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Thematic Input Paper 3

Pathways to sustainable solutions to manage water and reduce disaster risks under climate change in Central Asia and the Caucasus

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Introduction

Paper 2 reflects on two realities: on one hand, the willingness to modernize different sectors of the economy in the pressing context of climate change, and on the other hand, the incapacity to break with historical Soviet governance model (e.g. rigid institutional structures, radical vertical management, low level of initiative spirit, etc.) as well as post-Soviet patterns marked by authoritarian jurisdictions with little concern for equitability and collective resources. Adjusting the way we manage natural resources in a changing climate requires new sets of competences, pluri-disciplinary specialists, and increased levels of coordination among various actors. Based on the background provided in the Thematic Input Paper 2, the Thematic Input Paper 3 examines potential pathways for sustainable solutions relevant for the Central Asia and Caucasus regions.

1. Towards integrated levels of governance

Political actors and development practitioners often lack detailed knowledge about locally grounded, contextualized, well-functioning resource governance and management arrangements. Besides, there is a poor understanding at the local level of long-term strategies and objectives endorsed at national and transnational levels. This pathway consists in promoting a better vertical integration and balanced participation between policy/decision making levels (i.e. central authorities) and executive/management levels (i.e. local entities).

Raising public participation for water resources management: The good status of natural resources is the responsibility of all. The level of awareness about the importance of water is relatively low in the CIS countries. Water as a resource should not only be thought of in terms of a natural resource and its environmental aspects but as a common good. Raising public awareness in this direction would emphasize the aspect of fair distribution, reasonable use, protection of water resources and improved understanding of the ecology/environmental issues. This could be done through trainings or media campaign using national or local NGOs. Engaging and stimulating discussions with different water users on the ground is equally important to further manage competing uses of water resources (e.g. consumer needs, agriculture including fishing, industry, energy, etc.) and assess their respective needs and priorities. In Central Asia, agriculture accounts for about 89 percent of water withdrawals, with wheat, cotton and rice being the most water-intensive crops, while Turkmenistan and Uzbekistan are by far the largest water consumers (FAO Aquastat). Irrigated agriculture is also a major source of pollution (fertilizers, pesticides, salinity leaching back into the water courses). Other sources of pollution include open (both used and abandoned) mines and industries close to water sources, as well as household use e.g. towns pumping sewage straight back into major rivers. Because of the sensitivity of this issue, there are very few reliable accounts of types and sources of pollution: it would be an excellent contribution to promote widespread awareness of actual water quality. However, such a

program would have to be implemented in a sensitive way, e.g. through citizen science programs, in order not to create a further spiral of blame around water quantity and quality.

Box 1. Raising awareness context and activities - Caucasus: In Caucasus, irrigation followed by households and industry are the main water users. In Armenia, the biggest polluter is the mining industry. Apart from irrigation/agriculture, fish farms (around 250 fish farms with the total surface area of more than 3.5 thousand hectares) are the biggest water consumers. Water uses and supply changed after the dissolution of the Soviet Union. The abrupt de-industrialization has contributed to maintain the illusion of low pollution levels in major rivers of the region. However, the role of chemicals and fertilizers, household waste-water, and new industrial activities such as mining have been largely absent from public discussions. There is a clear evidence still of rivers contamination (i.e. tailings, chemical dumps, direct discharge of water used, etc.). Due to low levels of awareness, people engaged in agriculture activities use contaminated water on the lands, and in extreme cases, water flows across cities and villages. Raising awareness among local communities, promoting social activism and citizen engagement has proven to be a very effective tool. **NGOs such as "Green Alternative" in Georgia** combine campaign work with capacity building of the local groups, facilitating direct engagement of local communities in environmental discussions. Current campaigns focus among others, on hydropower development projects, which pose significant threat to environment and local communities.

