced environmental destruction, and the former fishing fleet currently stranded in the dunes -the so-called 'ship cemeteries'-, has become another attraction point (*Annex 5*). According to Mike Robinson (2022), professor of cultural heritage at Nottingham Trent University, "developing small-scale tourism based upon the sustainable use of the natural and cultural heritage of a region and engaging with local communities is a valuable approach in helping to re-build an eomies and societies".

3. Social third-party involvement

Outreaching civil society organizations (CSOs) and non-governmental organizations (NGOs) and bringing them into regional consultation roundtables can strengthen basin-wide

governance and ensure an effective policy implementation at the local level, through formalizing constructive partnerships.

Upon independence, the non-governmental sector was a new phenomenon in the former Central Asian Soviet Republics since their historical background had been relatively short in the region. This fact triggered two consequences: "first, people lacked a clear understanding of the necessity of the sector, and second, NGOs themselves were too inexperienced" (Gerasimova, 2015).

In 2015, the University of Cambridge (Gerasimova, 2015) estimated the number of basin-wide NGOs by classifying them into thematic areas: Children/youth (302), women (236), on sectional/scientific issues (212), and environmental sector (120). Among them, the following (NGO Explorer, 2022) are worthy of special mention: Aga Khan Foundation, which focuses on health and rural development projects; the Mercy Corps, humanitarian and rehabilitation-oriented; Fauna & Flora, working on conserving threatened species; International Alert, a leading peacebuilding and conflict prevention originations; the Institute for War and Peace Reporting (IWPR), which develops training and mentoring programs for journalists and HR activists.

The Regional Environmental Centre for Central Asia (CAREC) has worked on delineating IWRM Plans for the Isfara (Kyrgyzstan and Tajikistan) and Aspara (Kazakhstan and Kyrgyzstan) river basins. The CAREC has also undergone pilot projects in clean drinking water supply in rural villages of Kazakhstan, and in monitoring information exchange on water quality between Kazakhstan and Kyrgyzstan. Its Shared Environmental Information System (SEIS) keeps track of the five States' environmental indicators in an attempt to support policy implementation and supervise multilateral environmental agreements.

Nature conservation societies are also of essential importance to help preserve the endemic biodiversity across the basin-wide ecosystems. For instance, the Society of Nature Protection of Turkmenistan has set in motion key regional conservation initiatives, including the Central Asian Desert Initiative, the Central Asia World Heritage Thematic Study and IUCN's nascent 'Save Our Species' initiative (IUCN, 2018).

Academic institutions and scientific communities are also of common interest in nurturing scholarly literature and for granting technical expertise on the root causes of water insecurity contexts. Basin-wide high education institutions and professional development centers have intensified their curricula on agro- and hydraulic-scientific programs, namely, the Kazakh National Agrarian University, the Kyrgyz State University of Construction, Transport and Architecture, the Turkmen Agricultural Institute and Tashkent Institute of Irrigation and Agricultural Mechanization Engineers. Since 2019, the Aral Sea Summer School gathers experts from Central Asian states to train future decision-makers on disaster risk reduction, including field trips. On the other hand, the International Innovation Center of the Aral Sea Basin serves as a hub of regional scientific and technical cooperation (IICAS, 2019), by developing research on sthe ustainable use of water resources in agro-ecosystems.

Social third-party stakeholders may also exert political influence and canalize social and environmental demands. By way of illustration, the Ecological Movement of Uzbekistan, founded in 2008, reconverted itself into a political party in 2019 and won 15 parliamentary seats (out of 150) during the 2020 Legislative Chamber elections. One of the top priorities of this new 'green' party has been to revive the Aral Sea.

CHAPTER IV; HUMAN RESPONSES AND ANTHROPOGENIC INTERACTIONS BETWEEN CONFLICT AND COOPERATION IN THE ARAL SEA BASIN

I. Economic and material costs

1. Agricultural Productivity

Recalling that 20 to 40% of the productivity output of these countries stems from agriculture, the Aral Sea Basin's economics remains closely bound to regional natural resources (White, 2014), what makes these delta sector activities particularly sensitive to many social and environmental externalities.

Cotton yields still represent the dominant share within agricultural commodity markets, with lingering inefficient water allocation practices, depicting 39% of the basin water consumption in regional agriculture. When it comes to the economic policy of cotton activities, Turkmenistan and Tajikistan have delineated annual production plans through centralized control of inputs, production quotas, exports and monopsonistic procurement prices, whereas Kyrgyzstan and Kazakhstan paved the way for more open market reforms by removing governmental control and liberalizing this sector (White, 2014; Sadler, 2006). In nominal terms, growing demands on cotton have trended up the basin-wide harvest area, stockpiles and exports of this raw material (White, 2014, pp. 18-20). However, compared to the overall basin-wide productivi and economic reliance, these figures show a downward trend in relative terms.

During the early years of independence (1990-1994), diminishing cotton production and cotton seeded areas were accompanied by rises in grain and rice fields (*Annex 6*), which increased the regionwide relative water scarcity (Fig. 7). Enhancing food security through grain "self-sufficiency" became a national priority for basin states, which swelled their cultivating area from 12% to 77% between 1990 and 1998 (Spoor, 1998; Aldaya, 2010). Regarding the area sown to cotton, except for Turkmenistan, both Uzbekistan, Kyrgyzstan and particularly Tajikistan have reduced their total irrigated lands due to depleted facilities for lack of maintenance (Aldaya, 2010). On another note, relative declining exports are attributed to an increase in domestic raw cotton processing activities, thus triggering additional domestic employment and income opportunities in textile industries (White, 2006, p.).

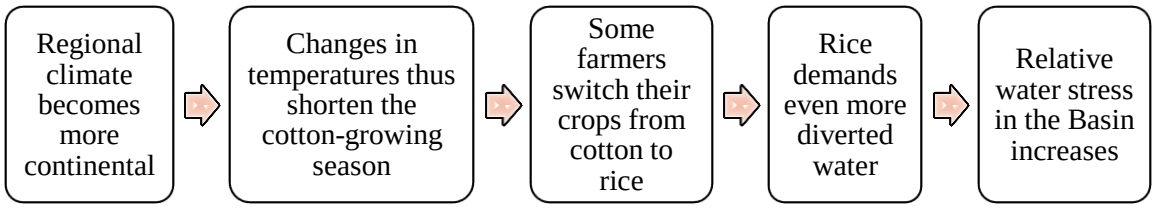


Figure 7: Changes in the agricultural productivity model may spur systemic changes in the Basin's water stress. Source: Own elaboration, adapted from Nandanal and Niper (2007)

These most notable human-induced effects damage the quantity (overirrigation) and quality (high salinity) of the water volume used for agriculture. First, ageing irrigation canal infrastructure and outdated irrigation methods have been identified (Berkchanov et al., 2016, p. 30) as the main constraints that hamper efficient water usage, since virtually 90% of the basin-

wide water withdrawals are employed on these purposes and considering the area's meager rainfall and high evaporation rates.

For this purpose, researchers of the ZEF/UNESCO Uzbekistan Project have developed a hydro-economic model to assess, from a basin-wide approach, the economically optimal allocation of technological investments in water application and conveyance efficiency (Berkchanov, Ringler et al., 2016, p. 30). The estimations from this study project that:

> "[the] implementation of an optimal set of investments could increase basinwide benefits by 20% (from US$ 3.2 to 3.8 billion) under normal water availability and by 40% (from US$ 2.5 to 3.5 billion) under dry conditions (80% of normal supply)" (Berkchanov, Ringler et al., 2016, p. 30)

Consequently, overirrigation has induced salt buildup in many fertile areas (Nandalal et al., 2007, p. 289). Rising river salinity, ranging from 0.7 to 15 g l^{-1} [8], has pruned profound adverse impacts by damaging soil fertility and by reducing crop yields, particularly among downstream users of water: 37% of irrigated land in Turkmenistan, 15% in Tajikistan, and 20% in Uzbekistan (World Bank, 2015). It is worth noting that these are the average calculi per State, but fluctuations of salt are highly concentrated around some regions, such as in Tuyamuyun or Khorezm (of which 90% of the territory is saline). To compensate for the loss of vital minerals and salts that are needed for the productivity of the croplands, local farmers have begun to utilize a wide array of fertilizers, herbicides, pesticides, and defoliants (Columbia, n. d.).

