CLIMATE CHANGE, COMPLEXITY AND RESILIENT COMMUNITIES

Case study: Tajikistan

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CONTEXT

Central Asia faces the double burden of fragility and climate change. Uneven distribution of resources across the various Central Asian countries poses significant risks to stability, with climate change adding an additional layer of insecurity. The collapse of the Soviet Union left some Central Asian countries with an abundance of water resources but limited fossil fuel energy and others with less water but more fossil fuel reserves. Transboundary sharing of water and energy resources has caused escalating tensions between the various neighbours in the region. Climate change will act as a threat multiplier by negatively impacting on the availability of these natural resources, with rising temperatures and frequent and more intensified drought already decreasing the water reserves available to upstream countries.

Hydropower resources are concentrated in Kyrgyzstan and Tajikistan, the upstream countries of Central Asia's Amu Darya and Syr Darya rivers. These countries however, have a negligible share of fossil fuels. Water is therefore the cheapest source of electricity for them. Downstream countries Uzbekistan, Turkmenistan and Kazakhstan, on the other hand, are dependent upon water flows, especially for irrigation from the upstream countries, but are better endowed with fossil fuels and are suppliers of gas and coal to their upstream neighbours. Hydropower is especially important for the upstream countries during winter months, when heating needs are highest. As flows during winter are limited, Kyrgyzstan and Tajikistan store water in large reservoirs during the summertime, when water flows are more abundant. The summer months however, are precisely the months when the irrigation needs of the downstream countries are most acute.

The water demands of the upstream and downstream countries are therefore directly in contention with each other. In the absence of effective mechanisms and agreements guiding trans-boundary resource sharing, the exchange of water and energy resources across the various Central Asian countries increases the conflict potential between these countries. With climate change decreasing the water available to these countries (UNDP, 2012), understanding the nexus of water, agriculture, climate and energy security is important for assessing the wider security situation in the region.

CLIMATE CHANGE AND COMPLEXITY IN TAJIKISTAN

Tajikistan and Kyrgyzstan respectively hold 40 and 30 percent of the water resources serving the five Central Asian countries (University of Central Asia et al, 2012). However, recorded increases in ground air temperatures are affecting the water reserves available in Tajikistan (Government of the Republic of Tajikistan, 2008). In the face of melting glaciers and changing water tables as a result of climate warming, Tajikistan is exposed to the challenges of water security, energy security, food

security and insecure livelihoods. These insecurities further increase the risk of instability and conflict in the country. One of the main intervening factors in the breakout of the civil war in Tajikistan (1992–1997) was conflict over access to water and land and other resources among native and resettled populations in cotton growing areas. The root causes of conflict continue to exist today and in the wake of these existing socio-economic and political stressors, understanding the impacts of climate change becomes all the more essential.

This case study therefore aims to understand the different risks and challenges facing communities at the local level in Tajikistan and the differential ways in which climate change can interact with those pre-existing risks and exacerbate them. This report is based on desk-based research and interviews conducted with farmers, cotton pickers, village elders, staff from local and international non-governmental organisations and donors in 2012 in Penjikent district in Sughd province and Khovaling and Abdurahmoni Jomi (henceforth A. Jomi) districts in Khatlon province.

Penjikent is located to the north-west of the country near the Uzbek-Tajik border on the foothills of the Fan Mountains and has experienced widespread deforestation. Khovaling to the southeast of Dushanbe is at the foothills of the mountains and water-rich. A. Jomi district, south of Dushanbe is densely populated and primarily a cotton producer.