…/…

Promoting flexible governance models at the local level: Globally, a major paradigm shift is currently undergoing. Natural resources management is not the exclusive domain of the public sphere anymore. Participatory management, stakeholder's involvement in decision making, community level management models are becoming increasingly important (Pahl-Wostl et al., 2007). Indeed, there is no "silver-bullet" measure to solve water-related challenges (e.g. water overallocation, unreliable water supply, water quality deterioration, flood damage, ecosystem degradation, etc.). Also, asymmetrical power relations and diversity are basic features of human societies. Therefore, representatives of different social categories including elites/decision makers AND representatives of marginalized social groups such as women, youth, and deprived persons must be consulted and included in decision-making and implementation. In-depth and

Box 2. Benefits of local governance models
- Reduce the risk of decontextualization
- Provide customized solutions to the local context
- Create real ownership for the solution achieved
- Effective vertical lobbying channel, influencing policy and decision makers
- Effective and transparent evaluation impact of the projects
- Improve infrastructure operation and maintenance.

…/…

The Global Environment Facility Small Grant Program in Armenia supports grassroots initiatives building links between Civil Society Organizations (CSOs) and the Government. The Air-Aid project by Aires Development Foundation (2017-2018) uses the latest advanced technologies to increase the links between participating organization, CSOs and respective government agencies. The project uses an open-source platform directly linked to relevant units within the Ministry of Nature Protection. The project developed and integrated participatory approaches in environmental monitoring within the Ministry's relevant departments with a clear positive impact on public accountability of the state institution and contributed to closer 3-tier interactions (Government-CSO-Citizen).

differentiated understanding of local and regional governance and management practices, power relations, livelihoods, as well as adaptation and coping strategies is necessary before specific instruments will be developed. Finally, the development of instruments and measures that contribute to develop problem understanding as well as contextualized and locally accepted solutions should be pursued in a participatory way. Examples below are illustrative of how this can work in practice.

In Tajikistan, an especially promising example is the Water User Association 'Ob Umed' (Water is hope) of Porshnev Municipality, which has been awarded the UNDP Equator Prize in 2014 for its efforts to "meet climate and development challenges through the conservation and sustainable use of nature" (UNDP, 2016). This WUA was initiated by local efforts and supported by the Mountain Societies Development Support

Programme (MSDSP), an initiative of the Aga Khan Foundation (AKF). This local-specific water use and management arrangement is based on several key elements including the application of historical environmental knowledge, transparent and inclusive decision making processes, collaborative action, as well as low membership fees and widely accepted burden sharing (collective repair and maintenance work). At the transboundary level, Stucker et al. (2012) provide the case of cross-boundary cooperation of Kyrgyz and Tajik water users on the Khojabakirgansai, a small tributary of the Syr Darya in the Ferghana Valley shared with Kyrgyzstan. Livelihoods in this area are particularly vulnerable to water variability caused by climate change-related hazards (e.g. shifting precipitation regimes, changing in the runoff regimes including flash floods, variability in the water volume, etc.). In the awareness of interdependence, the water users rely on a well-functioning institutional framework mutually agreed upon, apply collaborative measures for water supply and infrastructure maintenance, and operate transboundary early warning systems to handle water-related hazards such as floods following heavy rainfalls.

In Armenia and in a different context, grass-root entities and NGOs could successfully challenge state institutions and operating companies (e.g. mining, water supply) and influence policy decisions. In the midst of the recent changes in the government, public accountability has become central in the policy apparatus. As a result, a moratorium was imposed by the Government on all new mining explorations for 6 months until proper environmental checks and impact assessments would be done. Prior to the recent changes in the Government, corruption and the intermingling of the state and business interests prevented the effective enforcement of environmental legislation, which led to multiple violations and negligence. Reflecting on the recent transformations in society, it has been demonstrated that when the political will is backed by the support of the majority of the population, changes may happen in a relatively short period of time (e.g. enforcing fines, disrupting the "business-as-usual" approaches of the industry, engaging environmentalists and CSO community to review existing regulations, banning plastic, etc.).

