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Managing Disaster Risks and Water under Climate Change in Central Asia and the Caucasus

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Actors, Approaches and Cooperation Related to Water Management and Natural Hazards Under Climate Change in Central Asia and the Caucasus

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1. Introduction

The objective of this thematic input paper is to provide a multi-dimensional overview of the diverse approaches, actors' interactions and cooperation towards water resources management and disaster risk reduction, in consideration of the challenges posed by climate change in the Central Asia and the South Caucasus regions. The first parts of the paper set the scene of the current socio-economic and geo-political background, presenting the current challenges for sustainable growth for both regions. The following sections provide a detailed overview and analysis of the institutional frameworks and key stakeholders for both regions, at the regional, national and local levels.

In 1991, the dissolution of the Soviet Union has led to the emergence of new political and socio-economic dynamics shifting from a centralized command system to market oriented economy. In this context, each of the fifteen post-soviet states advanced its own approach to building long term development strategies, resulting in a diversity of models, stakeholders and positions.

Although both regions are considered to be well endowed in water resources, these are unevenly distributed, exacerbating strong transboundary inter-dependence and tensions. Low levels of cooperation have so far hindered the rational and efficient management of this important resource, impacting on different sectors of the economies at the local, national and regional levels as well as intensifying competing interests between upstream and downstream countries.

In the Central Asia Region, upstream countries consisting of Tajikistan and Kyrgyzstan¹ are considered to be rich in water resources and are willing to invest in hydropower production for domestic needs (with a peak use in winter for heating needs) and for export. On the other hand, downstream countries represented by Kazakhstan, Turkmenistan and Uzbekistan have tremendous water needs for irrigated agriculture (with a peak use in the spring and summer months). Tensions have increased since Tajikistan and the Kyrgyz Republic accelerate their hydropower production potential, competing with the downstream countries on seasonal water allocations for irrigation.

In the South Caucasus region, challenges are exacerbated by the presence of unresolved territorial disputes and geopolitical struggles (i.e. status of Abkhazia and South Ossetia, and the Nagorno-Karabakh conflict) which fuels mistrust between the involved parties, affect the economic development and sustain high levels of poverty. The geopolitical situation results in the lack of trans-boundary cooperation on critical issues, especially on Integrated Water Resources Management.

In both regions, the expected effects of climate change, including increasing temperatures, extreme weather events and glacial melts will have a major influence on water availability. While Central Asia will experience the "drier getting drier and wetter getting wetter" effects (Scenario RCP 8.5, cf. paper 1), the Caucasus is likely to no longer get sufficient rainfall to meet summer demand. In both regions, glaciers melting is an alarming issue; while increasing the water flow for the time being, it is increasing the risks of lake outbursts and floods in a few decades. Central Asia is currently home to 70 million ethnically and linguistically diverse people. By 2050, the population in the Central Asia region is expected to rise to 95 million people, increasing the pressure on natural resources uses, thus reducing the per capita water availability by more than 30% (World Bank, 2014).

36

2. Socio-economic & political context as of today

Water Resources are conducive to the economic and social development in the Central Asia and South Caucasus regions. The management of water, as one of the most important elements for the livelihoods of the people in Central Asia, has to be seen not merely as a technical process, but as a political, social, and economic process that is closely connected to the overall socio-political systems and development policies of the state, as well as environmental

¹ Afghanistan is the most upstream country on the Amu Darya River. Afghanistan is getting more and more engaged on natural resources management issues in the region, for now, rather on a bi-lateral basis with Uzbekistan, Turkmenistan and Tajikistan.

42 conditions. For instance, in Central Asia, over 8.4 million hectares of irrigated agriculture contribute around 20% to GDP
43 and employ a large percentage of the population (FAO, Aquastat). In the South-Caucasus, 2.1 million hectares of arable
44 land dedicated to irrigated agriculture (FAO/Aquastat) contribute to around 14% of GDP in Armenia, 7% in Azerbaijan
45 and 6% in Georgia (WB, 2017). Overall, depending on the country, 30% to 40% of the working population in the South
46 Caucasus earns their livelihood in the agricultural sector.

47 **Countries from Central Asia and South Caucasus regions are still**
48 **transiting from water resources management historical models to**
49 **build their own.** Many challenges arise from the post-Soviet
50 transition, as the old economic and political ties established by the
51 USSR ceased to exist, and with them, the centralized Soviet resource
52 distribution system that managed the exchange and allocation of
53 water, energy, and food supplies among the republics.
54 Consequences included a progressive degradation of essential
55 infrastructure (e.g. water, sanitation, energy, central heating and
56 solid waste), the weakening of institutions in charge of managing and
57 regulating natural resources management sector, and the
58 accumulation of gaps in the educational / professional systems. Also,
59 despite multiple on-going initiatives to reform the water sector,
60 Integrated Water Resources Management policies are not
61 consistently implemented through the region, mostly due to
62 technical and institutional capacities as well as lack of investments.