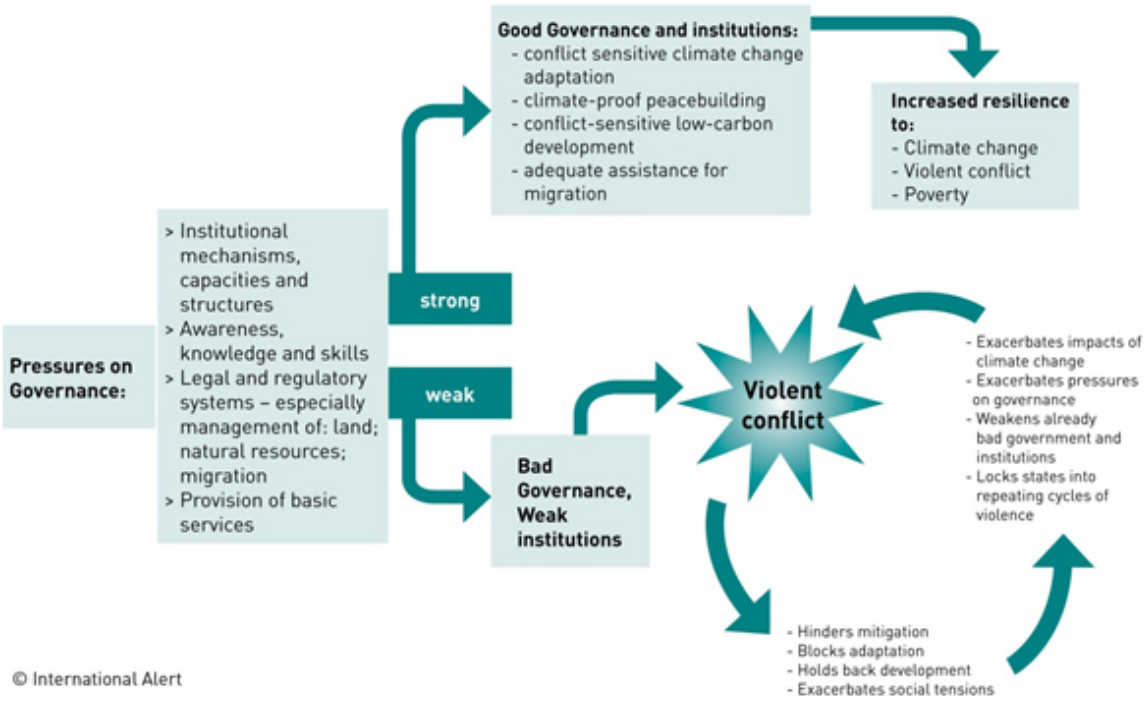
UNDERSTANDING THE LINKAGES

Hardest hit by climate change will be people living in poverty, in under-developed and unstable states, under weak governance. The background of poverty and governance challenges means many of these communities have both a low capacity to adapt to climate change and face a high risk of conflict. In such contexts, especially when the specific nature of climate impacts are uncertain, building community resilience to cope with a range of possible climate futures must be seen as the priority. Development and natural resource related policies must necessarily include local communities and engage their energies in a social process to work out how best to build resilience to climate change and the linked social and economic risks communities face as they arise, so that they do not become violent (Smith and Vivekananda, 2007).

To understand how the effects of climate change will interact with socio-economic and political problems means tracing *the consequences of the consequences* (see Figure 1). This process highlights key elements of risk such as economic instability (i.e. livelihood/income insecurity), food insecurity and large-scale migration (Smith and Vivekananda, 2007). Economic instability narrows the range of income possibilities for the population and deprives the state of resources with which to meet people's needs. Food insecurity challenges the very basis of being able to continue living in a particular locality and, as a response to that and other kinds of insecurity, large-scale migration carries high risk of conflict because of the fearful reactions it often receives and the political stresses that often greet it.

In the following sections, the interactions between the effects of climate change and other socio-political and economic factors in Tajikistan are outlined.

Figure 1: Climate change in fragile states



Water and irrigation

Following the collapse of the Soviet Union, a majority of water resources came under Tajik control. The glacial reserves concentrated in the Tajik mountains are considered multi-year reserves and a major source of fresh water. Glaciers cover about 6 percent of Tajikistan and their annual melting provide an average of 10 to 20 percent of river volume (UNDP, 2012; Government of the Republic of Tajikistan, 2008). Water is a critical resource for agriculture, hydropower and other related sectors in Tajikistan's economy.