2. *Stepping out of the national zone*

Historically, Central Asia and the Caucasus were integrated regions characterized by the exchange and mobility of people, commodities, and ideas. Closed state borders and national solutions are more recent phenomena, which do not meet current complex challenges the regions are facing. Just as running water and climate change know no boundaries, the societies of both regions should recognize the potentials of regional integration and increased cooperation, and focus on mutual solutions to shared challenges. Questions of inter-state cooperation are highly political and motivated or influenced by the broader geo-political and economic context. Re-building a culture of cooperation could include the following aspects:

- *Facilitate dialogue between the technical and political spheres at national and regional levels*. What is obvious in terms of cooperation benefits for the stakeholders working in the water/environment sector is not always evident for political/financial decision makers. For instance, the increasing role of the Ministries of Foreign Affairs in the Water sector (in particular for Central Asia) has increased the "politicization" of the water sector, creating more sensitivity on the topic;

- *Already existing institutions should be used*. The development of new institutions runs the risk of enlarging the existing institutional thicket, complicating coordinated actions as well as creating additional "influence zones" potentially leading to conflicts of interest among different actors. If necessary, the existing bodies should be restructured or reorganized to enable solution-oriented and multilateral negotiations of common visions for the region;

- *Identify entry points for cooperation*: entry points are evolutive, can cover different sectors and at various levels; e.g. DRR, information exchange, education, research, etc. Experience has shown that initiatives do not have to be significant to generate positive impacts and serve as catalysts for major changes. For instance, pilot projects format provide an ideal format to experience and test what is working or not. Also,

focusing on small transboundary areas provide a more manageable framework and sometimes less embedded into larger political stakes (e.g. experience on Isfara river basin, Chu-Talas, etc.);

- *Provide access to global experiences*: challenges in the Central Asia and Caucasus regions are specific but are not unique. Other regions in the world have their own challenges and might provide inspiring knowledge and experiences. Targeted audience would include a large public (e.g. general public, policy makers, etc.), using media or other communication means (cinema, literature, art projects….); e.g. documentaries on successful grassroots initiatives in other parts of the words.

3. Cross-cutting pathways

Climate commitments and ecosystem approaches: the five Central Asia and Caucasus countries have signed the Paris Agreement and have announced their commitments through their respective Nationally Determined Contributions (NDCs) to reduce greenhouse emissions and promote renewable energy investments. Decentralized action, such as individual cities signing up to climate action, rather than whole nations could be also envisaged. Large cities both in Switzerland and Central Asia are significant players, especially where broader accords fail: maybe these could be linked, also globally in a network of mutual commitment. If integrated in economic benefits of some kind, this could be attractive to Central Asia cities, and also foster new kinds of networks at regional level.

Ecosystem based approaches complement IWRM practices, bringing the flexibility required to address climate change challenges, including through the introduction of flexible financial mechanisms and investments. Providing a holistic umbrella, investments developed under this approach would provide different alternatives to larger infrastructures, by nature more sensitive in a transboundary context, taking into consideration the environment's requirements. Ecosystem approaches and services are also increasingly used for DRR, locally developed for local communities and developed as part of their livelihood strategies (NIDM, 2012).

Box 3. Reducing water related natural disasters through Integrated Watershed Management. Eco-system based approach: the case of Aksu transboundary watershed. Study Case by Ilhom Gulomjanov, ACTED.

The Aksu watershed is a transboundary basin shared by Kyrgyzstan and Tajikistan. The local population is exposed to the constant threat of mudflows; soils are highly degraded due to both man-made (i.e. Deforestation, pasture degradation, inappropriate agricultural techniques) and natural erosion and are easily washed away during extreme rainfalls, creating mudflows, destroying downstream infrastructures and shattering lives.

The project was implemented in the framework of DIPECHO X program, funded by ECHO and the National Water Resources Management Project implemented by the consortium HELVETAS, GIZ and ACTED and funded by SDC in Tajikistan since 2014. The project is anchored in the on-going Tajik Water Reform launched in 2014, shifting water management from administrative boundaries towards hydrographical boundaries (i.e. river basins and watersheds).

ACTED adopted a dual approach, building the local disaster preparedness capacities and introducing DRR and mitigation methods. The innovative approach here is to combine integrative and participatory planning activities with technical activities, both supporting each other. It is especially innovative in Tajikistan, where natural resources management is vertical and administrative, excluding ground-level day-to-day users.