63 **The whole new set of international relations is influencing an**
64 **original culture of regional cooperation in the water sector:**

65 In Central Asia, the policy instruments put in place (e.g. “Almaty
66 Agreement” of 1992 for cooperation, joint management, utilization
67 and protection of Interstate Water Resources for the Aral Sea Basin”)
68 did not provide the necessary tools to modernize the sector,
69 prolonging the Soviet legacy in terms of water allocations, originally

Box 2. Influence of international relations for transboundary water resources management in the South Caucasus. Together with adjacent areas of Turkey and Iran, the Kura Araks River basin covers most of Armenia, Azerbaijan and Georgia. Given the stalemate situation regarding Nagorno-Karabakh between Armenia, on the one hand, and Azerbaijan and Turkey, on the other, the joint transboundary management of this river basin, including the monitoring of its contamination and the mutually concerted flushing of dams is a major challenge. A joint agreement doesn't exist, Georgia is the only country that has open communication lines with all other riparian states. Azerbaijan as the country furthest downstream prioritizes its interests in pipeline transit (Baku-Tbilisi-Ceyhan oil and Baku-Tbilisi-Erzurum gas pipelines) and acquiesces also to pollution caused in Georgia.

87 Belt could potentially stimulate greater cooperative efforts and political will among the states to effectively address
88 underlying regional hazards in the interest of mutual economic benefit” (SIPRI note, Richard Ghiasy and Jiayi Zhou, 2016).
89 Other major projects, i.e. the Turkmenistan – Afghanistan – Pakistan – India Pipeline (TAPI) and the Central Asia-South

Box 1. “Dams in Central Asia”: In the Central Asia region, the Soviet Union had built a number of large dams, particularly in Tajikistan and Kyrgyzstan, to store irrigation water and produce electricity. The irrigation system was also vastly expanded across the region to scale-up cotton and food production. In the long-term, this expansion has taxed water sources heavily and led to problems in water and soil quality, as well as new swamps emerging, as the water table changes.

Large-scale water infrastructure was also expected to ‘civilize’ a region considered backward. The political prestige of such projects frequently seemed to determine how potential benefits were assessed, and led to underplaying financial, social and environmental risks: these tendencies are also evident today. In the Perestroika era, the catastrophic shrinking of the Aral Sea caused by diverting river water to fields was one of the environmental issues that caused public outrage and a loss of faith in Soviet governance.

designed to sustain the irrigation flow

regime. In a study realized by Adelphi and CAREC and supported by SDC, the cost for inaction has been estimated at US 4.5\$ billion per year. In Central Asia, the recent evolutions in the political relations have positively influenced the cooperation in the water sector. In particular, the political shift in Uzbekistan undertaken under the new Presidency (2017) is creating a more favorable environment for discussions, at least on a bilateral basis with neighbor countries on trade (i.e. energy, goods, etc.), environment, security cooperation, etc. Although fragile, this is seen as a window of opportunity to pursue the modernization of the water and environment sector overall. This context is amplified by the geo-economic changes driven by China’s Belt and Road initiative; “In Central Asia, the

90 Asia Transmission line (CASA 1000) further evidence the increasing east-south connectivity as well as additional efforts
91 to develop cooperation in the water-energy nexus.

92 In the South Caucasus, the absence of a framework has caused existing gaps to remain unresolved issues, amplified in
93 the framework of the tensed political context (cf. Box 2). However, cooperation at the technical level with the
94 participation of experts from all the countries has resulted in positive achievements such as the NATO-OSCE South-
95 Caucasus River Monitoring Project.

96 **Finally, the Caspian Sea emerges as a strategic area**; future pipeline projects cross the Caspian Sea (linking Turkmenistan
97 to Azerbaijan) have now become more likely to be implemented in the nearer future. Its five littoral states Russia,
98 Kazakhstan, Turkmenistan, Iran and Azerbaijan have signed an agreement on its status on August, 10th, 2018 in Aktau,
99 Kazakhstan, after decades of dispute, even though seabed division still requires further agreements. Environmental
100 protection clauses, in theory further strengthening the 2003 Tehran Convention, might only serve as a fig-leave for the
101 littoral States' main approach of seeing it as a reservoir of exploitable hydrocarbon resources rather than a water
102 reservoir with a unique ecosystem, vital also for fishing and desalinated water supply on a small-scale. The previous
103 experience of the 2013 Kashagan environmental incident in Kazakhstan that went without protest by neighboring states
104 suggest that these might use environmental clauses as a cover-up to prevent rivaling pipeline projects.

105

106 3. Institutional set-up

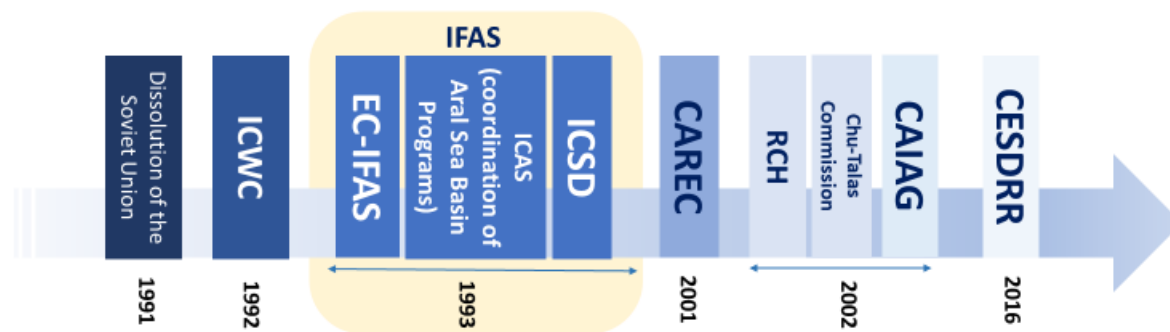
107 a. Institutional Framework in Central Asia

108 - Regional level

109 **The legal and institutional framework for water resources management** was established in the early days of
110 independence. It consists of a robust set of agreements of various kind (i.e. from binding to declarative) as well as
111 regional institutions that demonstrated at that time, the willingness of the countries to maintain the pre-established
112 inter-state relationships under the Soviet Union framework.