Tajikistan inherited Soviet irrigation infrastructure that was put in place to cultivate arid lands. Considered a success in the initial days, Soviet irrigation technology made possible the use of otherwise unusable land, whereas today, the same irrigation infrastructure is often in a state of disrepair. According to respondents, water distribution infrastructure in A. Jomi and Khovaling districts, namely irrigation canals and pumps, is on a steady decline, resulting in some villages without direct access to water. As a result of evaporation, siltation of canals and leaks from pipes, it is estimated that less than 40 percent of the water diverted from rivers actually reaches the fields. And about 20 percent of irrigation water is directly wasted in the field (Renner, 2010).

In Khovaling and A. Jomi, access to water was cited as a key concern of community representatives. The structures for water management such as a Water Authority and Water Associations are in place in Khovaling. However, budgetary allocations to ensure their effective functioning and operation are often 'on paper' and lacking in practice.

Cotton monopoly

A cotton monoculture, a directive of the Soviet era, has resulted in the allocation of vast amount of water resources towards the cultivation of cotton, a water-intensive crop. Such an orientation towards water-intensive agriculture, coupled with faulty irrigation infrastructure and a naturally arid climate, is drying up the water resources in the country. The 'cotton monopoly' has not only neglected the long-term environmental impacts of dwindling water reserves but has also hurt the prospects of people to diversify their livelihoods. According to respondents in A. Jomi district, there are only few jobs outside the cotton industry making it difficult to find an alternative source of livelihood. Even within the cotton producing profession, the majority of incomes are at best, at subsistence levels.

Cotton production in Tajikistan

Cotton contribution to economy accounts for between 75-90 percent of agricultural exports since Soviet times (FAO, 2009). It has been the country's main cash crop. However, cotton production in Tajikistan is not without its problems, both social and environmental. On the social side, wages for cotton pickers are notoriously low; the industry is controlled by a small number of politically connected traders. On the environmental front, cotton production is both highly water intensive and damaging to water sources due to the polluting effects of fertilisers which run-off the fields.

Under the Soviet regime, collective cotton farms had to meet targets for cotton production, which put a lot of pressure on the low-paid pickers. While these targets were formally abolished after the collapse of the Soviet Union, in most places, unofficial cotton targets are still set, and cotton farmers and pickers (often women, youth and some forced labourers) continue to be paid a very low wages. According to some cotton pickers interviewed, wages are so low that the only gains from picking are the leftover cotton husks and stalks that they can use for fuel. Cotton ginners and the exporters however, sell cotton with a huge mark-up, making a large profit, especially when global prices of cotton are high. The practice can be seen to be exploitative of farmers who explained that they had no options to leave the cotton industry.

International donors have lobbied Tajikistan to adopt the 'freedom to farm' principle, whereby farmers theoretically have the opportunity to farm whatever crops they choose. This has been transcribed into various legislative decrees. However, in reality, it is seldom applied, except in some areas with less powerful actors, or where there was an executive decision to redirect land from cotton to wheat because of food security concerns. Farmers explained that their options for diversification are limited because they do not have sufficient capital investment and technical knowledge required for change.

Migration and remittances

The livelihood of the people in Khovaling district is primarily secured through two types of incomes; the first through kitchen garden agriculture and livestock and the second through remittances sent from family members (mostly men) working in Russia. In Soviet times, large-scale farming and livestock rearing provided secure employment to people. According to respondents in Khovaling, the

situation now is dramatically changed as the income people can earn through agriculture and cultivating the land has become very limited; there are no cash crops and resources are already stretched to the limit. It is mostly through remittances that households finance their basic household expenditure. However, remittances too are insufficient to expand livelihood opportunities into other more lucrative avenues. Women seem to be particularly affected by economic migration, as they are often left to head the household and provide for families through irregular employment.

