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Reaching Tipping Point?

Climate Change and Poverty in Tajikistan



Oxfam International

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Summary

The people of Tajikistan, a small, mountainous country in Central Asia, are experiencing the impacts of climate change. More frequent droughts and heightened extreme weather conditions are hitting poor communities, eroding their resilience. The country's glaciers are melting, bringing the danger, in the future, of greater water shortages and even disputes in the wider region. Last summer's unusually good rains and consequent harvest brought some relief to rural communities across Tajikistan but the long-term trends are clear – and ominous.



"Last year was drought – for 3 years we could not grow wheat and barley. Because of 3 years of drought we are not planting wheat in rain-fed lands, people do not want to invest," Saidshoev Abdualim, a village elder in Vose District, October 2009. Photo: Anita Swarup

Tajikistan's plight highlights the international injustice of climate change. Tajikistan is one of the countries least responsible for the greenhouse gas emissions that are causing climate change. It ranks around 109th in the world for all greenhouse gas emissions and 129th in emissions per capita; its people emit less than 1 tonne of carbon dioxide per head, compared to nearly 20 tons by citizens of North America.[1]

The government of Tajikistan recognises the fact and importance of climate change and its impacts, but it faces serious challenges in terms of funding and lack of capacity to cope with such a potentially overwhelming phenomenon. Increased funding for research on the impacts of climate change is urgently needed. Planning in high-risk environments requires investments that are beyond the financing capacities of most governments acting alone.

> **"It's not crisis point yet but it will be soon"**
> Timur Idrisov, NGO, Little Earth, October 2009.

This Oxfam report is based on interviews undertaken in communities in Spitamen and Ganchi in the north and Vose, Fakhor and Temurmalik in the south in October 2009. It gives an insight into how poor men and women are experiencing climate change, what challenges they are currently facing – and will continue to face in the future. It makes suggestions for what they say needs to happen to help them cope better with climate change.

This report draws attention to the plight of poor communities in Tajikistan, and also highlights Oxfam's demands for a climate change deal that is both fair and safe – that agrees both the drastic cuts that are necessary in greenhouse gas emissions and the new funds that developing countries like Tajikistan need to adapt. Oxfam considers the United Nations conference on climate change at Copenhagen a huge disappointment, and the Accord that came out of it, a "climate shame". The talks were characterized by chaos and near-collapse. The pursuit of national interest by the major powers deepened the mistrust between developed, developing and industrializing countries. 2010 may be the last chance for these climate negotiations to prove they are an effective process for stopping climate change by delivering a fair, ambitious and binding deal. The time for action is now.



Temurmalik District, south Tajikstan. Photo: Anita Swarup



"The drought is becoming more severe and the temperature is increasing. Last year there was drought. The wheat plants cannot grow as the high temperatures affect them. We can't harvest fodder for the animals. We need livestock to sell for vegetables and to buy water"
Shovaliev Nurali, a farmer in Hansanbek village, Temurmalik District, October 2009. Photo: Anita Swarup

Recommendations: Community Level:

- Improve access to water. Local communities consider water the key priority, both for agriculture and domestic use. Climate change – notably rising temperatures and more droughts – is putting an additional stress on water resources. Farmers want improved water management, water storage reservoirs, water saving techniques such as drip irrigation, and more access to safe water from boreholes.

- Improve methods of food storage and preservation. Farmers say they want to plan for future hard times and store more food.

- Provide more support and training in agricultural techniques, marketing and setting up agricultural shops in which to buy and sell agricultural produce and seeds.

- Scale up better insulation of houses. Expand use of energy efficient stoves to increase people's access to energy for cooking and heating and to improve women's health as well as reducing use of biomass for fuel. Boost biogas and solar power, and small hydro in mountain communities. Expand use of passive solar greenhouses to grow vegetables off-season - particularly in the winter when the ground is frozen. This helps improve food security and provides extra nutrition for families.

- Understand, respect, evaluate and build upon local knowledge. In adapting to climate change, many farmers are already using local remedies for the increasing level of pests, for example using garlic around fruit trees to ward off locusts and other insects.