113

114 Fig1. Chronology of Central Asia Water Related Institutions²



115

116

117 The International Fund for Saving the Aral Sea (IFAS) is considered as the main umbrella institution which coordinates
118 regional actions in the water and environment sectors. Established at the highest level by the Five Central Asia Heads of
119 States, the platform is composed of several technical and working entities. Particularly relevant for the water sector, the
120 *Interstate Commission for Water Coordination (ICWC)* is responsible for elaborating, approving and implementing annual

² ICWC – Interstate Commission for Water Coordination; ICSD – Interstate Commission for Sustainable Development; CAREC – Central Asia Regional Ecological Center; RCH – Regional Center of Hydrology; CAIAG – Central Asia Institute for Geosciences; CESDRR – Center for Emergency Situations and Disaster Risk Management

121 water consumption limits for each riparian Republic of the Syr Darya and Amu Darya rivers. The Executive Committee of
122 the IFAS (EC-IFAS) is also serving as a regional platform for dialogue and coordination on water and environmental issues
123 among the countries of the Aral Sea basin as well oversees the implementation of the Aral Sea Basin Program (ASBP).
124 The chairmanship and location of IFAS rotates every three years among the country's five presidents. The Presidency is
125 currently in Turkmenistan.

126 After more than 2 decades of existence, multiple institutional and legal discrepancies in the IFAS constituency as well as
127 the lack of political willingness to properly invest and use the structure for the common good of the region, have
128 weakened the original mandate of the organization. The IFAS system has been unable to address critical issues of
129 cooperation as well as foresee the modernization of the water sector, including promoting IWRM principles and the river
130 basin approach. Several attempts to reform this system into a more comprehensive, transparent, and efficient
131 mechanism have failed as of today (Discussion paper, UNECE, GIZ, EC-IFAS, 2010). In 2017, Kyrgyzstan withdrew from
132 IFAS and is now actively pushing for a reform of the system at the highest level. This question sits on the work program
133 of the EC-IFAS chairmanship, led by Turkmenistan. The results will again determine the current convening power of IFAS
134 and its ability to facilitate dialogue of the highest importance in the region.

135 **Regarding disaster risks management**, the complex geography configuration creates a need for enhanced coordination
136 between the Central Asian Republics. Formally established in 2016, the Center for Emergency Situations and Disaster
137 Risk Reduction (CESDRR) for Central Asia and South Caucasus is one of the most recent institution created in Central Asia
138 and Caucasus that facilitates dialogue and strategic planning for disaster risk management. Among other issues, the
139 Center aims at consolidating efforts and support resources mobilization for preparedness and effective response to
140 emergencies. It also helps Governments with policy guidance as well as planning and implementation of the Sendai
141 Framework for DRR. The agreement for the establishment of the Center has been signed by Kazakhstan and Kyrgyzstan.
142 Operational costs for the functioning of the Center are provided by both countries. Afghanistan has been granted the
143 status of observer. Tajikistan is also planning to join the organization but lacks financial resources to join effectively the
144 process. Other countries from Central Asia and Caucasus participate in the activities of the Center but discussions are
145 still on-going regarding their effective engagement.

146

147 - ***National level***

148 **On water resources management aspects**, the Central Asian countries are conscious of the necessity to modernize the
149 existing foundations for natural resources management to adjust to upcoming challenges, including those related to
150 climate change. For instance, Integrated Water Resources Management (IWRM) is perceived as a primary instrument
151 for the modernization. Indeed, each country has undertaken several initiatives to reform the water sector in this regard
152 and integrate key IWRM principles. **In Kazakhstan**, Agriculture is a key driver for the national economy and growth.
153 Impacted by the economic crisis in Russia, the drop of oil prices and the overall decrease of fossil resources, Kazakhstan
154 is urged to diversify its economy. In the context of Kazakhstan, investing in agriculture also means increasing water
155 productivity and enabling a more efficient use of water resources (e.g. use of high value crops, introduction of water
156 savings technologies, rehabilitation of key infrastructures) - A new water resources management strategy up to 2020 as
157 well as an Agriculture program for 2017-2021 have been adopted. **Kyrgyzstan** seeks to develop its hydropower potential
158 optimizing the cascade in the upper Naryn River, and has undertaken a series of reforms on tariffs, transmission and
159 distribution as well as winter heating. It is a stakeholder of the CASA 1000 project. At the same time, water supply and
160 sanitation is becoming a high priority. Finally, the Government is still undertaking efforts and investments to achieve the
161 full implementation of the Water Code dispositions, in particular through the Project *National Water Resources*
162 *Management (World Bank and SDC)*. **In Tajikistan**, the water-energy nexus is at the heart of the national agenda. Highly
163 dependent on energy resources as part of the regional distribution grid put in place during the Soviet Union, and with
164 connectivity to the Central Asia Power System (CAPS) cut in 2009, Tajikistan invests in energy security and in its economic
165 value. Also, a structural reform was started in 2006 with the implementation of a strategy for the establishment of a
166 stable institutional system, supporting new approaches to the resolution of management issues affecting the socio-
167 economic development of the country. A revision of the water code is pending, consolidating the river basin approach
168 in the country. Water quality and sanitation is growing as priority in the context of climate change. **In Turkmenistan**, a

169 new Water Code was introduced in 2016, allowing water usage by different organizations, including the private sector.
170 The efficient management of the Karakum canal - one of the longest canals in the world - is on the priority list of the
171 Government (~ 80% of water loss). At the same time, Turkmenistan invests in desalinization due to lack of good quality
172 freshwater supply in some areas. Given the extreme, dry and arid conditions for agriculture, Turkmenistan is interested
173 in high-value cropping investments. **In Uzbekistan**, the state is also undertaking a vast multi-sectoral reform program
174 that concerns the water sector as well as the agriculture and the energy sectors. There is no full clarity about the
175 definitive arrangements, although several transformations are expected at the local level.