In A. Jomi district, people's incomes are mostly financed through employment in the cotton industry. As previously mentioned, the heavy reliance on cotton has limited diversification into other agricultural products and other professions. For young people, the majority of respondents noted that the opportunities for gainful employment in other industries are non-existent. These have to be sought out in Russia. According to respondents in Penjikent, if they had a choice, they wouldn't go to Russia. "If only one factory was opened, we would be ready to work, even for 100 somoni/month", said one respondent.

Energy

Hydropower is Tajikistan's primary energy resource. Hydropower generates about 95 percent of Tajikistan's energy, demonstrating the country's economic dependence on the availability and usage of water resources (Granit, J et al., 2010). Given this overwhelming dependence on water for energy security, Tajikistan experiences seasonal variances in electricity production, facing an energy deficit during the winter months, when flows are limited. In Khovaling for instance, the availability of electricity is limited to only a few hours, compelling people to resort to wood-cutting.

Deforestation

High levels of deforestation have increased the frequency and severity of landslides, resulted in soil erosion, and other forms of land degradation, which according to respondents is clearly visible across Khovaling. Respondents in Penjikent also confirmed the erosion in the mountains particularly because of deforestation along the banks of the Zeravshan river. In Penjikent, deforestation is further deteriorating the land, which in many areas has meant that villagers are unable to cultivate enough food. In the hilly and mountainous areas officially protected by 'LesKhoz' (local forestry authorities), illegal cutting of shrubs is a widespread practice for heating and cooking purposes. The increasing demand for fuel wood has resulted in the felling of trees, which is partially illegal but nevertheless widespread. 70 percent of Tajikistan's mountain woodlands have perished since the collapse the Soviet Union (Eurasianet, 2011).

Consequences of human action on the environment

Unsustainable human actions such as intensive farming without crop rotation, overgrasing and deforestation have been particularly damaging on the environment and undermine long-term community resilience.

- The practice of intensive farming without crop rotation has intensified in the post-Soviet era causing an excessive depletion of soil nutrients.
- Overgrazing near villages is also making land unviable for crops. Traditionally, farmers would grow wheat in a particular year and allow animals to graze in the subsequent year that would help in the replenishment of soil nutrients. This practice has been discontinued, with overgrazing now the more common way. Herders also explained that they feed seeds

to animals when there is not enough fodder, but this is at the opportunity cost of future food security/livelihood options in terms of agriculture. Similarly, in the absence of adequate fuel, dung is used, which might otherwise be used as fertiliser providing nutrients to crops. Farmers then have to use artificial fertilisers which have a detrimental cost – both financial and in terms of human and ecosystem health.

- Deforestation, especially along the hilly, mountainous areas of Tajikistan has long been widespread, and continues to pose a major problem to community resilience. Trees are being cut to meet the rising demands of fuel wood for heating and cooking purposes, especially as fuel costs rise in the winter months. According to one respondent, in certain areas 97.9 percent of land is degraded, resulting in landslides and sedimentation of rivers.[1] He explained that there can be up to 30 grams of silt for every one litre of water, stating that "the mountains are flowing through rivers", to describe the scale of deforestation that is currently underway. In the long run, continued deforestation and degradation will render vast tracts of the mountains and hills unviable for habitation and cultivation.

These unsustainable practices are not sufficiently regulated and where policies exist, they are poorly implemented. After decades of Soviet imposed centralised farming through collective farms and then years of civil war, traditional farming practices have been largely lost and there is now insufficient local knowledge on how to adapt. According to an NGO respondent, it is challenging to promote adaptive practices in Tajikistan because people are resistant to change, and some lack faith in international institutions.

In order to bring about more sustainable farming, animal husbandry and forestry practices among communities in Tajikistan require communicating information to people such that they not only understand but also trust the environmental information they are receiving and also believe the benefits of changing their practices. However, international donors need to recognise that any efforts towards building people's confidence will take time and results will not immediately be visible.

The government also needs to take a more long-term approach to climate change adaptation as currently it treats environmental-related disasters as emergencies that humanitarian agencies can deal with through disaster appeals, rather than trying to manage the risks early on and preventing them and related conflicts from escalating.