Recommendations: National

- Support farmers to adapt agriculture to ensure production under changing conditions. Strategies should include crop diversification, development and introduction of drought-resistant crops and seeds and improvements in livestock breeding. Climate change threatens food security through both seasonal changes and pressure on water availability.

- Mount public awareness campaigns on climate change in communities, schools and media, and campaigns at local level to raise people's awareness in communities, through a concerted joint effort by government and civil society (non-governmental) organizations in Tajikistan.

- Centre research and policy planning on adaptation on the needs of poor people and their key areas of concern. The social and economic impact of climate change on poor people should be at the forefront of research and policy formulation.



Shibanai village - washing hanging out to dry. The village's only water source is the river so getting water for drinking and washing is always a problem. Photo: Anita Swarup

Planning needs to take into consideration livelihood resilience strategies, socially disaggregated vulnerability assessments, gender-disaggregated data and capacities for disaster risk management – all at the local level. Scaling up community-owned approaches where people come together for training and awareness raising will be central to successful national strategies. Women who carry much of the burden of farm and household work, must be at the centre of adaptation strategies, and for this, gender-disaggregated data and research is necessary.



Collecting water from a tapstand by the side of the road. This is a job for women. Photo: Karen Robinson/Oxfam

- Integrate climate planning across government departments. Climate change concerns should not be under a particular sector – and particularly not seen as only an environmental issue - but integrated across all sectors including agriculture, trade, transport and energy.

- Integrate climate change adaptation into national planning and budgets, particularly for sustainable development and poverty alleviation.

- Use climate change as an opportunity to scale up disaster risk reduction programmes. Strengthen the Committee for Emergency Situations, for example on Early Warning Systems, and the State Organisation for Hydrometeorology on monitoring glaciers, snowmelt and flood hazards.

- Promote disaster risk reduction at local levels by supporting community-based strategies. This method is more effective and has benefits that go beyond just tackling climate-driven disasters. Ensure women are at the centre of community-level responses.

- Research programs on climate change, its impacts on natural resources, the economy and public health, development and adaptation measures.

- Build institutional and technical capacity on adaptation. Adaptation will require skilled personnel in all fields, including climate and hydrological research, geographical information systems, environmental impact assessment, protection and rehabilitation of degraded land, water use, conservation of ecosystems, agricultural and infrastructure development and health protection.

Recommendations: Regional and International†

- At a time when the urgency of the climate change challenge is becoming blatantly clear, stand-offs between the most powerful countries at the Copenhagen Conference have left the world heading towards 4^{0}C global warming – a catastrophic prospect. Negotiations must get straight back on track to keep global warming far below 2^{0}C and politicians, negotiators, scientists and the public must commit to sustained and focused engagement that delivers a fair, ambitious and binding deal in 2010.

- The Copenhagen Accord commits developed countries to providing new and additional "fast-start" finance for adaptation and mitigation approaching $30 billion for the period 2010-2012. This is welcome – but must be additional to existing aid pledges. Further commitments are required to meet the estimated shortfall of $2 billion per year with clear commitments on funds needed from 2014 to 2019.

- The Accord also calls for $100 billion to be mobilized for adaptation and mitigation by 2020, which is welcome but only half the minimum sum needed. Furthermore it does not say how it will mobilized or by whom. Rich countries must clearly state that development aid will not be pillaged to pay for climate change. Finance must be raised separately and be additional to aid commitments of 0.7 per cent of national income.

- In Central Asia, institutions for regional co-operation must be strengthened, in particular to monitor and manage water resources in the light of glacial melt, higher temperatures and increases in water scarcity.

† *For further details of Oxfam International's analysis and recommendations for action following the Copenhagen climate talks see the Oxfam Briefing Note: Climate Shame: get back to the table: http://www.oxfam.org.uk/resources/policy/climate_change/climate-shame-copenhagen-reactive.html*