The Aksu Watershed-Dialogue serves as a coordination platform gathering key stakeholders in the watershed (about 30-35 farmers, breeders, representatives of the district, local forest administration and local water management administration). The platform conducted a participatory assessment of the state of the watershed. Experts issued recommendations segregating "grey" (short-term) measures (e.g. river bank reinforcement, diversions, etc.) and "green" (long-term) measures, (e.g. substitution of grains by perennial grass on the slopes to stop erosion and planting of trees to enhance reforestations). Measures were then further organized into an action plan.

This approach demonstrated the following benefits:

- Capitalization of the local knowledge, building on stakeholders' expertise, generating legitimacy and allowing appropriating the decisions made together.
- Target concrete ways to use natural resources
- Ensure the commitment of local stakeholders, responding to their direct and future needs through enhancing livelihoods and reducing risks.

"Knowledge is a pre-requisite for action": Access to reliable and timely information is essential for effective natural resources management and for apprehending upcoming climate change challenges. Developing solid information systems requires long-term investment programs looking at adequate institutional frameworks and infrastructure, and needs to be integrated into key strategies at the national and regional levels. In the context of variable climate and increased risks of disasters, monitoring, recording and reporting of events over relatively long-time scales and standardized data reporting are key (TIP1). However, benefits of investing in needed equipment and other resources are not obvious to higher instances - or simply hindered by limited financial resources- thus, investments in monitoring networks and information systems are not always a priority (TIP1). When developed effectively, data management related activities enable better planning, use and distribution of natural resources in the short and long-term, apprehend the effects of climate variability and enable to set-up corresponding DRR strategies. Furthermore, this can introduce innovative ways of institutional coordination, increase transparency towards natural resources uses and facilitate the development of inclusive approaches at the local level:

- Large-scale data collection, processing and analysis capabilities add to the national and regional capacities in terms of modeling and forecasting, as well as contribute to informed, evidence based decision making.

- When solidly rooted at the national level, natural resources information management can become an important driver for transboundary cooperation. Kazakhstan and the Kyrgyz Republic are undertaking joint activities on the Chu-Talas River Basin, in particular conducting automatic accounting of the main water intake facilities, developing a database for the annual distribution of water resources in the basin, and creating an Information-Analytical Bulletin called "Operational Hydrological Data Basins Chu-Talas".

- Information management activities can foster inter-sectoral and inter-institutional cooperation, bridging the coordination gaps within the various institutions, including those in charge of environment issues or for responding to disasters.

Box4: Data management for Disaster Risk Reduction. The International "Charter Space and Major Disasters" supported by the UN Office for Outer Space Affairs and Sentinel Asia is an initiative on a voluntary basis led by the Asia-Pacific Regional Space Agency Forum. They provide satellite data to those affected by natural or man-made disasters through registered organizations, for use in monitoring and response activities. The platforms aim at mobilizing all relevant agencies, their know-how and their satellites through a single access point on a 24/7 basis at no cost for member countries. A greater engagement of the South-Caucasus and Central Asia Republics in these initiatives would significantly reinforce the capabilities of the countries in terms of critical data acquisition, processing and analysis for disaster risk reduction. Copernicus, the European Earth Observation Program's Management Service also includes tools for monitoring floods, droughts and wildfires and is currently a major stakeholder in the Caucasus region.

Stimulating research, innovations and reforming education: the dissolution of the Soviet Union had a terrible impact on the education systems in the Central Asia and Caucasus regions. This is still influencing the quality of education as well as all the scientific/research activities provided today and the capacities of human resources in the economy and administration. The link between the institutions in charge of natural resources management and the research/education entities needs to be re-established to properly form the future generation of specialists. Scientific cooperation and the education sectors are also excellent drivers for inter-state cooperation, as well as vectors for youth empowerment and innovation development. In our ultra-connected and fast-developing world of technologies, both regions strive for modernizing this area. Related projects have demonstrated encouraging and fast results. In the Central Asia region, several institutions of

higher education such as the Nazarbayev University, the American University of Central Asia, the Kazakh-German University, and the University of Central Asia have been active stakeholders in this sphere.