Cooperation projects for cleaning the soil opposite of the salts face different obstacles, since it harms humus layers and financial funds should be allocated from other activities (petrol, tractors, etc.). In this regard, Shirokova (2006) has concluded that "in downstream of Amudarya River farmers traditionally do it properly, because ground water is very close from the surface and they couldn't get cotton plant germination without soil leaching". According to the EC-IFAS (2018), the Rehabilitation of these disaster zones is a major economic burden for these States, which spend around US $650 million per year on environmental stabilization. Further to this, UNDP's *Program to Improve National and Regional Locust Management in the Caucasus and Central Asia* has begun cultivating salt- and drought-tolerant crops in Turkmenistan and Uzbekistan (CAWATER, 2019, p. 162).

The European Union has also undertaken decisive aid programmes in this realm alongside the Aral Sea Basin states, most notably, the Water Resource Management and Agricultural Production in the Central Asian Republics (WARMAP) or the Water Use and Farm Management Monitoring System (WUFMAS).

2. Fishery Industry

The fishery industry has also been largely affected by large-scale irrigation and flows diverting projects, leaving about 40,000-60,000 anglers without any means of livelihood (Ataniyazova, 2003), without considering other potential water-related salient sectors across the Basin, for instance, ships maintenance plants, health resorts and fish cannery workers. These figures are purely illustrative given the fact that the production, processing, and transportation

[8] The threshold of water with salinity over 1 g l^{-1} is considered unsuitable for usual crops.

of fish and fish products occupied more than 80% of seacoast inhabitants (The Permanent Mission of the Republic of Uzbekistan to the UN, 2017).

At length, the demise of commercial fishing has been accompanied by four invasive changes in the hydroecosystem (White: 2014, pp. 322-323): desiccation, shrinking surface area, water balance changes, and increasing salinity. In addition, the application of defoliants in field crops has induced elevate concentrations in soils, from which agrochemicals discharge into rivers.

Prior to the collapse of the Soviet Block, by the late 1980s, fishery activities commenced being transferred into internal water bodies, such as reservoirs (Mejdurechye) or lakes (Ayazkala, Sarikamish, or Akchakul). Yet, fishery yields depend today fully on the quantity of water inflow of these deltaic water bodies (Karimov, 2005, p. 99), whose operability is interwoven in the basin-wide political dynamics, as Karimov (2005, p. 91) has noted:

> "Freshwater lakes situated in the delta region have been endangered by the diminished inflow of freshwater from upstream and by the regulation of flow rates, which either completely eliminate the annual cycle in water discharges, or change them so that they do not coincide with the demands of fish for reproduction and early life stages"

Thus far, 20 of 24 endemic fish species have disappeared (Micklin, 2016) and fishery activities remain to be active only in the North Aral Sea (NAS). To overcome these concerns, the dam and dike complex was financed by the World Bank and the government of Kazakhstan in 2005 (Syr Darya Control and Northern Aral Sea Phase I project) and the *Towards Sustainable Aquaculture and Fisheries Development 2009-2020* (funded by the Finnish Ministry for Foreign Affairs) projects have improved ecological conditions in and around the NAS, by encouraging the return of migratory waterfowl and the restore of the greatest export potential fish species (White: 2014, pp. 325).To date, 4 500 tonnes of fish are currently caught for commercial purposes, and a fish processing facility has opened in Aralsk (Nachtnebel et al., 2015). In this regard, the rapid reproduction of the pikeperch, of high commercial value, has positively impacted the recovery of the regional fishery economy.

These cooperation attempts, of added value to national Fishery Development programs, have enabled the revival of the fish processing sectors, by extending the area of fish-breeding basins and spurring commercial fish harvests year after year, as evidenced by its increasing trend (*Annex 7*). Local scientists and fishery managers estimate that the implementation of cutting-edge techniques in small and medium reservoirs of intensive aquaculture would increase basin-wide fish production, by adjusting to the new hydroecological realms (Karimov, 2005, p. 94).

3. Natural resource extraction and Energy

Across the Aral Sea Basin, there are 45 hydroelectric plants with a combined capacity of around 34.5 GW. The two largest hydroelectric facilities are Toktogul, in Kyrgyzstan, and Nurek, in Tajikistan, with a capacity of 1,200 MW and 2,700 MW, respectively. Hydropower accounts for 27.3% of the average basin-wide energy consumption (FAO, 2013), being Tajikistan (nearly 98%) and Kyrgyzstan (approximately 75%) the highest hydroelectric contributions to total energy consumption, and Turkmenistan (about 1%) the lowest

(CAWATER, 2019). Nonetheless, compound regional geopolitics threatens resource distribution.

The abandonment of the CAPS[9] led to a renewed but still uncertain energy context (*Annex 8*). As laid before, while Turkmenistan, Kazakhstan and Uzbekistan have comparatively abundant fossil fuel reserves and hydrocarbon reserves allowing them to satisfy domestic energy demands, the upstream least developed countries -Tajikistan and Kyrgyzstan- mostly rely on imports. For this reason, upstreamers converted their existing reservoirs from agricultural to the hydroelectric mode by collecting water in the spring and summer and dumping it during the winter (Xenarios, 2021). As if this were enough, the sector's infrastructure is outdated and underdeveloped, since its deteriorating dams, canals, pumping stations and drainage systems deteriorate agriculturally productive land, waste more water, and make irrigation even less effective (UNECE, 2004).

Despite their ageing hydraulic facilities, the 2019 Hydropower Status Report, led by the International Hydropower Association (2020), estimates that enormous margin for additional production, provided that upstreamers produce hydroelectricity below their full potential: Kyrgyzstan only exploits less than the 10% and Tajikistan, the 5%.

Regarding the former, the Kyrgyz government has moved forward to restructure the power industry over the last decade, including the creation of a National Energy Holding Company, an Independent Regulator, a State Committee on Industry, Energy, and Subsoil Use, as well as a new revenue and settlement system (IHA, 2020). Currently, the government still maintains ongoing negotiations with Russian investors to finance the Kambar-Ata 1 Dam (EPRS, 2018, pp. 4-5).

Concerning the latter, the Tajik Roghun Dam is expected to be constructed by 2028, after a 40- year delay, prompting a hydroelectricity generation up to 3 600 MW. The Dam is financed by a combination of domestic and international funds and is slated to be the tallest dam in the world when completed (EPRS, 2018, pp. 4-5). The dam is situated in an earthquake-prone area, which has engendered strong criticism from its neighbours. On a separate note, an intergovernmental initiative, resulting from the Tajik Government-The Aga Khan Fund for Economic Development (AKFED) partnership, has assisted small-scale hydropower installations and maintenance in Tajikistan's Gorno-Badakhshan Autonomous Oblast (GBAO) (IHA, 2019).

II. Social Vulnerability and Migratory Impact

Social vulnerability indexes are critical drivers of human security, which can pose detrimental effects on health, living and working conditions, as well as on ecological migration, without neglecting their negative multiplier impact on the regional economy.

Overall, regional public health concerns pose a twofold problem. First, life expectancy has dropped from 65 to 61 years (Ataniyazova, 2003, p. 3). Second, rates of illnesses continue

[9] The Central Asian Power System (CAPS) sought to ensure consumers' energy supply through a jointly operated regional generation and transmission network, thus creating a high level of interconnection and coordination across all of Central Asia's diversified energy resources in Soviet times.

an upward trend, such as tuberculosis, infections and parasites, typhus, hepatitis and paratyphoid dramatically (Mahambetova 1999). The absence of top-notch medical facilities and human resources for providing patients with the proper care hindered regional human development in aboutese problems.

Geographically, health-related risks vividly stand out in three main subregions within the ASB (White, 2014): the autonomous Republic of Karakalpakistan (Uzbekistan), the Kyzylorda Oblast (Kazakhstan), and the Dashaguz velayat (Turkmenistan). For instance, significantly higher infant morbidity and mortality rates, as well as sexual and reproductive pathologies are observed (Aibek, Khaibullina et al., 2021, pp. 5-6),) in these subregions compared to others. In fact, during Soviet times, the highest infant mortality rates in the USSR were reported in Karakalpak -60/1000 live births in the late 1980s (Siegelbaum, 2015).

In this vein, different scholars (Van der Meer, 2001; Mickin, 2008; Waehler et al., 2017; EPRS, 2018; Aibek, Khaibullina et al., 2021, pp. 5-6),) have attempted to underscore the ground causes of the basin-wide negative health conditions:

- *Exposure to chemical pollutants used in the cotton harvests*: The overuse of insecticides and pesticides, namely, dichlorodiphenyldichloroethylene (DDE), butiphos, propanide, hexachlorocyclohexane (HCH), and dichlorodiphenyltrichloroethane (DDT) (Aibek, Khaibullina et al., 2021, pp. 5-6) is estimated to cause 35,000 farmer deceases per year (Hoskins, 2014).