THE CONSEQUENCES OF CONSEQUENCES IN TAJIKISTAN

Research shows that air temperature in most districts and high altitude zones of Tajikistan is increasing. For instance, the annual mean temperature in mountainous areas has increased by 0.3-0.5°C, over a 60 year period. Khovaling has experienced the biggest increase in annual mean temperature of 1.0 - 1.2°C (Government of the Republic of Tajikistan, 2008). The warming of climate in Tajikistan has serious implications for the mountain glaciers and water resources in the country. However, the risks to instability in Tajikistan involve multiple drivers beyond direct environmental hazards; many of these drivers are pre-existing social, economic and political stresses, with which climate and environmental change interacts and amplifies. In this section, we take a look at these pre-existing stressors, which climate change can compound.

Water

[1] Guiseppe Bonati, CESVI, interviewed 12.07.2012.

Tajikistan glaciers have already reduced by an average of 20 to 30 percent in the 20th century (UNDP, 2012). It is projected that the area of glaciers in Tajikistan may shrink another 10 to 20 percent compared to the present and water resources in glaciers may shrink by 80 to 100 km3 (UNDP, 2012). This will significantly affect the fresh water supply, and exacerbate tensions over water rights and supply. In Khovaling, access to water was already viewed to be uneven across villages due to the water distribution infrastructure and the situation will only become more challenging with increased water stresses.

Agriculture

Agriculture directly depends on the availability of water. Irrigated agriculture remains the main consumer of water in the region. Agriculture constitutes an important sector of the economy and source of employment, accounting for about 25 percent of Tajikistan's GDP and about 70 percent of employment (Government of the Republic of Tajikistan, 2008). The potential of short-term flooding, as a result of increased air temperature and climate-induced intensified snow melting can cause widespread destruction of crops and farms. In the summer of 2005 for instance, flooding occurred in the Pyandj river in Khamadoni district due to temperature increases and heavy precipitation (Government of the Republic of Tajikistan, 2008). And over the long-term, water stresses will result in less water for irrigation purposes which presently requires more than 90 percent of the resources of the Aral Sea basin (UNDP). Droughts and hotter temperature will add additional strains on irrigation.

Learning from history: Two examples of environmental degradation in Tajikistan

1. **Sarazm:** Settlers arrived in the ancient site of Sarazm in Penjikent district of Sughd province around 4,000BC as the land in the area was the most fertile for agriculture, irrigation, cattle rearing and mineral extraction. The Sarazm civilisation continued for 800 years during which time extensive plots of land underwent deforestation to supply wood to build roofs for houses, smelting metal, and the building of kilns to fire ceramics. To get 100kgs of bronze, it is estimated that two tonne trees required to be felled. The settlers also extracted mineral resources and precious metals from the land including copper, bronze, silver and lapis lazuli. Trade with Iran, Afghanistan, Pakistan, and other Central Asian cities exporting ceramics, mineral and metals helped sustain the way of life of the settlers. Archaeologists have concluded that the settlers of Sarazm had to move away and re-settled elsewhere, probably as a result of a change in the water courses, drought that spread through Central Asia around 3000BC, and extensive overuse of land.

2. **Soviet collective farms**: Tajikistan under the Soviet era in the 20th century practiced a collectivised system of cotton farming that provided a source of livelihood to Tajiks, but also resulted in environmental pollution. Cotton cultivation consumes large amounts of water, and also pollutes it because of the mixing of field water replete with chemicals, fertilisers with river water and drinkable ground water. Decades under the Soviet controlled economy, with decisions being made centrally has meant that localised knowledge of farming, cultivation and cattle rearing has often been lost. Therefore despite the detrimental environmental impacts of cotton cultivation, farmers now feel ill-equipped to adapt and lack the technical know-how of what to grow other than cotton. Irrigation of cotton fields at present are also through outdated Soviet irrigation infrastructure that causes further water losses through leakages. In the words of an international donor, the Soviet legacy further complicates the environmental

situation in Tajikistan: "The weight of history prevents us from changing the system, at the official level and at the unofficial level."