Box 5: Social Innovation Pathway in Armenia. UNDP, through the Kolba Innovation Lab and Social Start-up Incubator has recently organized several successful social innovation camps and hackathons (e.g. Smart City, Open Data), harnessing the power of communities (i.e. creative thinkers, designers, programmers, architects) to tackle environmental, climate change, agriculture and urban development and DRR issues through intense idea and product/service prototype generation exercises (within 24-hours format). The latest (July 2018) hackathon by UNDP Wildfire Management Project in collaboration with UNDP Impact Aim Venture Accelerator focused on development of innovative solutions to face challenges in forestry and agricultural sectors within the context of climate change. Governmental agencies, including the Ministries of Nature Protection and Emergency Situations have actively supported the events.

Opportunities

- *Opportunities in Central Asia*

Food security is a priority for all the Central Asia countries. As such, agriculture is a key sector in the countries' economies. For instance, Kazakhstan and Uzbekistan have adopted irrigation and agriculture strategies which also include modernization segments focusing on water efficient irrigation techniques (e.g. drip irrigation), and the use of less water intensive and high value crops. Pilots in Uzbekistan, co-led by the

Box 6: The "Social Life" of a River: environmental histories and conflict resolution along the Naryn-Syr Darya. The water allocation of the Naryn and Syr Darya river - the longest river in Central Asia and second-largest feeder of the now divided Aral Sea - has been a central source of conflict between the four upriver and downriver republics in the independence era. Part of unlocking the impasse over regional water management lies in a re-appreciation of the Syr Darya as an object of enquiry, interaction and management. Through collaborations with local NGOs and communities who live by and get their livelihood from the river, the project hosted by University of Tübingen aims at co-constructing and sharing knowledge between riparian communities. Through research, 'dialogic workshops', and an itinerant exhibition that travels along the Syr Darya, up-river and down-river residents get to meet, learn about each other's livelihoods, and connect mutual needs. One of the challenges is also to provide policy makers with sustained insight into river-based livelihoods affected by their decisions.

Government and the International Water Management Institute are developed for treating soil degradation (i.e. use of licorice plants). Pilots for groundwater recharge will be also implemented (i.e. Ferghana Valley – Phase II project – World Bank). There is a lot of space for implementing these strategies, including piloting various solutions and with encouraging or subsidizing farmers to plant alternative crops, e.g. drought-resistant, or loans for planting poplars (excellent building materials). This modernization is not expected to happen from one day to another and therefore, concepts and ideas for incentivizing the community of users need to be proposed and tested.

Strengthening the transboundary ties and the regional integration: despite multiple institutional challenges (i.e. IFAS), there is a long history for transboundary cooperation in the Central Asia region. Reforming the existing institutions is a high-level political process, which is hardly influenceable by the development community. However, realistic mechanisms through which all parties involved could contribute to the maintenance of existing upstream water infrastructure, so that costs and responsibilities are equally shared, could be put forward. Aso, although there is little clarity on the future opportunities as part of the Belt Road Initiative (BRI), it could well be a growing factor of economic integration in the region.

Private sector expansion: the rold of the private sector in the field of water and natural resources management is still very limited. The public sector remains the exclusive decider in this field. However, individual entrepreneurs can certainly act as pioneers and try out technical/risky innovations. Examples can be seen in many rural regions of Central Asia. However, this does not necessarily mean that individual successes/failures always initiate social development. A good example is a company called Pamir Energy, which provides electricity in Gorno-Badakhshan to affordable prices (https://www.akfusa.org/our-work/pamir-energy/). However, supporting the private sector in certain forms such as social enterprise might

be useful to stimulate public action, engage stakeholders, provide qualitative service, and develop innovations.

- *Opportunities in the Caucasus*

As a result of complex geopolitics, there is not yet a regional program in place. However, building on positive achievements to institutional DRR a strategic engagement in climate change adaptation and integrated risk management is being developed for the sub-region.