- *Released substances into the atmosphere:* Dust clouds can blow these salt, dust and toxic contaminants as far as 500km (EPRS, 2018, p. 8), and breathing in carcinogenic dust can thus provoke respiratory disorders and throat cancer (Mickin, 2008). The local population experience sand and dust storms for three months of the year, seriously damaging the environment and human health.

- *Water contamination*: The discharge of industrial contaminants into bodies of water, especially the Syr Darya River, negatively affects its quality under internationally accepted safe drinking water standards. Thus far, different refineries, such as Ispat-Karmen, Balkhashmys, Akchatau, Shalkiya and Shymkent, have been reportedto deployg heavy metals and persistent organic compounds (POC) that include polychlorinated biphenyl, polychlorinated dibenzodioxins, and polychlorinated dibenzofurans (Aibek, Khaibullina et al., 2021, pp. 5-6). The high mineralization of water and the growing salinity levels would also fall into this category, snce salt-crust preserved metals (e.g., cadmium and lead) induce anaemia, cardiovascular diseases, bone metabolism or accumulation of kidney stones (Aibek, Khaibulina et al., 2021, p.6).

- *Polluted nourishing material*: Regional food security is hampered by polychlorinated biphenyl (PCB), polychlorinated dibenzodioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs) substances, which have been detected in fish, sheep, milk, and eggs. Besides this, chlorinated organic pesticides have also been found in onions and carrots (Waehler et al., 2017).

Poverty and inequality are some of the noteworthy drivers of social instability. Despite the legislative attempts to ban child labour in the cotton fields, an informal economy prevails in the region and children from 7 years onwards (Piper, 2020) remain to be displaced from their schools to cotton harvests. In fact, half of the annual cotton harvestings in Uzbekistan are picked by children[10] (Saidazimova, 2008). International requests to boycott cotton from Uzbekistan have been made in response to this problem (White, 2014, p. 320), and some multinational textile companies (e.g., Levi-Strauss or H&M) have stalled purchasing Uzbek cotton.

When it comes to the cotton sector working conditions, forced labour dominates the scene: workers are set a daily kg quota and they are not permitted to desert until they have handed in their allotted quantity. These harsh conditions can even be more extreme, as laid by Safo and Kremer (2012): "the official punishment for refusing is dismissal from your job but many say that the real punishments can be much more severe including prison time, torture, and or exile".´

Regional migration patterns have also been altered by environmental externalities, most notably, mudslides and landslides, floods, hazardous waste, and desertification (Sulaimanova, 2004). According to the UN High Commissioner for Refugees (UNHCR, 2010), basin-wide environmental calamities have compelled over 250,000 climate-driven migrants[11] to flee their communities, of which near 100,000 inhabitants were displaced just during the 1980-1990 timeframe.

III. Gender mainstreaming in regional hydro-politics

At a global level, women are responsible for more than 70% of water management worldwide, yet they remain excluded from decision-making, formulating, planning and implementing policies over water resources. This set of policies that do not recognize the roles ascribed to different genders are referred as *gender blindness*. To gain a proper understanding of these social phenomena, the rationale of integrating socially constructed gender roles in the management of water resources leads that inclusive and consultative policy processes can contribute to reducing social imbalances, to more effective decision-making and implementation processes and to bet water governance at large (OSCE, 2022).

Sociologically, in Central Asian states, the main choices on land usage, irrigation, and water management, particularly those relating to quantity, source, cost, and payment, are decided in all-male family gatherings like the traditional "mahalli" (EEAS, 2021). As a result, a vast pool of knowledge and skills remains untapped, undermining the efficiency of water governance and hampering women's economic autonomy.

[10] *Child labour* refers to "all cases in which children are exposed to harm at work whether or not children are less than 14 years old or less", according to the ILO Convention No.182 of Worst Form of Child Labour (UNESCO, 2005).

[11] We have decided on this terminology since the expression "*climate refugee*" is not endorsed by UNHCR, which instead opts for "*persons displaced in the context of disasters and climate change"* (UNHCR, 2022). Please, note that climate-induced migration does not fit within the refugee criteria of the 1951 Convention on the Status of Refugees.

In spite of the inclusion of gender-balanced boards in more than half of the basin-wide water user associations (OSCE, 2020), women remain underrepresented in the main regional public water management bodies and water committees. These gender biases set aside women's added value as the main water users, since they could bear into consideration the needs of the domestic water supply services (DWSSs).

Women's reproductive health problems are another such gender concern. In this region, the average annual mortality rate for women is, even more, elevate (Aibek, Khaibullina et al., 2021, p. 9), due to the considerable number of perinatal losses, menstrual disorders, early menarche cases, spontaneous miscarriages, chronic intrauterine hypoxia and birth asphyxia (Turdybekova, 2017). As an OECD report (2001) illustrates, several direct and indirect health issues for both women and men are strongly linked to the social aspect of the crisis, i.e., destruction of livelihoods, outmigration of men, or feminization of poverty.

Different stakeholders have developed gender-sensitive and gender-responsible projects for promoting women's participation in water resource management in Central Asia, designed to achieve equal participation in water conflict prevention and crisis management, as well as in humanitarian planning. For instance, the Gender and Water in Central Asia Network (GWANET) enhances the ability of regional, national, and local players in the water sector to include gender problems in decision-making by gender awareness raising programmes. Second, the International Bank for Reconstruction and Development's (IBRD) Climate Adaptation and Mitigation Program For the Aral Sea Basin (CAMP4ASB) outlines the main challenges, gaps, and concerns (*Annex 9*) to be addressed by local gender-responsive project interventions.

Partnerships with Academia can also result fruitful in this regard. By way of illustration, the Kazakh-German University and the Central Asia Knowledge Network have teamup ed to carry out a joint programme at different universities and research institutions that seek to promote women's capacity development, through training programmes and online conferences (EEAS, 2021).

IV. Climate proofing for development

Environmental conditions prompt a major burden for basin states, since climate adaptation and resilience straightly affect the basin's supply and demand patterns, and eventually patterns of peace and conflict. As Link (2016) draws upon, "the fact that the impacts of climate change will be spatially heterogenous makes a clear distinction from the impacts of socio-economic factors difficult".

According to records from the last Environmental Vulnerability Index (EVI, 2010: Fig. 8), Tajikistan and Uzbekistan remain under the threshold of *vulnerable*, whilst Kazakhstan, Turkmenistan and Kyrgyzstan are labelled under the rating of *at risk*. When it comes to addressing the changes in the natural physical environment, as well as their attempts at transboundary cooperation, there are three major hotspot areas: regional climate change, aeolian dust redeposition and loss of biodiversity.

Current projections on climate change (IPCC, 2021) are expected to register an increase of a surface air temperature of +3.7ºC by the end of the 21st Century. During the last decades, the pace of mountain glaciation has raised, and upstream glaciers have shrunk by 25% between

1957-2000, losing about 104 billion m3 of water (Utrera, Aura et al., 2013). According to Sorg et al. (2012), these areas may experience more floods and droughts as a result of glacier shrinkage on nearby mountains, which may eventually result in decreased runoff (EC-IFAS, 2013).

Spatial and temporal variability in precipitation patterns is estimated to decrease by -3% by the end of this Century: with +4% during Winter and -13% in Summer (Lioubimtseva, 2014; IPCC, 2021). According to the World Bank forecasts (2020), these interannual variations indicate that by 2050, the Syr Darya River basin's streamflow may fall by 2–5% and the Amu Darya River Basin's by 10–15%, respectively. Thus far, the basin's evaporation has exceeded the sum of rainfall, melting, and groundwater supplies (Fig. 9).