176 However, implementing reforms, national strategies or complying with international standards remain overall
177 challenging in each country. Indeed, heterogenous levels of capacities at the sub-national levels, insufficient and non-
178 continuous budget mobilization, and low communication quality don't create an enabling environment for effective and
179 sustainable implementation of the reform.

180 The reform processes are also often used at the government level to strengthen and sometime overuse top-down
181 approaches in the provinces, and therefore strengthen their power base. This translates in a disconnection between the
182 central and local authorities which are respectively not properly informed about the long term vision and the reality of
183 needs on the ground. Despite the success of few pilots at the local level, achieving these processes at the national level
184 would require, among others, robust strategies, implementation plans and long-term support programs.

185 **Regarding disaster risk reduction:** The Ministries of Emergency Situations are the main institutions in charge of disaster
186 risk management in respective countries except for Turkmenistan, where the functions sit with the Ministry of
187 Defense. The National Hydro-Meteorological Services (NHMS) are key institutions in charge of hydrological and
188 meteorological monitoring and forecasting. The mountainous set-up in the Central Asia region present significant
189 forecasting challenges and the NHMS across the region are not currently able to provide adequate weather, water and
190 climate services due to under-financed support conducting to obsolete, broken equipment, poor telecommunications,
191 incomplete training and other issues. The poor access to timely and reliable information for climate and water is a key
192 challenge in all the Central Asia countries to anticipate dreadful weather-related situations as well as planning
193 strategically water resources uses.

194 The institutional frameworks for the water, DRR and the climate sectors are overall fragmented; the existing institutions
195 are generally disconnected and cross-sectoral exchanges are limited. Huge efforts of coordination have to be undertaken
196 to reach a harmonized standard for natural resources management. One of the major areas of improvement also lies in
197 the establishment of sound and reliable information systems with effective standards of coordination across sectors and
198 stakeholders.

199 - *Local Level*

200 Local administration, legally prescribed organizations like Water Users/Consumer Associations (WUAs/WCAs), private
201 entrepreneurs, and self-organized community bodies represent different categories of players dealing with water-
202 related challenges at the local level, including the provision of drinking water, irrigation management, land use
203 management, and DRR.

204
205 In areas such as the Ferghana valley, the dismemberment of local networks and inter-ethnic family ties through border
206 closures and by states fostering distrust between ethnic groups, has widely damaged collective water-management
207 practices (which were always subject to negotiation, and sometimes force). There is little possibility, and these days little
208 immediate interest, for e.g. Kyrgyz and Uzbek farming communities using the same canal to interact. Frequently, neither
209 side even has up-to-date information on current water infrastructure (closing, opening canals, expanding fields,
210 deterioration of infrastructure) on the other side of the border, let alone an agreement on water consumption. Where
211 innovations that are considered unfair, e.g. drawing more water, are obvious, these frequently become part of broader
212 tensions around territorial claims, particularly in the poorest areas. To date, despite rhetoric to the contrary, the process
213 of disengagement and zero-sum thinking at national level on these issues persists. Access to dinking water is also an
214 issue: overall, households in urban centers have piped water, though the quality is often questionable and treatment
215 plants inexistent or performance highly reduced. In city outskirts and the countryside, in many instances less than half

216 of households are connected, and some areas e.g. of the Ferghana valley buy their drinking water from trucks (if they
217 can afford this).

218
219 • The case of WUAs/WCAs

220 For two decades, the everyday life in rural Central Asia has been remarkably influenced by the introduction of
221 WUAs/WCAs. Responding to donors' demands to reduce government spending and decentralize resource management,
222 governments started in 1996 to transfer the management of on-farm irrigation systems to WUAs/WCAs, in a process
223 supported by several development organizations such as the World Bank, the Asian Development Bank and USAID.
224 WUAs/WCAs serve the purpose of regulating water management at the farmstead level through intense participation of
225 the users in decision-making processes (IBRD 1993; Salman 1997; Wegerich 2000; Sehring 2007; Roudik & Vodyanyk
226 2013; Shenav & Domullodzhanov 2017).
227

Box 3. Governance features and interaction with Local Users in Water Resources Management: the Syr Darya Delta (A. Samakov, 2018)

The local district in Kazaly is a branch of the “Kanzsushar” National State Company, responsible for maintaining irrigation infrastructure and providing water to farmers. In this small district where around 76,000 inhabitants live, livelihoods depend on the water supply from the Syr Darya River for activities such as herding, gardening, and reed harvesting. The main crop produced is rice. Challenges pertaining water uses in Kazaly mainly relate to the very low pricing attributed to water. Water users are supposed to pay monthly for their water allocation, but in practice, water fees are collected at the end of the harvest, when farmers have ready cash. Water users pay about 0.2 KZT (0.0005 EUR) for a cubic meter of water. Subsidies were mentioned in regulations that were revoked in 2016 but are still implemented at the local level, which reflect the poor inter-level communication channels. Water managers understand that local users wouldn't be able to pay for all the water they are currently using even though the water fee is low and additionally subsidized. If farmers had to pay for “every liter of water used” agriculture would no longer be viable in Kazaly.