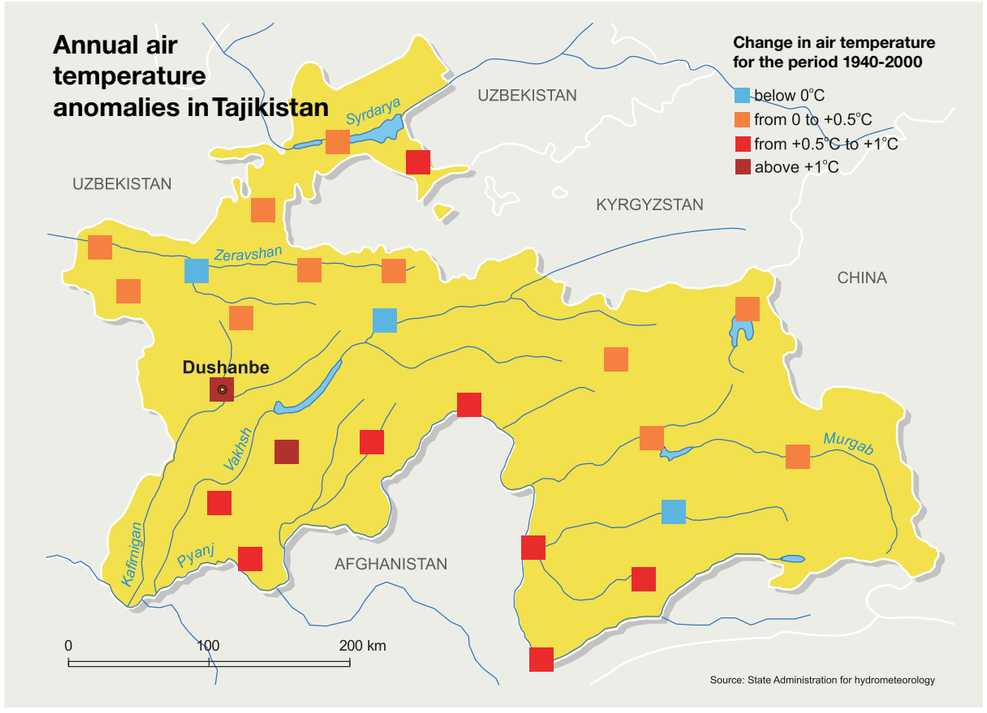
Climate Change: Past, Present and Future

"The effects of climate change are already visible in higher average air and ocean temperatures, widespread melting of snow and ice, and rising sea levels…Globally, precipitation has increased even as Australia, Central Asia, the Mediterranean basin, the Sahel, the western United States, and many other regions have seen more frequent and more intense droughts."[3]

Global and regional climate patterns have changed throughout the history of our planet.
Prior to the Industrial Revolution these changes occurred due to natural causes but since the late 1800s, scientists believe the changes have been increasingly influenced by rising atmospheric concentrations of carbon dioxide and other greenhouse gases (GHGs) as a result of human activities, such as fossil-fuel combustion and land-use change. Most of the excess greenhouse gases currently in the atmosphere come from emissions from the US, Europe, Australia and Japan.

"We are seeing more extreme weather conditions and more extreme cold and more extreme heat, particularly in the valley…. If nothing is done, all the glaciers will melt and I don't know if we will have water in 20 years"
Natalya Mirzokhonova,
IMAC (Information Management and Analytical Centre)

The greatest concern in Tajikistan has been an increase in air temperature, which has serious implications for its glaciers and water resources. Ground air temperatures are increasing in most districts and high altitude zones.[4] The biggest increase of annual mean temperature has been at Dangara at 1.2 degree C and Dushanbe at 1.0 degree C over a 65-year period. In mountainous areas, 1.0-1.2 degree C was observed in Khovaling, Faizabad and Iskashim. There has also been an increase of the number of days maximum temperatures have reached 40 degrees C or over. There has been an increase in east and south - east (warm) winds, and a decrease in west and south - west (cold) winds. Thunderstorms and hailstorms, both associated with cold fronts, have decreased.



Increase in mean annual air temperatures over the 50 years. Source: Tajikistan Second National Communication under UNFCCC (2008).