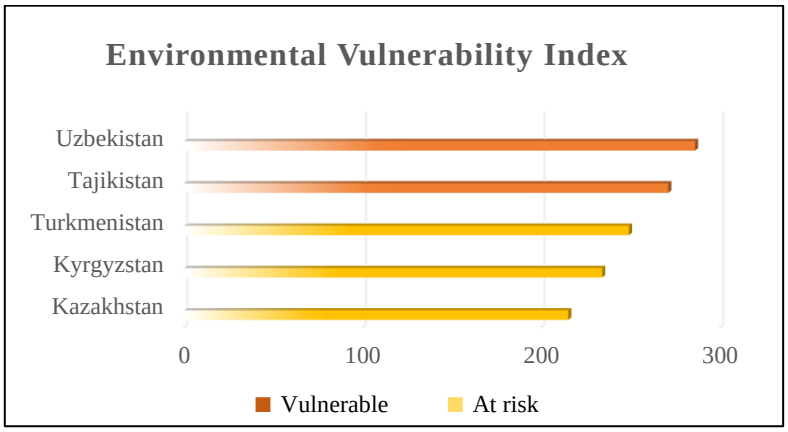


Figure 8: Environmental Vulnerability Index (EVI) per ASB country. Source: Own elaboration, reference values retrieved from https://archive.unescwa.org/environmental-vulnerability-index

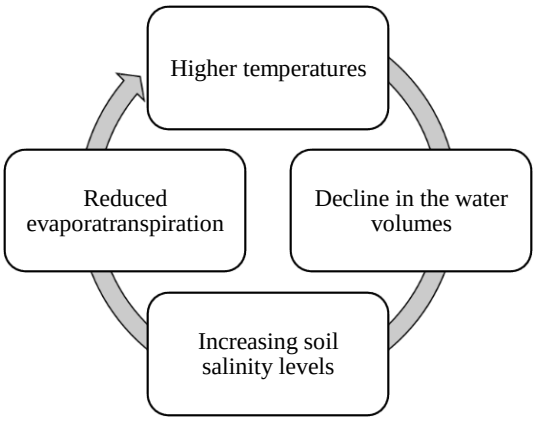


Figure 9: Causality nexus in the ASB hydrological model. Source: Own elaboration.

Implementing a risk-based approach for adapting water systems to climate change is of paramount importance for coping with their side effects. Under the auspices of the World Bank, the Climate Adaptation and Mitigation Program for Aral Sea Basin (CAMP4ASB) has operated since 2016, coordinating efforts between the Governments of the Central Asian states and the Executive Committee of the IFAS on three interactive fields of activity (EC IFAS, 2021). First, the Regional Environmental Center for Central Asia (CAREC) offers technical support to the

setting of an uniform rational analytical platform to ensure the region's growth on a climate-sustainability basis. Second, the Regional Fund of climate investments seeks to stimulate worldwide financial investments in the region's agricultural products and land management. Third, the CAREC attempts to transpose these regional efforts to national-level agendas and policies and strengthens their monitoring.

The Aral Sea has evolved into the *Aralkum*, a saline desert covering a surface of more than 60,000 km². Its barren seabed is exposed to the aeolian dispersion of dust including salts, pesticides and heavy metals (Lotz, Aslanov et al., 2018), and, as stressed by Lioubimtseva (2014, p. 415), these materials depict "up to 1.5% salt in the total mass of hard particles transported by the wind". Some studies (Chen, 2018) have demonstrated that prolonged exposure to these substances increases the likelihood of breathing diseases.

Regosols, Calcisols, and Solonchaks are the characteristic soil types in the arid areas of Central Asia. These soil properties are vulnerable to aeolian erosion and may be distinguished by high salt concentrations since they were formerly marine sediments in the ancient Cenozoic Sea (Opp, Groll et al., 2016, p. 2). Strong wind blows can cause suffocating dust storms to arise, engulfing adjacent populations.

To lessen these worrying implications, the Land Use, Ecosystem Services and Human Welfare in Central Asia (LUCA), carried out by ZEU and the Volkswagen Foundation, operates as a joint analysis platform on the impacts of land use in the region. Its SP2 program focused on assessing the trends of dust dynamics in Central Asia until 2012. Besides, the UNEP, along with the World Wildlife Fund (WWF) has planned to plant 3 billion intercropping trees by 2030 for reducing wind speed, as well as cultivated salt-tolerant species (e.g., Russian olive or saxaul). The EU-funded Long Term Ecological Research Program for Monitoring Aeolian Soil Erosion in Central Asia (CALTER) monitors dust storms and landscape oscillations by employing remote sensing imagery, and provides policy recommendations for the most affected areas (CORDIS, 2010).

As a result of these processes, the loss of regional biodiversity has acknowledged that 24 sealife and 180 land animal species have completely vanished. Regarding flora, basin-wide vegetation decreased by 40% because of desertification (Columbia,). On top of that, many other several endemic species are in danger of extinction, including the Snow Leopard, the Great White Pelican, the Marco Polo sheep or the Saiga antelope (White, 2014, pp. 308-309), to name a few.

The loss of biodiversity is even more pressing in arid regions, where the extinction of a single species has a more pronounced proportional leverage on the regionwide biodiversity (White, 2014, pp. 308). The UN Decade for Ecosystem Restoration 2021-2030 provides technical advice on the efficient allocation of ecosystem restoration subsidies and fights against economic forces and vested interests that contribute to the degradation of local ecosystems, as set forth by UN Secretary-General Antonio Guterres (Babadjanov, 2021). Up until today, Uzbekistan and Kazakhstan have joined the International Union for Conservation of Nature, as a forum for discussing biodiversity conservation initiatives. Additionally, regional efforts to restore the ecological burden also comprise a conservation project to construct Uzbekistan's first biosphere reserve over a buffer zone of 68,718 hectares located in Karakalpakstan targeted at the conservation of endemic biodiversity, especially the tugai forests (Babadjanov, 2021).

CHAPTER V: FRAMING ENVIRONMENTAL PEACEBUILDING WITHIN THE CONFLICT TRANSFORMATION PARADIGM

I. Drivers for conflict

Resource capture strategies over exploitable freshwater, between 5 compelling nations, are but one driver, among several, that impact the conflict-cooperation nexus. As a result, water itself may either fuel conflict or promote cooperation, but it is not the only cause of major, violent conflicts. Conflicts are not static but dynamic phenomena. That is, they evolve based on the behaviours assumed by the different actors -primary and secondary- involved in one way or another in the management of incompatibilities (Romeva i Rueda, 2003). In order to implement a strategy in terms of analysis and, particularly, conflict management, it is necessary for policymakers to take into consideration the extraordinarily intricate interrelationships that exist between these events as they develop during this process.

Accordingly, intangible systemic drivers pose more acute conflict flashpoints than tangible ones. Since security concerns can rely upon associated value perceptions, vulnerabilities, and security conceptions of the respective agents (Link, 2016), downstream states -namely, Uzbekistan and Turkmenistan- have regarded upstream infrastructure construction as a 'threat' to their national security. Securitization discourses on water availability are one the most immediate indicators of early warning and conflict prevention, as Link (2016) stresses, "Real or perceived water scarcity (…) in combination with increasing levels of insecurity and securitization can establish an environment of anger, fear or hostility, creating incentives to engage in conflict and eventually deploy violent means". In the Central Asian political setting, downstream Governments have resorted to discourse mechanisms to publicly oppose upstream building of water amenities while, by contrast, upstreamers try to promote a nation, region and worldwide legitimation framework for their hydraulic development.

More precisely, Kyrgyzstan launched its Kambarata-2 power station justifying its incapacity to meet domestic electricity demand during winter months (Kirilenko, Dronin et al., 2008). Besides, Tajikistan lodges Lake Sarez, the biggest natural dam in the world, set in an earthquake-prone zone since 1911. In this regard, seismicity could spur the fracture of this landslide dam which would unleash a 100ft-tall wall of water (Thornhill, 2020) to Tajikistan, Uzbekistan, Turkmenistan and Kazakhstan. Yet, early warning mechanisms remain outdated, and no independent institution for dam safety assessment exists to date.

By the same token, the Rogun Dam in Tajikistan prompts a major issue of concern for downriver states, since it would pose a significant shift in the basin-wide status quo by providing a seasonal surplus sale of 3,600 MW (Menga, 2016, p. 378) at the expense of reducing downstreamers' water supply. On the other hand, the Uzbek President Karímov went well beyond in 2012, making the following statement:

> "This gradual reduction in water supply is fraught with immense conflict potential, both in relations among the regional states and for social stability inside the country (…) all of this could deteriorate to the point where not just serious confrontation, but even wars could be the result" (Nurshayeva, 2012)

Imbalances in energy compensation are driven by divergent seasonal requirements in accordance with each state's productivity model. In the 1990s, the upstream nations faced an increasing energy crisis due to a lack of energy sources. Upstream states converted their reservoirs for hydropower usage by limiting summer water discharges and increasing winter outflows as a result of the energy crisis. This resulted in downstream nations' summertime irrigation water supply being curtailed, thus endangering their capacity to secure their food security and leading to occasional flooding incidents in downstream territories (Xenarios, 2020). In response to these incidents, Uzbekistan deployed its armed forces in the proximity of the Kyrgyz Toktogul reservoir in 2002. To this effect, CA countries have instituted a sensitive securitization model in which the energy security of upstream nations must come at the expense of the security of downstream water-intensive crops. However, this hydroelectricity-irrigation disjunctive is still reliant on upstreamers' water supply schemes.