228 As of today, local management entities such as WUAs/WCAs have been applied as a one-size-fits-all model without
229 legitimate alternatives and has so far produced very variable results. WUAs/WCAs are frequently simply viewed as the
230 pretext for a new ‘tax’, with little confidence that the collected money will result in better maintenance of irrigation
231 infrastructure. In the case of Uzbekistan, this kind of governance has been relatively effective in controlling and thus
232 capping agricultural water consumption. In terms of the democratic aspirations of WUAs, there is little positive effect
233 visible. For example, the many female-headed farming households (often husbands and fathers are away as migrant
234 workers) are often not adequately represented on these bodies, and thus disadvantaged in their water allocation rights³.
235 In countries such as Kyrgyzstan, the introduction of WUAs/WCAs are often unpopular, with farmers preferring locally
236 established, legitimated and informal (though not necessarily more equitable) modes of agreeing on water distribution.

237 Throughout the region, the figure of the mirob/murab village water manager is a key role that persists, with or without
238 WUAs/WCAs. Though not necessarily formally elected, these are figures that are collectively chosen and are broadly, if
239 not completely, trusted. Village level agreements to engage in collective repair or maintenance of canals (‘ashar’) was
240 historically also a common feature, that persist to this day in many sites. These systems of self-governance are however
241 rivalled by an expectation that higher levels of government should provide infrastructure and water services.

³ “In Kazakhstan, women’s employment in agriculture has doubled between 1998 and 2003. In Tajikistan, it is now estimated that women are at the head of around 20 percent of the small private farms that replaced the huge collective farms of the Soviet era. In Uzbekistan, women outnumbered men in agricultural employment by 2008, with one-third of all working women employed in the sector”: <https://thediplomat.com/2018/06/the-impact-of-migration-on-water-scarcity-in-central-asia/>

242 Examples of top-down introduced WUAs/WCAs, their modes of operation, and different outcomes are provided by
243 Zinzani (2015a, 2015b & 2016) and Hamidov et al. (2015) for Kazakhstan and Uzbekistan, as well as Sehring (2009) and
244 Isabekova (2013) for Kyrgyzstan and Tajikistan. Apart from the widespread perception of tense transboundary water
245 relations at the regional and national levels in Central Asia, there are also some promising cases of existing local
246 cooperation on water management and water sharing across national boundaries and which are finely adjusted to the
247 socio-environmental conditions of the respective locality (Stucker et al. 2012).
248

249 *b. Institutional framework for the South-Caucasus:*

250 The institutional setup in the Caucasus sub-region shares a historic background from the Soviet period. This equally
251 concerns the DRR and the water sector, including policies and legislation for water resources use in agriculture and
252 potable water supply and sewerage.

253
254 - **Regional Level**

255 **Regarding water resources management aspects**, the complex geopolitical situation following the dissolution of the
256 Soviet Union prevented productive interstate cooperation, especially on transboundary water resources management.
257 The Kura-Aras River Basin is the main source of water for Armenia, Azerbaijan and Eastern Georgia and in this regard, a
258 critical area to achieve good inter-state cooperation. Several initiatives are on-going with the objective to maintaining
259 satisfying water quality and quantity in the basin, meeting the required standards at community and ecosystem levels.

260 Given the lack of a joint regional agreement, several bilateral agreements to regulate transboundary water management
261 and environment protection between the South Caucasus countries have been signed; Agreement on Environmental
262 Cooperation between the Government of Georgia and the Government of the Republic of Armenia (1997) and
263 Agreement on Environmental Cooperation between the Government of Georgia and the Government of the Republic of
264 Azerbaijan (1997). Water diplomacy activities continue between Georgia and Azerbaijan (EUWI-EECCA, 2016), including
265 through the assessment of political economic benefits of transboundary cooperation. International organizations have
266 launched several joint projects to stimulate cooperation and palliate the absence of a joint regional agreement, involving
267 regional experts and NGOs such as the “South-Caucasus River Monitoring”, first South Caucasus transboundary water
268 project launched in 2002 by OSCE and NATO.

269 There is currently no interstate organization in charge of water and environmental issues. The Regional Environmental
270 Center Caucasus (REC Caucasus) is the only joint entity supporting the implementation of environmental projects in the
271 region. It has a non-profit status and gathers stakeholders from Armenia, Azerbaijan and Georgia. The mission of the
272 REC is to promote cooperation at national and regional levels among NGOs, governments, business, local communities,
273 and other environmental stakeholder, facilitate free exchange of information in accordance with International standards
274 (e.g. Aarhus Convention), introduce and support the implementation of global, European, regional and national
275 environmental policies. Effectively established since 2000, the REC Caucasus is a gateway for dialogue, networking and
276 cooperation among all environmental stakeholders at various levels.