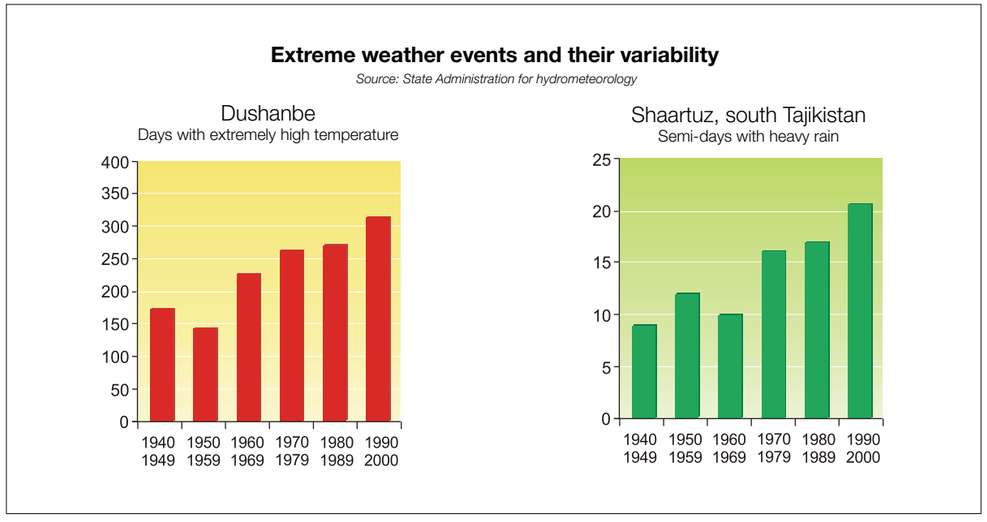
Droughts will likely be more intense and frequent in the future. One of the worst droughts was in 2000-1 where, in the lowland arid region of the Amu Darya River Basin (e.g. Karakalpakstan), access to water was halved.[5] Climate change will worsen a long-term spiral of intensifying aridity in Central Asia including Tajikistan.[6]

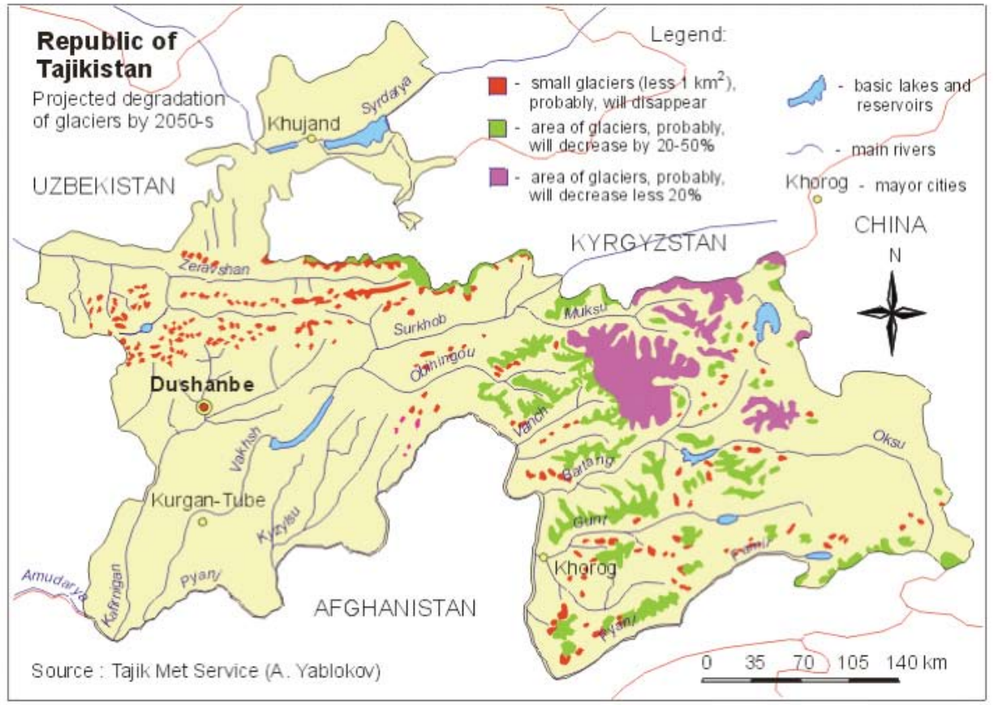
According to the IPCC (2007) *"the projected decrease in mean precipitation in Central Asia will be accompanied by an increase in the frequency of very dry spring, summer and autumn seasons. Changes in seasonality and amount of water flows from river systems are likely to occur due to climate change. Changes in runoff of river basins could have a significant effect on the power output of hydropower generating countries like Tajikistan, which is the third-highest producer in the world."* [7]