On closer examination, *timing* has been identified (Kirilenko, Dronin et al., 2008) as a root cause for this atmosphere of mistrust. Annual barter agreements for the exchange of energy-water resources are often signed in the late spring when Kyrgyzstan has the highest winter energy demand and the downstream nations have an urgent need for water for crops. Kyrgyzstan conserves water to develop hydroelectricity as a result of its concerns over the provision of sufficient fossil fuels under the barter arrangement.

Upstream failure to abide by water quotas has triggered a spiral of tensions over the water-energy nexus. By taking advantage of their abundant energy resources, downstream states -mostly Uzbekistan- have introduced high purchase prices and strict payback deadlines on natural gas exports, as well as gas supply cuts (Menga, 2017), in an attempt to leverage their bargaining power in the regional energy trade (Menga, Mirumachi et al., 2016). To avoid such energy shortages, upstreamers have led to a self-enforcing cycle of distrust by undoing the pre-existing agreements and conveying hostile moves. For instance, Kyrgyzstan has siphoned natural gas from Uzbekistan on its way to Kazakhstan, as a way to ensure its own gas supply (Elhance, 1997, pp. 212-213), and some reports (Kucera, 2011) suggested that the deletion of a rail bridge nearby the Uzbek-Afghan border had been triggered by Taskent opposition to the Rogun Dam construction.

To outweigh downstream states' excessive reliance on upstream freshwater resources, downriver countries have undertaken a series of reservoir constructions in their own territories, such as the Kolsaray reservoir (Kazakhstan) or the Golden Lake Dam (Turkmenistan). Notably, Uzbekistan has made important strides by erecting four water reservoirs with an extra stockpiling for an estimated 2.5 billion m3 of water (Kirilenko, Dronin et al., 2008).

Inter-ethnic tensions have also the potential to embroil the entire region, as unresolved administrative and border divisions have prompted contentions over discriminatory schemes of land and water allocations. Above all, ethnic conflagrations have occasionally taken place in the Ferghana Valley, comprising Uzbekistan, Kyrgyzstan and Tajikistan. The lack of actual frontiers has led to major constraints regarding the rearing of livestock, farmland and land usage, which have resulted in low-intensity incidents, such as quarrels, stone-throwing and damage to property (Eschment, 2021). Nevertheless, a gradual escalation of conflicts during the last years has ranked these protracted border disputes as 'potentially explosive' (Larionov, 2020).

In this region, various small-scale domestic and cross-border ethnic strives (Kirilenko, Dronin et al., 2008) have occurred during the recent decades, all of them linked to water

shortages: in Osh (Kyrgyzstan) between the Kyrgyz and the Uzbeks; in the Vaksh Valley (Tajikistan), between Tajiks and Uzbeks; or in the Isfara-Batken district (Kyrgyzstan), between Tajiks and Kyrgyz.

As laid down by Elhance (1997, p. 213), the Ferghana Basin's territories and those along the Amu Darya's lower course are the most susceptible to hydric stress. This, intertwined with the growth of Islamic fundamentalism, clan competition and drug trafficking problems, could spur violent conflicts of outstanding implications over regional security, affecting Afghanistan and Iran, and leading to "a stream of refugees to some already overburdened areas in the region" (Elhance, 1997, p. 213).

Figure 10: Potential water conflict flashpoints in the region. *Oval*s are used to indicate the tension zones along the transboundary tributaries of the Amu Darya and Syr Darya Rivers. *Intercepts* indicate the areas of friction over hydraulic infrastructure for water storage and management that are located in one nation and serve the needs of another country. Source: State Secretariat for Economic Affairs, Switzerland.

II. Conflict maintainers

Conflict maintainers are set as those systemic drivers of watercourse management which do not have the direct potentiality to inflict an interstate conflict on a short-term basis, but which could contribute to the deterioration of the regional security context in the medium to long-term.

The existing atmosphere of distrust has retreated the contractual agreements for exchanging hydrological data among riparians since upstream states persist in periodically

withholding this information (Elhance, 1997whichhat deters clear transparency for both national policy and inter-state negotiation.

Population growth is a constant variable in all five Central Asian Basin states, explicitly implying an increase in water demand. Notably, the most dramatic rise is occurring in Uzbekistan and Kazakhstan, and current forecasts estimate that these states' populations would be at 95 million (+36.9%) by 2050 (Stronski, 2019). In this fast-evolving environment, young generations will play a vital role in water consumption patterns, recalling that the median age in Central Asia is 27.6 years, with only 3 to 7% of the overall population in any country beyond the age of 65.

Continued socio-economic growth may also remain key when addressing future estimations in water demand, considering the rapid urbanization (household water) and larger industrial water usage, particularly owing to the expanding cotton irrigation in downstream areas, where 83% (Giese et al, 2004) of the total water is allotted. While conventional cotton requires a great deal of pesticides and water, organic cotton could become a more sustainable and environmentally friendly cash crop because it uses rainwater more efficiently and does not employ any GMO (genetically modified organisms) seeds. Social cohesion between urban and rural communities as well as between the regions would be necessary to avoid a two-speed prosperity model. Prospective socio-economic scenarios (Kirilenko, Dronin et al., 2008) face significant obstacles like trade barriers, flawed financial sectors, high transportation and transit costs, low regional business competitiveness, an inefficient energy market, and out-of-date technology and management, and an inefficient legal system on the regional market economy. Regarding the current water allocation schemes, it is also imperative to assess each state's availability and accessibility of energy resources, as it would define their national consumption structure: Kazakhstan's energy balance depends on coal, Uzbekistan's and Turkmenistan's relies on gas, and Kyrgyzstan's and Tajikistan's on hydropower (Narbayep et Pavlova, 2022).

Environment externalities impact the availability of freshwater resources, noting that human-induced streamflow diversions have declined the water level, thus increasing evapotranspiration. Changes in the hydrographic cycle of surface waters foresee a faster glacier melting and a less dense snow cover, affecting the regime of both rivers (Narbayep et Pavlova, 2022). Global warming will trigger more extreme air temperatures, thus enlarging growing seasons for cotton, and fluctuations in precipitation patterns will leave an adverse impact on freshwater supply, impacting agricultural yields and accelerating soil erosion. According to the World Bank forecasts (2020), these interannual variations indicate that by 2050, the Syr Darya River basin's streamflow may fall by 2–5% and the Amu Darya River Basin's by 10–15%, respectively (Menga, 2016), and Kazakhstan should experience the greatest increase in precipitation.

As it regards water quality, the use of pesticides and fertilizers, water contamination, growing salinization and aeolian dust deposition are being considered as the most substantial conflict maintainers that affect land degradation and,the at last stage, socio-economic development, as outlined in Chapter IV.

Finally, increasing water-driven migration in Central Asia might also sway the basin-wide security architecture in an already region of transit migration. Provided that environmental calamities become more extreme and water supplies deteriorate, more people will experience water shortages and be compelled to relocate, in addition to the continued decline in agriculture, fishing and tourism as well as ominous health vulnerability.

III. Conflict escapers

Under these circumstances, it is not merely a question of returning to the ex ante institutional, physical and social situation prior to the conflict, but rather of carrying out the imperative transformations in the structures and the inter-state relationships so as to fade, or at least redirect, the potential drivers that at the time led to the fuelling, and finally, the outbreak of the conflict. In other words, these 'conflict escapers' have the purpose to turn common challenges into mutually beneficial opportunities for cooperation, from technical to political issues.

The institutional capacity building reduces other actors' (states') uncertainty in basin politics and increases expectations from other parties in transboundary interactions. While it may be true that treaties "stabilize (the relations of states sharing a river) giving them a certain level of certainty" (Wolf, Veilleux et al, 2016), the fact that there is no supervisory body monitoring water quotas implementation has reduced their effectiveness and given rise to "free rider" states. Yet, the ICWC is responsible for allocating annual water use caps for each party, but it lacks any binding legal instruments regarding states' compliance.

In this vein, some authors (Boisson de Chazournes, 1997; Wolf, 2003; Link, 2016) stress that there is an urgent need for strengthening the regional legal framework on transboundary water management by also detailing conflict resolution mechanisms in case of future disputes and by expressly updating the criteria for water allocation quotas per country. The ASB's institutional capacity could also be reinforced by abiding by international legality, by complying with the guidelines of financial compensation among the concerned states (Boisson de Chazournes, 1997).

By acknowledging that complex interdependence brings multiples centres of authority (polycentricity) (Warner and de Man, 2020, p. 286), both vis-à-vis and institutionalized cooperation ought to comprise more balanced stakeholder and sectoral negotiations to enhance the effectiveness of regional treaties. Since each given interest group is targeted with specific water use, a broader spectrum of stakeholders through puzzling[12] would let barter agreements meet actual societal needs. Prior to submitting the drafts to the governments for adoption, the following stage is to create regional working groups and multisectoral working groups at the domestic level comprised of experts in water, energy, and agriculture (Boisson de Chazournes, 1997). By fostering women's participation in regional water resource management roundtables, socio-economic development would meet the demands of a higher share of population's needs.