Keeping an open eye for small and evolving opportunities of transboundary cooperation: Regarding potential opportunities, the Enguri HPP, jointly operated by Georgia and Abkhazia and managed by the Russian company Inter-RAO, is a good practice example of how transboundary water can have a positive impact in a tensed context. The location of the dam on Georgian-controlled territory and the power generator on the Abkhazian side were a unique set-up that potentially provided a win-win situation. This practice should be rather envisaged in the Abkhazia context as the stalemate situation between Azerbaijan and Armenia on the Nagorno-Karabakh area is far more tense and therefore does hardly present any potential for cooperation for now. Instead, opportunities at national and local levels may be pursued with prospects of integration at later stages. This may relate for example to DRR data management and sharing practices, bringing together experts from the South Caucasus region at expert meetings in Eastern European and Eurasian contexts, including (emerging) experts in the de-facto entities, as well as synchronization of standards and protocols.

Climate change can foster technological innovations: Opportunities may also revolve around the adaptation challenges increasingly brought up by the local effect of climate change. Specifically, in Armenia, mild winters and the lack of precipitation affect the country's agriculture with local reservoirs left without sufficient water for irrigation during the summer. The Government is trying to improve the situation by promoting the use of drip irrigation, subsidizing interest rates of loans for the introduction of drip irrigation systems. Between 2018-2022, the Ministry of Agriculture plans to install drip irrigation systems in 1,600-1,700 ha of land annually.

Final thoughts

The pathways described above reflect on several groups of solutions:

1. Technical solutions implemented at local, national and transboundary levels, capitalizing on innovations and on-going modernization processes for natural resources management including irrigation, water quality, groundwater, data management and information coordination, climate adaptation;
2. Citizen and awareness based solutions which increase the understanding, participation, ownership and engagement of the general public, users and communities in the development and implementation of environmental projects;
3. Central measures and governance aspects that emphasize constructive political will and public accountability for developing policies, building robust institutions and investments for sustainable water and other natural resources.

Combining these three ingredients is critical for successful implementation of relevant projects. However, to align with the different contexts, solutions could be implemented on the short-middle-long terms.

In both regions, the development community is investing significantly. Water resources projects occupy a major share in development portfolios, comparing to climate resilience and specific disaster risk management projects that come in as newer and broader themes. By nature cross-sectoral, these latest approaches have proven to have less political sensitivity and are more propitious for developing multi-scale actions (e.g. improving livelihoods, community development projects, etc.). Pilots are seen as a convenient format to experiment and try new solutions. However, replication aspects should be carefully studied along the project. Finally, modernization processes do not imply e-inventing the wheel and introducing totally foreign

techniques: for instance, rural sectors of the population will respond most posivitely to the valuation and redefinition of already existing practices.

Coordinating the actions of different members of the development community is always an issue, due to: (i) lack of common development vision among the organizations and how to get there; (b) lack of coordination of programs and projects; and (c) frequent contradictions between programs and project goals and the interests of power holders/social elites. However, the experience has also demonstrated that coordination platforms at various levels (central authorities, operational level) with an active engagement of the governments and other stakeholders can be helpful. For example, the National Policy Dialogue project, implemented by the UNECE and supported by the EU Water initiative in the Central Asia and the Caucasus provide excellent examples of successful coordination.

Although the geopolitical environments remain challenging in the Central Asia and Caucasus regions, adjusting to climate change may bring opportunities to introduce improved models for modernizing the Water and DRR sectors. The multidimensional nature of these sectors will ensure that the positive effects of these interventions are multiplied and passed along to other related sectors (i.e. agriculture, forestry, energy, etc.). The final outcomes would be highly rewarding with building the resilience of local communities and better economic prospects for livelihoods. The expansion of new technologies and the possibility to connect with experiences and practices all over the globe add in positive perspectives. The national, regional, and global levels consist in an inter-connected value chain which is also important to consider in the climate change context; thanks to modern communication means and networks, activities at all levels can impact and influence people to take initiatives, be inspired and create new solutions. As climate change engage a diversity of sectors, actors, and disciplines at all levels, this is also valid for water resources management and the DRR sectors: engineers, economists, lawyers, politicians, entrepreneurs, youth and communities need to be engaged and empowered to make a difference.

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