In 2007 the Youth Ecological Centre, Dushanbe, conducted a number of surveys on people's perceptions of climate change in Khatlon, Soghd and Pamir. People interviewed particularly remembered the unusual, intense heat of the summer of 2005, accompanied by insufficient irrigation water and difficulties with grazing. In Khatlon many people suffered that year from high blood pressure and heart disease. At the same time, villagers elsewhere reported unusually cold winters in 2005/6 and 2007/8 with abnormally heavy snowfalls and snowstorms.[8]

"In the last 10 years, the natural cycles are changing. In comparison, dry spells are becoming longer. Last year in 2008 was the longest period of drought"
Pulotjon Usmonov, an agronomist from the NGO, Saodat.

In 2008 Tajikistan suffered one of the worst droughts it has ever experienced. According to the UN Humanitarian Food Security Appeal, 2008, *"from April onwards, temperatures across the country have been significantly higher than normal. In southern Tajikistan particularly, temperatures deviated more than +5 degree C from the norm. Precipitation has been significantly lower than normal and in some cases as much as 43 percent below average."*[9]





Projected degredation of glaciers by 2050's

Yuri Skochilov, Youth Ecological Centre reports that *"cycles of droughts have become shorter and temperatures in the southern part of Tajikistan have gone up by around 5 degrees C. Every year it gets worse."*

Extreme weather conditions are also affecting the country. In 2008 winter temperatures fell to around minus 20 degrees C for more than a month.

"It was the first time that there was this kind of cold weather in 2008 – around minus 20. Before, there was not this kind of weather. This is climate change. The cold winter affected the plants which are mostly sub-tropical in this region – figs, pomegranates and grapes were frozen," reports Boboev Tillo, Director of Botanical Garden, Kulyab.

There is a real concern about Tajikistan's glaciers. According to Ilhomjon Rajabov, Head of Climate Change and Ozone Centre, Tajikistan State Organisation of Hydometeology, around 20 percent have retreated and some have already disappeared. Up to 30 percent more are likely to retreat or disappear by 2050. Annually, melting glaciers bring in 10-20 percent of water into rivers but during dry and hot years it can be up to 70 percent.[10] Tajikistan has around 8492 glaciers and its glaciers regulate river flow and provide water not only for Tajikistan but also for neighbouring Turkmenistan and Uzbekistan.

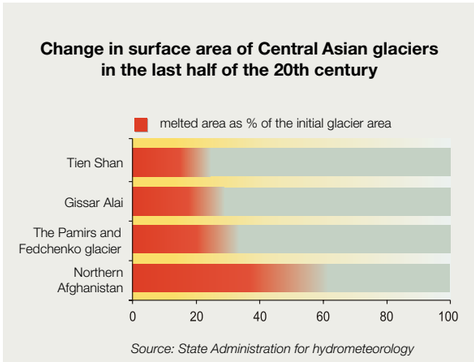
Its largest glacier, Fedchenko Glacier in the Pamir Mountains, is around 70 km long but this is melting at a rate of 16-20 metres a year. According to the Second National Communication, observations show that the glacier reduced by around 44 sq km or by 6 percent from 1966-2000. Glaciers in the Murghab river basin have become depleted by around 30-40 percent in the last few decades. Other glaciers have completely disappeared, including five small glaciers around Lake Sarez. This is likely to have contributed to the steady trend of rising water levels in the lake.

The Amu Darya River in Tajikistan is one of the main suppliers of water for the Aral Sea and to Uzbekistan and Turkmenistan as well as Tajikistan. According to some model predictions, the availability of water in this river may decrease by up to 40 per cent.[11] That could exacerbate already strained relations between the countries in a region that is water-

stressed. According to a recent report by the World Bank, 'Adapting to Climate Change in Europe and Central Asia', *"the consequences of climate change would overstretch many countries' adaptive capacity, contribute to political destabilization and trigger migration. As warming progresses, it is likely to intensify national and international conflicts over scarce resources."* [12]

Luigi de Martino, Centre for Education and Research in Humanitarian Action, University of Geneva, who has studied this issue, notes, "The downstream regions of the Amu Darya are [political] hotspots and more areas will become like this – with water quantity decreasing and environmental degradation – and add to that climate change which is an exacerbating factor."[13]

"The main problem of melting glaciers is floating broken ice and debris which can block rivers and form glacial lakes and reservoirs and this is happening now. We need resources to monitor glaciers as some are potentially very dangerous. There are hundreds of glaciers but we only know a few percent" said Nailya Mustaeva, Climate



Change Specialist, Tajikistan Organisation for Hydrometeorology. The State Organisation for Hydrometeorology lacks the resources and capacity for the overwhelming task of monitoring all glacial activity in Tajikistan.