By undertaking both formal and non-institutionalized forms of cooperation, high-level dialogue could prove to be beneficial for heightening the significance of water in its economic, social, environmental and security facets, by mainstreaming these concerns from 'low' to 'high' politics. Multilateral institutions could be tapped for this end. In this view, the Permanent Representative of Tajikistan to the United Nations, Sirodjidin Aslov, promoted the creation of an international hydropower consortium to evaluate the impacts of the Rogun Dam in 2012 (Menga, 2016).

Creating value and building trust would entail improving baseline information, which is of utmost importance for modelling water vulnerability scenarios, fixing early warning systems

[12] *Puzzling* can be defined as "rational collective problem-solving through multi-stakeholder negotiation" (Warner and de Man, 2020, p. 286)

for adverse hydrologic phenomena, and adapting water policy strategies and action plans to updated databases.

An adequate integrated water resources management (IWRM) would comprise information exchange on technical circumstances of water management systems, adoption of energy-and water-saving technologies, or the number of financial resources for reconstruction, among others. To achieve this, Narbayep and Pavlova (2022) conclude that basin organizations' roles at the national and regional levels must be strengthened. This would enable better accounting and monitoring of water resources and improved forecasting of changes in those resources' qualitative and quantitative status in light of global warming.

In conjunction with the above, technical pathways for watercourse management can curb the impact of exogenous shocks out of reach of human intervention, e.g., environmental externalities. To continue optimizing performance watershed management, an additional allocation of funds for modernizing agricultural and irrigation systems, further capability programs for irrigation engineers, or expanding the use of water-saving technologies

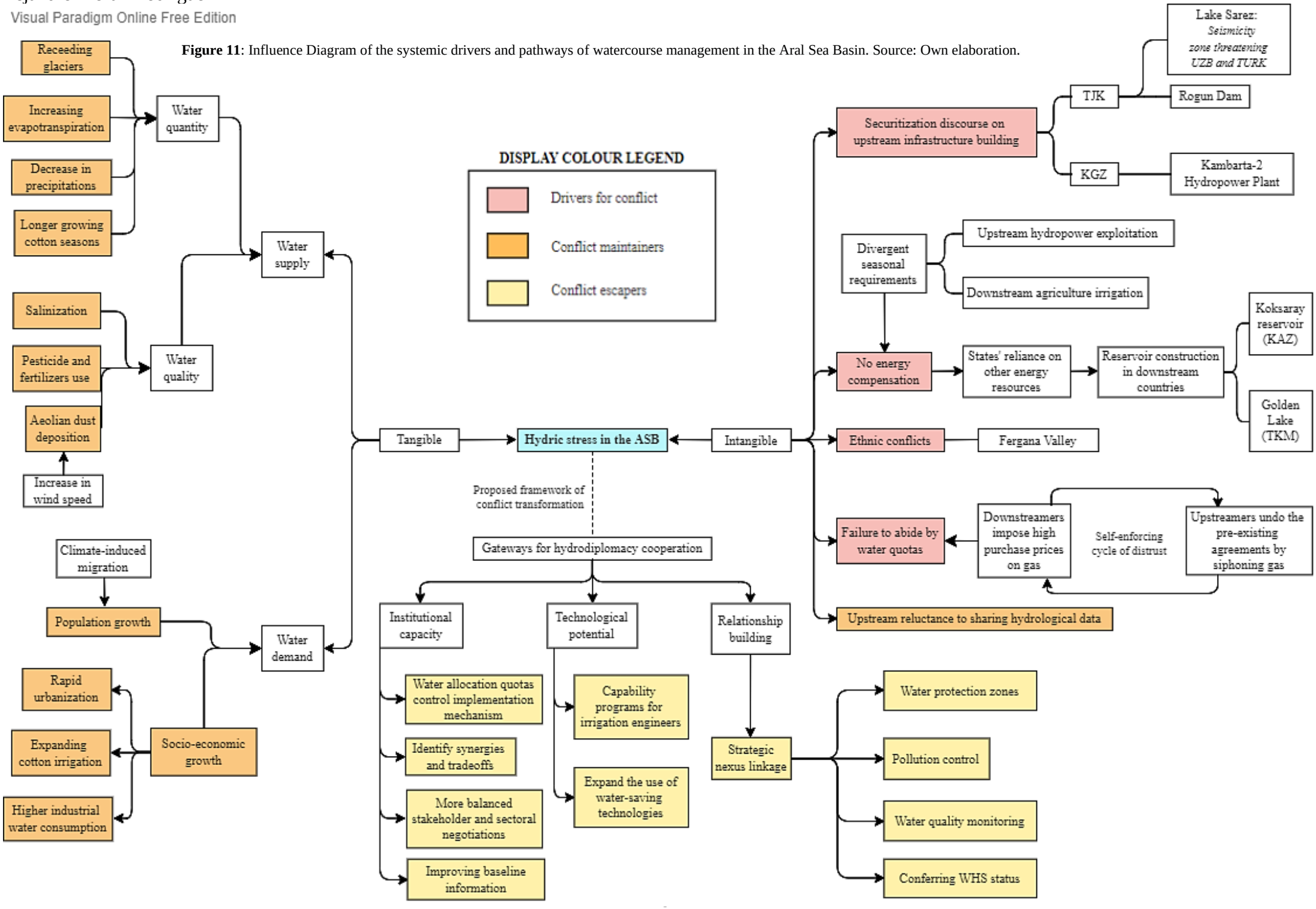
By dint of fostering strategic nexus linkages, relationship building can take mutual trust back to the negotiating arena. On the one hand, issue linkages could be productive for identifying interstate synergies in an attempt to address common challenges among riparians, broadening a shared understanding of these concerns. Thereupon, both upstream and downstream nations could strive for accomplishing joint management programs on common interest concerns which could include, inter alia, water protection zones, pollution control measures, or water quality monitoring systems.

On the other hand, exploiting issue linkages between water and non-water concerns, embedded into politics of scale, could minimize differences in outcomes and eventually promote regional integration (Warner, 2020). In political and social sciences, this is known as the spillover effect, which increases the likelihood of overflowing and extending interstate cooperation into other areas. This approach to water diplomacy and nexus governance would promote a ‘system-of-systems’ that would entwine interdependent policies, institutions and actors throughout economic, environmental and social systems (Salmoral, et al, 2019, p. 86).

By conferring the World Heritage Site (WHS) status, governments would be more inclined to display a stronger interest in the partial restoration of the Sea (Glantz, 2007, pp. 225-226), by encouraging additional financial resources and international development funds. Its biophysical features would meet the criteria of Article 2§2 of the World Heritage Convention: “Geological and physiographical formations…which constitute the habitat of threatened species and plants of outstanding universal value from (…) view of science or conservation”. In his view, Glantz suggests that by releasing specified amounts of Amu Darya streamflow to reach the Aral Sea each year for the next few decades, it would be able to replenish and stabilize it at an intermediate level, moving forward to restore delta productivity.

Alejandro Morán Rodríguez

Figure 11: Influence Diagram of the systemic drivers and pathways of watercourse management in the Aral Sea Basin. Source: Own elaboration.



CONCLUSION

As it regards the main research question, which motivated the object of study, this paper productively embraces a conglomerate of international scholarly literature depicting a gradual upward movement in water cooperation, as we have been able to demonstrate that basin-wide cooperative attempts outweigh -in both amount and intensity- the overall conflictive events.

As for our working hypothesis, we can properly conclude that regional active hydrodiplomatic cooperation has resulted fruitful in eventually mitigating the potentiality of water-related conflicts across the basin, as laid below. Nevertheless, our secondary study hypothesis could not be verified, as it would not be yet consistent to speak of these multilateral cooperation platforms as a true "regional water regime". Since *regimes* help to reduce the likelihood of free-riders by raising the costs of noncompliance, the lack of a water allocation quotas monitoring mechanism at the ICWC prompts a key challenge that restrains states from fulfilling their commitments.

For the nexus approach to governance of the Aral Sea Basin to be successfully implemented, the current framework of cooperation urgently needs to be strengthened and updated. As analysed in the previous sections, even when many transboundary agreements exist, more effort is needed to update them to reflect modern principles of transboundary water resources management, such as the obligation not to cause significant damage and the principles of cooperation and exchange of information. From a water resources perspective, supply and allocation of water must be established on a reliable long-term basis, rather than only on a year-to-year basis, as upstreamers take advantage of this void to modify barter agreements according to their annual energy provisions.