Looking at these historical examples demonstrates that human actions negatively impacting on the environment are not a recent phenomenon and that lessons should be drawn from them to help build resilience to environmental and climate change.

Food security

Given the dependence on agriculture, disruption in the agricultural sector caused by decreases in water availability will have immediate consequences on food security. Parts of Central Asia experienced a food crisis in 2007-2008 owing to the incidence of drought and global rise in food and fuel prices. WFP estimated that in the spring of 2008, roughly 2 million people in Tajikistan experienced food insecurity, with the situation worsening in the winter, which was particularly cold and characterised by damaged winter crops and reduced livestock herds (Granit et al., 2010). It has been argued that food insecurity, especially when caused by higher food prices, heightens the risk of protests, rioting civil conflict and democratic failure (Brinkman and Hendrix, 2011). In the case of Tajikistan, although food price hikes fell short of public protests, already impoverished Tajiks were left feeling frustrated and angry.

Energy

Reductions in water flows will also have a significant effect on hydropower output (Oxfam International, 2009). Melting water from glacial and snow reserves generate the hydropower in Tajikistan, making the sector highly vulnerable to climate change risks.

The domestic allocation of water resources in the country further exacerbates the complexity of the water-energy nexus. It is estimated that around 40 percent of the nation's electricity is allocated to the largest aluminium manufacturing plant run by the Tajik Aluminium Company (TALCO) (Jacoby, 2013). However, TALCO's energy bills are subsidised by the government, so as to ensure the competitiveness of Tajik aluminium in the world market. According to respondents, the prioritisation of energy supply to the aluminium plant however, comes at an opportunity cost of restricted domestic personal consumption, with people having to suffer persistent shortages of electricity in winter.

In 2008, Tajikistan suffered a particularly harsh winter, with temperatures plunging to -15°C in towns and up to -25°C in the countryside, causing great damages to the electricity and water systems and a breakdown in the country's energy infrastructure (Fumagalli, 2008). During this time, even the capital Dushanbe received power for only 5-10 hours/day. It is estimated that 70 percent of the population and most firms outside the capital face severe blackouts during the winter months (ADB, 2013). According to a key informant, there were also unconfirmed reports of small protests in Fayzabad Kulob, where a local energy official was beaten.

Regional security

Given the increasing pressures of population growth, higher demands for energy and dwindling water supplies, Tajikistan and Kyrgyzstan expect the downstream countries to pay for their water access. However, downstream countries are unwilling to monetise water, as they don't consider it a commodity. For the Uzbeks, there is a commonly held belief that "water is from God". The Amu Darya

river in Tajikistan is one of the main water suppliers to Uzbekistan and decreased water availability in the river could exacerbate already strained relations between the two neighbours. There is also a lot of water loss downstream in Uzbekistan and in Turkmenistan through evaporation from open-air water canal. This is already being seen in the context of the controversial Roghun project.[2] To remedy the energy crisis, Tajikistan revived a Soviet plan to construct the Roghun hydropower station, on the Vakhsh river, a tributary of the Amu-Darya. The idea behind the project was two-fold: electricity for Tajikistan as well as enough surplus to export for revenue. The perceived implications of this construction from the Uzbek perspective would be disrupted water supply to Uzbekistan's cotton fields, which is why Uzbekistan has stiffly opposed the construction. Uzbekistan has disrupted gas supplies to Tajikistan, with some speculating that Uzbekistan is attempting to pressure Tajikistan into acquiescing to Uzbek demands over Tajik water exports. However, there are others who contend that interrupted gas supplies during the winter have been mostly for reasons of non-payment (Jacoby, 2013). Uzbekistan has asked that Tajikistan pays international fuel prices, which Tajiks do not or cannot pay. As of January 2013, there is no more Uzbek gas officially going through to Tajikistan.