The IPCC (2007) reports temperature rise in Central Asia will also lead to a higher probability of potential disasters such as mudflows and avalanches.



Retreat of the Fedchenko Glacier terminus. *Photo: V. Novikov*

Climate Change, Poverty and Low Adaptive Capacity

A low-income country, around 53 percent of Tajikistan's population of seven million people live on less than USD 1.33 per day.[14] And, although less than seven percent of its land is arable, around two thirds of the population depend on agriculture for a livelihood – cotton, wheat, nuts, fruit and vegetables.

"Last year we had to sell our livestock in order to buy wheat flour – and more people went to Russia or Dushanbe to work. In future if these conditions continue, we will have to move" notes Shovaliev Nurali, a farmer in Hansanbek village in Temurmalik district



Girl in cotton field, south Tajikstan. Photo: Anita Swarup

People in Tajikistan are resilient when faced with difficulties and adept at taking advantage of good weather, as the 2009-cropping season showed. Timely and well-distributed rainfall, improved seeds, and wider use of fertilizer all contributed to this improvement, according to the FAO. But challenges posed by climate change already strain their capacity to cope and may overwhelm it if temperatures continue to rise. Tajikistan, according to a recent World Bank report,[15] is the most vulnerable country in the region to climate change and has the least capacity to adapt. Adaptive capacity is the ability of a system to adjust to climate change, including climate variability and extremes, in order to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.[16]

Almost two thirds of agricultural production is irrigated[17] but many farmers still have to make a precarious living from rain-fed land – which is considerably more vulnerable to the impacts of drought and climate change. The FAO says: "The importance of irrigation from the glacier sources notwithstanding, some 55% of the area sown to winter cereals depends on precipitation during the cropping season". Before the good rains and excellent harvest in 2009, several dry years (2000/2001, 2005/6/7} posed challenges to food security. Droughts in 2000 and 2001 cost Tajikistan 5 percent of its GDP.[18] Continued drought in the spring and summer of 2007, as well as a locust invasion further stretched the capacities of households to successfully cope. Against the backdrop of increased food insecurity, in early 2008 Tajikistan experienced the worst winter in decades with temperatures falling to minus 20 degrees C. The exceptionally cold weather damaged or destroyed agricultural assets (crops, orchards and livestock), the aging energy infrastructure collapsed under the demand for electrical power to heat urban centres and the cold damaged rural and urban water supply systems due to frozen pipes and other structural problems - exacerbating lack of access to safe drinking water. There was a 40 percent decline in agricultural yields following the harsh winter and drought.[19]

"The main thing for us is the land, we take all the income and food from the land. We don't have factories to go to work. That is why we ask God for good weather,"
Soqimatov Tohijon, Assistant to Chief in Togoyak local government, Spitamen, north Tajikistan

It cost the economy around US $850 million and around 2.2 million citizens experienced food insecurity with 800,000 of these in need of immediate assistance.[20] Many winter crops were destroyed, 70 percent of the livestock died, 90 percent of industry stood idle and while electricity was supplied in the capital for 4 hours a day, rural areas were without electricity for weeks. A drought and record high temperatures in summer of 2008 followed the cold winter. Tajikistan is vulnerable to a 'compound crisis' phenomenon such as that which threatened water, energy and food security in the early months of 2008.[21]