Against this backdrop, Aral Sea Basin states have endowed a regional cooperative system by setting up their own water management institutions and normative instruments, which can be regarded as a mixed success. On the one hand, if compared to the 1990s, it is believable to conclude that transboundary watershed cooperation has moved forward by leaps and bounds, and that complex interdependence is driving towards a shared understanding of the actions to be undertaken in a spirit of multilateral dialogue and upgraded common interests. More in detail, we have been able to draw on explanatory factors -both theoretical and empirical- that offer a glimpse of closer and deeper cooperation.

First, a liberal institutionalist insight has been very productive in proving that treaties mitigate other actors' uncertainty, and that institutions can facilitate the containment, prevention and resolution of water-related conflicts. Within this framework, riparians are confined to historically institutionalized paths of conduct which rise the increasing returns (path dependence) and can lead to spillover effects by developing strategic linkages in other areas.

Second, more networks of sub-state and foreign actors are embedded within this process of water governance, thus moving beyond the traditional 'state-centric' approach. By bringing a range of economic (e.g., farmer representatives, BVOs managers, fish farming agents, or tourists associations) and social (e.g., NGOs, the Academia, scientific communities, or nature conservancy associations) stakeholders to collective bargaining roundtables, a broader spectrum of interests will further legitimise obtained political outputs and meet each actor's actual needs.

While much remains to be done, gender-balanced boards amount to more than half of the basin-wide water user associations thus enabling them to collect and canalize their demands, especially over domestic water supply services (DWSSs) and reproductive health problems linked to degrading water quality. In addition, third-party diplomatic involvement in the region lends added value by providing technical and financial aid to address the burden of the overlapping economic, social and environmental stresses. This focus on multi-track water diplomacy lays the groundwork for strategic partnerships among riparians. As a result of fostering joint efforts, these programmes have considerably enhanced water-saving technologies, improved health conditions, and restore delta productivity through the exponential growth of ecotourism and some job restoration (e.g., in the commercial fishery).

On the other hand, the picture is not as rosy as it is sometimes depicted here. On a short-term basis, the incompatibility between water demands of hydropower and irrigation amid the upstream and downstream republics, respectively, governs the conflictive interactions. This research thus sought to transform these complex water trade-offs, driven by a context of distrust, structural basin-wide inequalities and ongoing conflicts, into new gateways for local, inter-state and regional cooperation. Beyond riparian position and hydrological potential, some fewer tangible factors like discourses sway interactions between states for the control of water resources and river basin development. These intangible drivers refer to inter-state perceptions that shape securitization moves over upstream hydraulic development and downstream energy compensation, as displayed in our Influence Diagram (Fig. 11). In other cases, water can aggravate or alleviate the potential of pre-existing disputes, such as ethnic conflagration in the Ferghana Valley.

Using the stakeholder mapping exercise, we identified the main actors' rationales, priorities and power interactions, building on Zeitoung's framework of "hydro-hegemony" and the two-level theory. On a medium to large-term, regional development is curtailed by the fact that states render top priority to their individual economic and livelihood security in the short run. This hampers upstream countries from diversifying their energy potential, and downstream states from switching to less-water-intensive crops from cotton monoculture in agricultural production. To overcome individual optimisation, states ought to adopt a mutual gains approach.

Some of the limitations that we experienced include that, by taking the basin as our unit of analysis, we realized that much of the data are mostly provided on a state-to-state basis. Timing has also affected our arrangement for conducting semi-structured interviews with chief officers and project managers on these issues. After consulting a wide set of multiple sources, we did not find much information on how the COVID-19 pandemic has influenced transboundary water interactions, such as population movement restrictions on water demands and the scheduling of facility construction. Due to space limitations, third-party political involvement has been narrowly discussed, while assessing different powers' -China, Russia, Iran, Pakistan or India- leverage on the basin politics could be an appealing field to explore. Thus far, it would be premature to consider the uncertain role that the newly established Taliban Regime poses in the Central Asia setting and its eventual engagement in the Aral Sea basin's ongoing institutions.

In light of these challenges and realities, it is hoped that the findings of this research will provide a framework for both policymakers and practitioners by understanding the structural incentives leading to water cooperation and by improving early warning in future transboundary conflictive interactions that could wreak havoc on already water-stressed regions.

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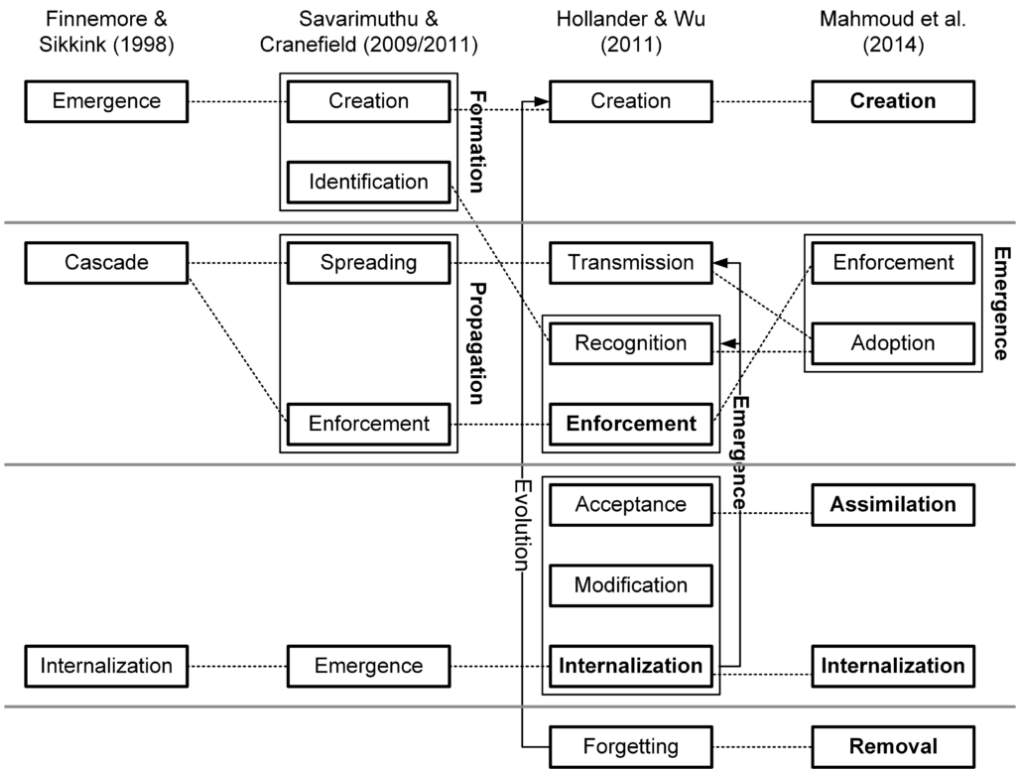
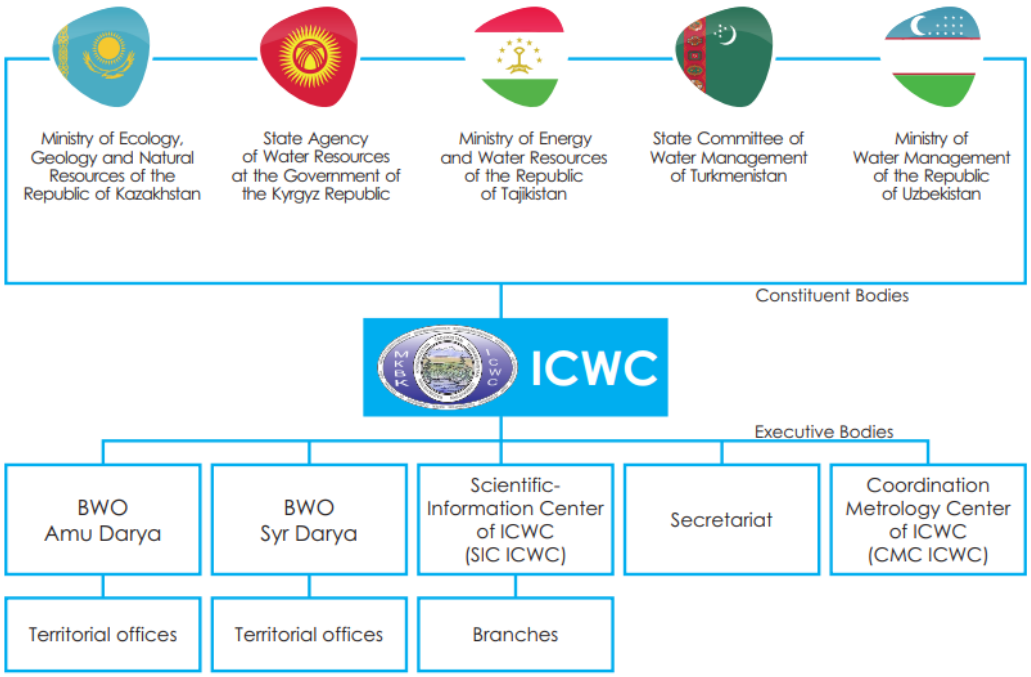
ANNEXES

Annex 1: Different Norm Evolution Theories. Source: Frantz and Pigozzi (2018).