CONCLUSIONS AND RECOMMENDATIONS

Research the indirect consequences of climate change

As evident from our research findings, the knock-on consequences of climate change will be different in each place, not only because the physical effects are different, but also because the social structure and economic base are different. Detailing out how the effects play out in different localities, districts and regions of Tajikistan will help better define the necessary measures of adaptation. For this, further sub-national research is imperative.

Develop research competence

It is important that long-term research competence to undertake research on understanding the knock-on consequences of climate change exits in Tajikistan. In the absence of locally generated research, it is likely that hard science on climate change will be seen as a foreign invention, whereas the social science assessment of risks will be treated as political interference. Moreover, the best place or research to be undertaken is in situ.

Increase knowledge and generate policy through dialogue

There is a need to increase people's knowledge and understanding of the ways in which the knock-on effects of climate change can unfold. Improved knowledge and understanding of the linkages between climate, development and security is necessary to inform better policy responses on these issues. Sharing information among thought leaders and policy makers through dialogue can enhance trust, cooperation and coordination between them, creating an enabling pathway for the information to shape appropriate policy responses.

Improve access to water

Given the disparities between access to irrigation and drinking water, water allocation and access is a key priority for people, both for domestic consumption and as a means of livelihood, in the case of agriculture. Although, at present, water is available for use given Tajikistan's glacial reserves, there

[2] Due to the limited scope of this case study, the many other complexities related to this issue have not been comprehensively captured.

are discrepancies in terms of people's access to water, distribution and usage. Water infrastructure for distribution is currently outdated and many villages do not have direct access to water. With rising temperature and increased drought, there will be additional strains on water availability and distribution. Efficient water management systems are essential for Tajikistan in light of climate change. At the very least, there needs to be better water management systems to ensure that communities have a more equitable distribution of water resources. This also requires balancing the use of water for industrial purposes that are deemed important for GDP growth and communities' use of water that is vital for their livelihoods and wellbeing.

Governance of water resources

The Ministry of Land Reclamation and Water Resources in Tajikistan, which is tasked with managing the irrigation systems, overseeing and implementing environmental regulations in the cotton areas, does not always have the requisite capacity and does not fully take into consideration climate change impacts in its policy approach.

Operations of international development banks in Tajikistan are focused on water extraction. There is little consideration given to the demand side of water and ensuring better administration and regulation of the distribution of water. Given that access to water is a particular challenge for communities, neglect of this area will be problematic from the point of view of resilience and peace. The disconnect between central government and local government is another area for reform to ensure better water governance. Any reforms in natural resource governance though should include communities and local power holders because without their participation, the potential risks of conflict can be exacerbated.

On the issue of resource governance, an international donor remarked, "What we really need for water supply today are national and international partners that will sit down and think about a strategy for integrated water resource management. The challenge is that there is no political will to put this on the agenda." Some policy dialogue does exist on such matters between relevant government agencies, donors and international non-governmental organisations, but these processes can be further strengthened and made more inclusive through locally informed evidence.

Investments in livelihood diversification strategies

As the primary livelihoods of people in Tajikistan, such as water-intensive cotton cultivation, are directly being affected by changes in climate, an important area for research and investment includes livelihood diversification into climate resilient areas. Given the historic livelihood dependence of some districts on cotton cultivation, any proposals or strategies into diversifying into other viable areas, needs to be culturally sensitive. However, within cotton farming, techniques such as crop rotation that helps reduce land usage and land degradation through the use of fertilisers should be explored.

Researching the potential of the foothills of the Pamir for expanding agricultural production could be another important area of investment as this is where unused agricultural land is mostly found.

Engage the private sector

Lack of employment opportunities is the main reason why people depend on natural resources for their livelihoods, and one of the main drivers underpinning environmental degradation (UNDP, 2012). The private sector can play a crucial role in driving forward adaptation through investments in the generation and expansion of alternative livelihood opportunities that are not climate dependent, and thereby help promote sustainable development. Establishing quick re-employment options after drought or extreme weather as well as investing in infrastructure, particularly irrigation infrastructure in the case of Tajikistan, are other areas for private companies to get involved in. However private sector involvement needs to apply best practices to ensure they are climate proof and compatible with local dynamics such that they promote equitable livelihoods and access to resources.