277 **Regarding Disaster Risk Reduction aspects**, regional cooperation among South Caucasus (and Central Asia) republics is

Box 4. WCAs in the Bukhara Region, Uzbekistan (Hamidov et al. 2015)

Uzbekistan’s irrigation management was reformed top-down in the 2000s without the engagement of local resource users. Due to the absence of a proper legal framework, some WCAs were and still are lacking financial, technical, legal, and/or administrative support. The Bukhara region presents very challenging characteristics, suffering among others from frequent water shortages and severely salinized soil and groundwater. Against this challenging background for the organization of collective action for canal maintenance and water distribution, several WCAs in the region have demonstrated their effectiveness. Three conditions appeared to be important; (i) appropriate chairmanship skills including good water management knowledge, long-term experience, etc. (ii) Combination of the above-mentioned skills with effective participatory governance and (iii) good cooperation of the water users with state actors in Uzbekistan.

278 supported by Ministerial Meetings on Disaster Risk Reduction supported by UNDP and UNISDR. These meetings aim at
279 strengthening cooperation in the area of early warning and information management for large scale and trans-boundary
280 disasters as well as harmonizing the legal base, bilateral and multilateral agreements. Examples of cooperation include
281 “Prevention, preparedness and response of human-made and natural disasters (Eastern region)” Programme (PPRD) in

282 the framework of a tool of EU European neighbourhood and cooperation (2011-2014) engaging Armenia, Georgia,
283 Moldova, Belorussia, Ukraine and Azerbaijan, and “Strengthening Bio-Safety and Bio-Security Capabilities in South
284 Caucasus and in Central Asian Countries” programme, funded under the European Union’s Instrument for Stability;
285 Armenia (2013-2015), Georgia, Azerbaijan, Uzbekistan and Tajikistan are involved in the programme.

286
287 - **National level**

288 Primary legislations (i.e Water Law, Water Code and related regulations) are in place in all the Republics of the South-
289 Caucasus. Existing legal framework gaps need in some cases to be clarified on different aspects: implementation
290 mechanisms, including for the endowment of lower level administration entities with the necessary competences, and
291 the overall allocation of resources. Water resources management capacities considerably vary within the three countries
292 regarding the supply of potable water and sewerage as well as the monitoring of river contamination. The latter is a
293 concern to all three countries of South Caucasus while specifically water management and irrigation systems are high
294 priorities for Azerbaijan and Armenia. The condition of the networks, leading to high water losses and continuous
295 replacement and repairs, as well as illegal connections to the network are also important issues.

296 **In Armenia**, extensive efforts are still on-going to support the irrigation and agriculture sectors. One of the major shifts
297 for irrigated agriculture was the creation of WUA (i.e. Law on Water Users Associations, 2002) which have been central
298 in promoting shared public interest in operation and maintenance of irrigation systems and community-driven
299 development approaches. The development of robust information systems in support of sound-decision making was
300 made a priority. *The Irrigation System Enhancement Project* (World Bank) supports the development of Supervisory
301 Control and Data Acquisition (SCADA) systems, as well as water measurement and water flow control models. Also, a
302 National Financing Strategy has been developed in 2016 for rural Water Supply and Sanitation (WSS) to meet the
303 Sustainable Development Goals (SDGs) targets with the objective to close the financing gap for operation and
304 maintenance (EUWI-EECCA, 2016). Several pilots have also been developed on river basin management plan and
305 payment for ecosystem services. **In Azerbaijan**, the National Water Strategy was drafted and submitted to the
306 Government in 2016 (EUWI-EECCA, 2016). The strategy aims at developing water resources management and water
307 protection as well as water supply and sanitation in Azerbaijan, to meet both EU level standards and objectives.
308 Azerbaijan is also undertaking large investments to improve access to clean drinking water, which is a major challenge
309 in the country. *The Second National Water Supply and Sanitation Project* supported by the World Bank is on-going since
310 2008 and additional policy making efforts have been undertaken to monitor the performance in the WSS sector. **In**
311 **Georgia**, the Law on Water (1997) is the main legal source regulating water management. Currently a new law on water
312 resources management has been proposed in 2018 (based on the EU Water Framework Directive requirements) along
313 with several by-laws. This is a big step forward, although experts anticipate the implementation of regulation measures
314 for water consumption by different stakeholders, which will be provided by the law, to lack in strength (Kakha
315 Bakhtadze).

316 Regarding the Disaster Risk Management set-up, the sub-region presents high risk of exposure and vulnerability due to
317 the frequency, intensity of natural hazards as well as insufficient capacities for risk management. Natural and
318 technological hazards and risks are abundant ranging from Nuclear Power Plant management in Armenia to oil industry
319 infrastructure in Azerbaijan. The institutional frameworks currently in place provide regulation for governmental
320 participation and the engagement of a wider circle of stakeholders from public, business, academia, and NGOs. The most
321 significant natural disasters include earthquakes, (one of the strongest happened in 1988; Spitak earthquake in Armenia)
322 but they are not climate driven. Floods, droughts and forest wildfires are of lesser extent and often of local impact.

323
324 - **Local Level**

325 In Armenia, WUA have yielded considerable results, bringing recovery to Armenia’s irrigation system. The success was
326 mainly brought about through the improved efficiency and reliability of irrigation networks. WUA were less successful
327 in Azerbaijan and even less so in Georgia, where irrigation was less efficiently used. Despite efforts by World Bank
328 projects, for instance in the Marneuli area, Georgia’s most important agricultural area that depends on irrigation, the
329 WUA model did not work. In the first place, the Georgian irrigation system had suffered a more significant degradation
330 compared to Azerbaijan and especially Armenia. Then, the centralization and privatization of large water maintenance
331 companies favoured private hydro-electric dams as opposed to the detriment of small irrigation systems. Finally, because
332 large farms provide more reliable revenues, the government also focused on large farms, in an attempt to raise
333 production levels (Welton, G. et al. 2013, p22).