Floods, mudflows and avalanches may increase with climate change (for example sudden and rapid glacial melts) as they already occur regularly around the spring melt. There was a particularly severe and unprecedented flood in Hamadoni district in Khatlon in 2005 caused by heavy winter snowfall followed by very warm weather in June and July, causing excessive snowmelt. Over 11,000 people were evacuated. Lack of maintenance of flood defences and canals were also culpable. Climate shocks compound cycles of poverty. When drought, floods or extreme weather conditions destroy crops and livelihoods, communities are thrown further into poverty – as a result, many move away to seek work. Migration to Russia is key to Tajikistan's economy and remittances constitute the most important income for many households in Tajikistan. These transfers total about US$ 400 million to US $ 1bn or from 20 percent to 50 percent of its GDP.[22] In 2006, almost 1m workers, mostly men and boys, went to work in Russia.[23] As populations on the margin seek work or are forced from their homes by extreme events, the pressure to migrate to Russia is likely to increase.

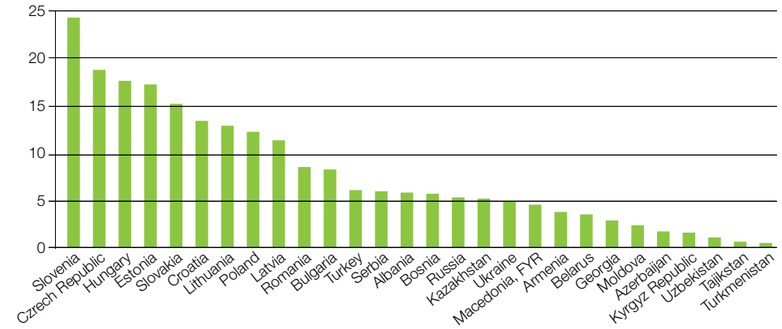
As a result of male migration, there are a significant proportion of female-headed households. Increasing burdens will be placed on women as many have to work in the cotton fields as well as collect water and firewood, grow food and manage the household. More women work in the lowest paid sectors such as agriculture. With the closure of state-run kindergartens and the increasing reliance on the consumption of home produced foodstuffs, the burden of unpaid work in the home has increased rather than diminished as a result of this transition.[24]

Tajikistan, like other countries in Central Asia, already suffers from serious challenges to the health of its environment. Soil fertility management and nutrient conservation are poor, pesticide and fertilizer use pollutes many waterways. . Floods are being exacerbated by rampant deforestation. The nation's forest reserves have dwindled from 1.3 metres cubed per person in 1990 to 0.9 metres cubed per person in 2003. Deforestation has been put down to cutting trees, stock grazing and an increase in the number of insect pests. The increase in pests is associated with increased temperatures. Acceleration in deforestation was linked to the severe winter of 2007/2008 and shortages of electricity, gas and other energy supplies, forcing people to cut trees in the mountain forests.[25]

Adaptive capacity to climate change.

Source: Fay and Patel (2008)

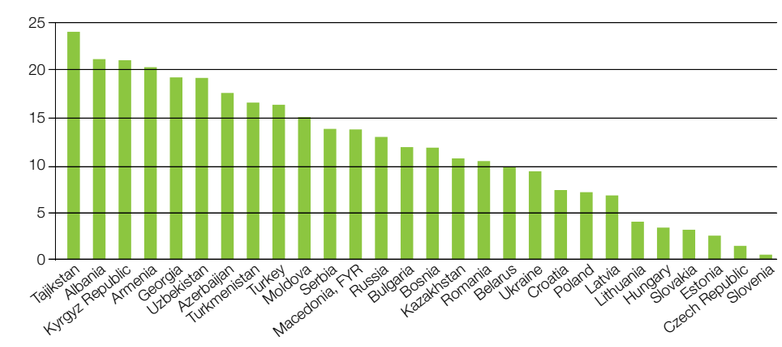
Taken from World Bank, June 2009, Adapting to Climate Change in Europe and Central Asia



Vulnerability to climate change

Source: Fay and Patel (2008)

Taken from World Bank, June 2009, Adapting to Climate Change in Europe and Central Asia



Climate Change, Agriculture and Food Security

Agriculture is the major component of the economy, representing some 24 percent of gross domestic product (GDP), around 66 percent of employment, 26 percent of exports and 39 percent of tax revenue. Agriculture is the main livelihood of rural families (64 percent of the population), who produce food for their own consumption and, to some extent, for sale on urban markets.[26] Since the times of the Soviet Union, cotton has been the main cash crop accounting for 75-90 percent of agricultural exports depending on the year.[27]

Despite good rains and harvest in 2009, food production in Tajikistan faces many serious challenges. Around 1.4 million people are food insecure and the level of severe food insecurity in the country is about 9 percent of the rural population.[28] "At the moment it is not a critical situation but there is a high vulnerability. If there's a shock people will lose their protective assets," says Christophe Viltard, Oxfam Livelihoods and Food Security Programme Co-ordinator.