Climate risks in the Ferghana valley

Environment and security issues in Ferghana valley mainly centre on access to and quality of natural resources such as water and land. Ferghana valley is a region divided between Tajikistan, Uzbekistan, and Kyrgyzstan encompassing three provinces of Kyrgyzstan (Osh, Jalal-Abad, Batken), three provinces of Uzbekistan (Andijan, Ferghana, Namangan) and the Sughd province in Tajikistan.

The Ferghana territories account for 51 percent of Kyrgyzstan's population, 31 percent of Tajikistan's population, and 27 percent of Uzbekistan's, hosting a total of 10 million people, making the region the most populous area of Central Asia (Baker, 2011). With high population density, the risk of resource use and depletion and consequently of competition and even of conflict is increased (UNEP, UNDP, OSCE and NATO, 2005).

Land-related tensions have been particularly problematic along border areas, especially where demarcation of land has been contested. Those along the Kyrgyz-Tajik border have had to deal with shortage of and unequal access to land for pasture, agriculture and settlement. Exacerbating the problem of shortage of land is the difference in population density between the Batken province in Kygyzstan (25.2/ square km) and Sughd region in Tajikistan (83.9/ square km) (Saferworld 2011). Tensions over land have escalated to open conflict between ethnic Kyrgyz and Tajiks in the Koktash region of Batken province, Kyrgyzstan, and in Shorsu, near the city of Isfara in Tajikistan (UNEP, UNDP, OSCE and NATO, 2005). In addition to high demographic pressures on land, people in the Ferghana valley are faced with limited economic prospects. Deteriorating economic conditions led to civil unrest in Osh and Jalal-Abad, two cities in the Kyrgyz part of Ferghana valley (UNEP, UNDP, OSCE and NATO, 2005).

Water concerns in the Ferghana valley have mainly related to water availability and access to water, quality of water and rising groundwater and waterlogging. Access to water for drinking and irrigation has been a challenge, as this often requires crossing territory that either formally belongs, or is perceived to belong to neighbouring communities/countries. In the Arka and Kistakuz regions of Tajikistan, rising groundwater levels have flooded land owned by Tajiks and forced them to resettle on higher Kyrgyz land, which has resulted in tensions between the displaced Tajiks and local Kyrgyz (UNEP, UNDP, OSCE and NATO, 2005).

Tensions over access to natural resources in the Ferghana valley are further at risk by climate

change, namely decreasing rainfall and increasing temperatures that will primarily affect the availability of water. Over the past 30 years, the average regional surface temperature in the Ferghana valley region has increased about 0.5 degrees C (Baker, 2011).

Promote regional cooperation on climate change adaptation

Central Asia faces significant 'upstream-downstream' issues with hydropower potential upstream and irrigation demands downstream. Unlike during the Soviet times, countries are now pursing water development strategies, unilaterally putting additional stress on the shared water resource. Central Asia's water-related challenges, exacerbated by climate change require greater communication and collaboration between the various neighbours. As water governance in the region is currently shaped and driven by national interests and mutual suspicion, strengthened cooperation in transboundary water and energy resource management needs to be prioritised. This can be advanced through greater collaboration on joint studies that critically asses the impacts of climate change and through dialogues that help improve knowledge. Such collaboration can help build trust, which in itself is a pre-requisite for political cooperation.

Integrating climate sensitivity across government departments and sectoral programming

Climate change should not only be seen as an environmental issue in Tajikistan as it is also impacts people's livelihood and wellbeing, but also as affects energy security and regional stability. Actors working to promote community resilience including the government, donors and NGOs should therefore move away from seeing climate impacts as something for climate experts to ensuring climate knowledge is integrated across all sectors including agriculture, trade, infrastructure and energy.

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