334 Specifically related to DRR, at the local level in Armenia, Oxfam in partnership with "OxYGen" Foundation is
 335 implementing a programme on "Supporting Community Resilience in the South Caucasus" funded by the European
 336 Commission under DG European Civil Protection and Humanitarian Aid Operations Programme (DG ECHO). The project
 337 increases disaster resilience of local communities by supporting strategies that enable them to prepare for, mitigate and
 338 respond to disasters. Among the implementing activities are the establishment of the inclusive Green Lab, supporting
 339 the development of DRR and Emergency Situation plans in all educational institutions of the target province, awareness
 340 raising seminars on first aid, climate change adaptation, inclusiveness and gender in DRR, behavioral rules in emergency
 341 situation and other DRR topics, and implementation of small-scale mitigation projects. A wider collaboration network
 342 includes local NGOs, volunteer rescuing team, provincial municipality, regional rescue service, etc.

343

344 3. Conclusion

345 The countries of Central Asia and South Caucasus seek greater water security in a nexus context with the energy,
 346 agriculture and environment sectors. There is a general awareness of the growing demand for water, while supply of
 347 water is constrained and, possibly diminishing through climate change impacts, pollution of water stocks, etc. Countries
 348 increasingly diversify agricultural crop patterns to shift resources to less water-intensive and more valuable crops and
 349 diversify their economies; these shifts are accompanied by varying degrees of reforms of the water and energy sectors.
 350 In Central Asia and in the South Caucasus, there is a clear willingness to modernize the water and environment sectors.
 351 However, many problems remain. Weak institutional framework, low technical capacities and financial resources as well
 352 as overall implementation processes remain challenging and require a long-term strategic approach in consideration of
 353 the climate change related risks and vulnerabilities. Finally, as there is a growing understanding that national solutions
 354 alone might not be sufficient to address upcoming challenges, investments in renewable energies, disaster prevention
 355 infrastructures and opening-up new trade opportunities connecting beyond the territorial borders are developing
 356 trends.

357

358

359

360 Annex 1 – Maps

361 Blue Peace Program – SDC – Rivers of Central Asia and Climate Change Impacts on Glaciers and Water



362

363



376 **Hydrographic map of the Caucasus. March 11, 2010. (Shannon/Wikimedia Commons)**

377 Source: <http://www.glimpsefromtheglobe.com/topics/politics-and-governance/forecasting-water-wars-in-the-caucasus/>

378

379

380 **Annex 2 - SWOT Analysis**

| Strengths | Weaknesses |
|--|--|
| <ul style="list-style-type: none"> • Water in Central Asia is not a scarce resource in absolute terms • Several water-related institutions are already in place at the regional and national levels in the Central Asia region • Complementarity between resources in upstream and downstream countries • Top-down management of water can be efficient in certain contexts, as long as users fear consequences of ‘disobeying’ • In contexts lacking effective formal governance of water, users nevertheless invariably organize themselves, often through well-established roles and bodies, with varying results in terms of representing users and water efficiency. | <ul style="list-style-type: none"> • Water in Central Asia and Caucasus is unevenly distributed and used inefficiently • Infrastructure is old and in need of restoration • No updated framework agreement for the management and sharing of water resources • The activities carried out by development actors are sometimes disjointed and uncoordinated • lack of connection between riparian users and thus understanding and sense of responsibility at local level of effects of wasting or polluting water • little meaningful consultation and inclusive decision-making with water users • oftentimes lack of trust in new forms of managing water such as WUAs/WCAs, expectation of corruption and abuse • No framework agreement for transboundary water resources management in the Caucasus • Outdated and weak information systems and monitoring networks for weather, climate, water and environment • No capacities for DRR and water available; there are major gaps in the systems for education and professional trainings |
| Opportunities | Threats |

- Because of increased melting, the region is in fact probably experiencing relative abundance of water at present
- Recent developments show increased political will to cooperate among Central Asian governments
- Numerous high-level water initiatives (particularly those advanced by Tajikistan and recently in Uzbekistan) denote the prominence of water issues in the regional political debate
- DRR and Climate Change can offer less political platform for transboundary dialogue and cooperation.
- Progressive understanding to shift the paradigm towards more effective water resources management and in the consideration of the climate change challenge;
- More openness to develop innovations
- Many development actors operate in the region and have put in place a number of significant water-related programmes
- existing informal modes of governance that do not call themselves WUA could be recognized and supported in networking upstream-downstream communities
- Reform of regional institutions

- Glaciers and snow packs in Central Asia are melting due to climate change and this will impact on runoff regimes, seasonal water availability and increase evapotranspiration
- Large hydropower plants are still controversial and there is no clarity on funding sources
- Short-term barter agreements to share water and energy resources can lead to conflicts and uncertainty over allocation of resources
- Border issues in the Ferghana Valley can exacerbate existing conflicts over water use
- Increased weather and nature related disasters due to climate change

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382

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Annex 3 - Institutional mapping for Water Resources Management and Disaster Risk Reduction (DRR) in Central Asia and the Caucasus

a. Central Asia

The table below is representative of the key institutions in charge of water resources management and DRR. Other relevant institutions from the academia are not included there.