Annex 3: Structure of ICWC. Source: ICWC.



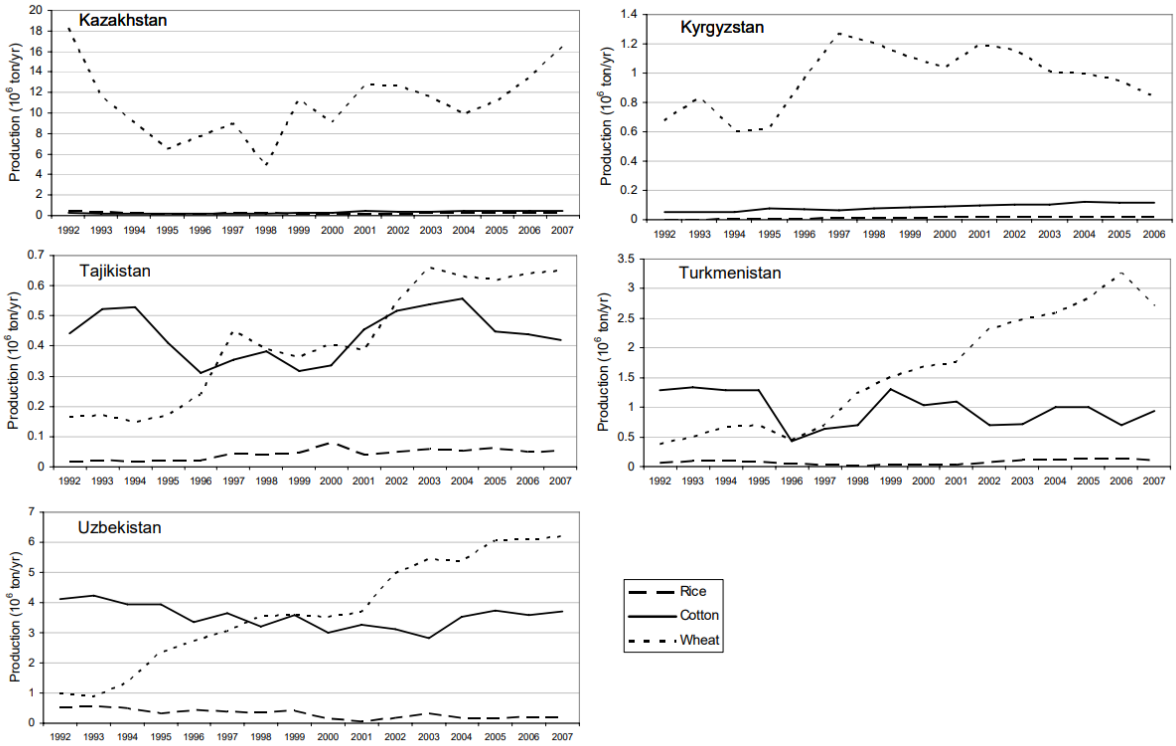
Annex 2: Map of irrigated zones in the ASB. Source: Francesco Bonino.

Annex 4: Regional transboundary watershed agreements and ratifications. Source: EC IFAS (2011)

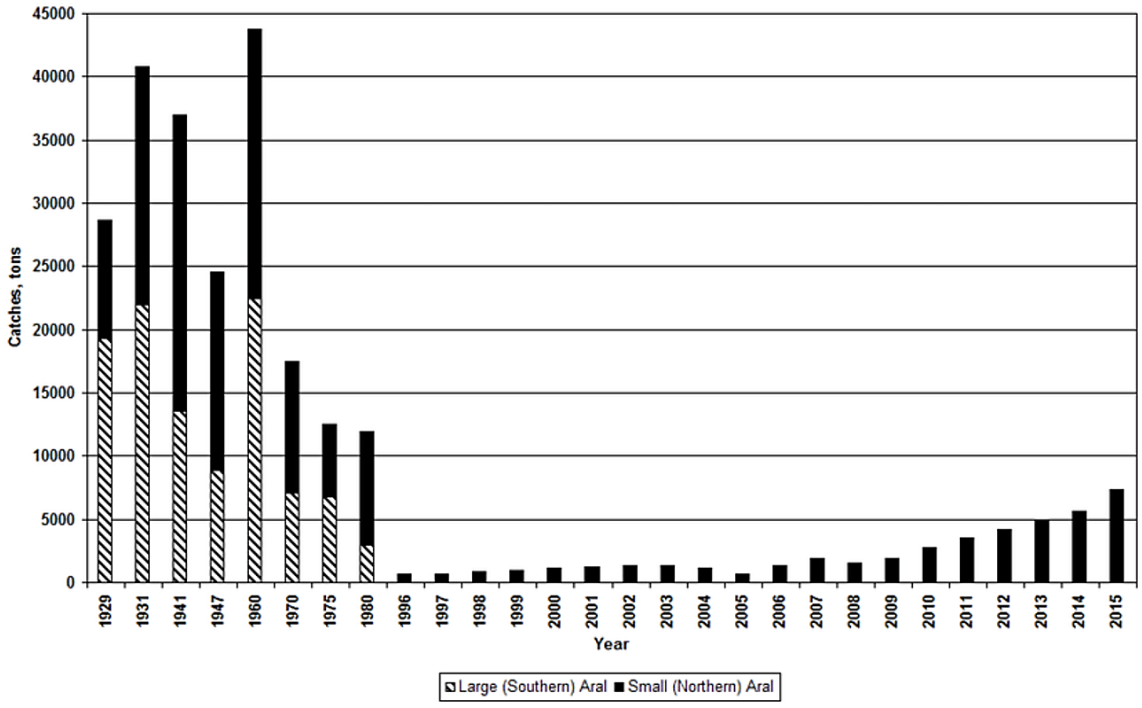
Central Asia	**Afg**	**Kz**	**Kg**	**Tj**	**Tm**	**Uz**
1992 Almaty Agreement	-	√	√	√	√	√
1993 Kzyl-Orda Agreement	-	√	√	√	√	√
1996 Chardjev Agreement	-	-	-	-	√	√
1996 Agreement on the use of fuel and water	-	√	√	-	-	√
1998 Syrdarya Agreement	-	√	√	√	-	√
1998 Environmental Cooperation Agreement	-	√	√	-	-	√
1999 Agreement on the parallel operation of CAR's energy systems	-	√	√	√	-	√
1999 Hydromet Agreement	-	√	√	√	-	√
1999 IFAS Agreement	-	√	√	√	√	√
2006 Sustainable Development Convention in CA	-	-	s	s	s	-
Commonwealth of Independent States	**Afg**	**Kz**	**Kg**	**Tj**	**Tm**	**Uz**
1993 Charter of the CIS	-	√	√	√	√	√
1992 CIS Agreement on Environmental Interaction	-	√	√	√	√	√
1998 CIS Transboundary Watercourses Agreement	-	s	-	√	-	-
1998 CIS Agreement on Informational Cooperation	-	√	√	√	-	-

Annex 5: Ship cemetery in Uzbekistan. Source: Francesco Bonino.

Annex 6: Evolution of wheat, rice and cotton production (1992-2007). Source: FAO (2009).



Annex 7: Evolution of fish harvests (1929-2015). Source: Micklin (2018).



Annex 8: Energy sector profile per country. Source: CIS Stadistical Committee (2020)

Country	Thermal and gas PP		HPP	Renewable power plants, MW				Total
	TPP	GTPP		WPP	SHP	SPP	BPP	
Kazakhstan	17,389	1,999	2,666,	383.9	224.6	883.6	7.82	22,936
Kyrgyzstan	862	-	3,030	-	40	-	-	3,932
Tajikistan	598	-	5,748.3	-	60.2	-	-	6,406.5
Turkmenistan	-	6,510	1.2	-				6,511.2
Uzbekistan	3,054	9,989	1,682	-	247	-	-	15,044
Total								54,829.7

Annex 9: Gender inequality in the Aral Sea region. Source: UN Women (2022)