| | Main institutions | Characteristics |
|--------------|--|--|
| Kazakhstan | Ministry of Agriculture | - Committee of Water Resources: water policy and coordination, allocation in the basin, permits, cadaster (Basin inspection). Deliver water for irrigation, drinking water and operate monitoring networks (Kazvodkhoz) |
| | Ministry of Energy | - Kazhydromet: Collection, processing & dissemination of hydrologic and meteorological information, Meteorological forecasting - Department of Climate Change |
| | Ministry of Emergency Situations | - KazSeleZashita: Kazakh Emergency Management organization for landslides, mudflows, floods |
| Kyrgyzstan | Ministry of Agriculture, Processing Industry and Melioration | - Department of Water Resources and Melioration: Investment & Policy, information & Analysis, manage water demand, distribution and planning for irrigation, construction & hydraulics, automation and metrology, international Issues, Chu-Talas Commission, Basin agencies and district water offices |
| | State Agency for Environment Protection | Environmental Monitoring & Enforcement, Forestry |
| | Ministry of Emergency Situations | Agency for Hydro-meteorology (Kyrgyz Hydromet): Collection, processing & dissemination of hydrologic, meteorological, and water quality information, meteorological forecasting |
| Tajikistan | Ministry of Water and Energy | Implement Integrated Water Resources Plan, basin planning, safety of hydraulic infrastructures |
| | Agency for Land Reclamation and Irrigation | Deliver irrigation water to users according to demands and limits set by the basin inspectorates, operate and repair water works including irrigation and drinking water works for delivery of water to users |
| | Committee for Environment Protection | Tajik Hydromet: Collection, processing & dissemination of hydrologic, meteorological, and water quality information, meteorological forecasting |
| | Committee for Emergency Situations | Disaster management and response |
| | Barki Tajik | Operation of hydropower plants |
| Turkmenistan | Ministry of Agriculture and Water | Water Resources planning & management, policy for water resources and agriculture |
| | State Committee for Environmental Protection and Land Resources | Implementation state policy and inter-sectoral control for environment and natural resources uses, protection of ecosystems, prevention of deterioration of surface and groundwater, monitoring of natural resources. |
| | National Committee for Hydro-meteorology under the Cabinet of Minister | Weather forecasts, water availability favorable periods, applied research in natural sciences and engineering, implementation of inter-state scientific and technological cooperation, including the exchange of information on natural disasters, and methodology for meteorological observations, monitoring network operation |
| | Ministry of Defense | Management, prevention and response to emergency situations |
| Uzbekistan | Ministry of Agriculture | Sectoral and territorial development (e.g. job creation, rural livelihoods), development of the economic potential in the agriculture sector, food security |
| | Ministry of Water Resources | Coordination and policy development for water resources, operation and maintenance of irrigation and melioration system, reservoirs, pumping stations, hydro-technical structures, protection of large water facilities, transboundary water resources management. |
| | State Committee for Nature Protection | Develop State Policy on environment security and natural resources uses, environmental certification and standardization of norms, climate change issues |
| | Ministry of Emergency Situations | - Disaster risk management and response - Uzbek Hydromet: Collection, processing & dissemination of hydrologic, meteorological, and water quality information, meteorological forecasting |

b. Caucasus

| | Main institutions | Characteristics |
|------------|--|---|
| Armenia | National Water Council | - Highest advisory body. Advises on water management issues, makes recommendations on policies, legal documents, and the National Water Program |
| | Ministry of Nature Protection | Includes Underground Resources and Environmental Protection departments, the Water Resources Management Agency, the State Environmental Inspectorate. Controls the use of water resources through water use permits. |
| | Ministry of Agriculture | Development of agricultural policy and strategies, including irrigation and drainage policies |
| | Ministry of Emergency Situations | The Ministry is responsible for the state policy on civil defense and population protection. It coordinates the development of state regulation policies for displaced population, coordination of emergency and disaster response, coordination of international rescue operations in the country, seismic risk reduction measures, hydro-meteorological studies and forecasts, maintenance of reserve stocks. |
| | National Platform for Disaster Risk Reduction | The National platform (formed by the Government of Armenia in 2010 as an NGO) is the result of the joint efforts of the MES, UNDP and UNISDR and other DRR partners. The Platform engages state, non-governmental, private and international stakeholders in decision-making and consultations. |
| Azerbaijan | Ministry of Ecology and Natural Resources | Overall responsibility for conservation of water resources and pollution control |
| | Committee on Ecology and Nature Use | Monitoring of salinization and water pollution |
| | State Committee on Amelioration and Water Management | Monitors water use, mainly for irrigation, issues permits for surface water and levies charges for water use. It is also in charge of land improvement on irrigated land and the operation and maintenance of the irrigation infrastructure. |
| | Ministry Health | Center for Epidemiology and Hygiene – Monitoring for drinking water quality |
| | Ministry of Emergency Situations | Disasters management and response. In addition, protection of petroleum and petroleum products and relevant industrial installations which are specific to this country and rescue services in Caspian basin. |
| Georgia | Ministry of Food and Agriculture | The department of Melioration and Water Resources is responsible for planning, monitoring, and promoting irrigated agriculture |
| | Ministry of Environment and Natural Resources | The Centre for Monitoring and Prognostication is responsible for the assessment of surface water quantity, including the Black Sea and groundwater. |
| | Ministry of Internal Affairs | Emergency Management Agency – disaster management and response |

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