Shamsieva Anvaroi, a farmer in Ganchi District, north Tajikistan, says her pears are often affected by pests and she has to use garlic in soil to help ward off diseases. Photo: Anita Swarup

One of the ways in which climate shocks such as droughts, flooding and extreme weather conditions create cycles of disadvantage is through their impact on agricultural production. During the drought in 2008, grain harvest totals were down between 30 percent and 40 percent over the previous year[29] and in September 2008, the UN had to launch a Humanitarian Food Security Appeal. Many farmers reported losing their wheat crops and having to sell their livestock to buy food. When a drought destroys a harvest, the resulting loss of income and assets can leave households unable to afford the seed, fertilizer and other inputs needed to restore production the following year. In Central and South Asia, crop yields are predicted to fall by up to 30 per cent by 2050 due to climate change, creating a very high risk of hunger in several countries.[30]



"I think the weather has become warmer in the last 4 or 5 years and that is affecting our crops. The sickness of our crops is increasing but the pesticides are expensive and we are losing almost 30 percent of our crops to diseases – onion, tomato and cucumber.
And the drought was very hard on the wheat crop last year."
Turaqulov Saidmuzator, a farmer in Temumalik District. Photo: Anita Swarup

"Last year it was a drought but this year is better. However there is still impact from last year's drought. Most of the 'dekhans' or collective farms are rainfed and still impacted from last year's drought. If a dekhan farmer is affected, his capacity to get seeds and fertilisers will be affected,"
Hminov Poteh, Deputy Mayor, Timurmalik District.

According to Ramazon Nematov, Head of Committee of Emergencies, Kulyab Zone, *"There was a lower yield from cotton and wheat in 2008 and people could not get fodder for animals. They could not store enough fodder, as 2006 and 2007 was dry as well. Last year people lost their harvest, this year (2009) people don't have seeds and also some rainfed lands have become dry."*



Shamsiddinovir Chinigul, a farmer from the Vose District. Photo: Anita Swarup

Many farmers, community leaders and local government have already observed more frequent droughts. Qodirov Hudoi-Berdi, Deputy of Chief, Committee of Emergency Situations, Sugd Region believes that droughts are getting worse. "Two years ago there was a drought and the harvest was very bad. Every two or three years there's been a drought in the last ten years. There are some droughts that destroy 100 percent of the crops and some droughts may be 50 percent. If things get worse, we will recommend that people store food now for the next year."

Luckily for all the farmers in Tajikistan, there were good rains in 2009 that meant food crops have flourished. Shamsiddinovir Chinigul is a farmer in Kaftarkhona Village in Vose District. Last year was difficult, she says (and she had received some food vouchers from Oxfam) but this year she is happy because there were good rains – and she managed to produce 5 sacks of potatoes.

Saodat, an Oxfam partner Improving Rural Women's livelihoods

Since soil degradation is a serious challenge in Tajikistan, soil conservation using natural techniques is one solution that helps preserve moisture in the soil. Omina Askarova (photo) is chief of the women's 'dekhan' or collective farm in Langor village, Spitamen district, north Tajikistan. This is a mountainous area with poor soil quality. She is participating in a bio-farming project with the NGO, Saodat. The project involves training in making compost from natural sources such as animal manure and dry leaves. She also took part in training in the use of drip irrigation and efficient use of water and she believes this will be useful when the dry periods come. During the drought of 2008, the 100 women farmers lost about 40-60 tons of barley. Since the training with Saodat and the use of organic fertilisers, Omina Askarova says, *"My life has really improved, if I need some money I can sell some product from the land and I can fix the price I sell it for."* This year she can even afford to marry off her third daughter. Yuldasheva Gulnora, Saodat Programme Co-ordinator comments, *"Last year was a drought so there was a problem with irrigation. These issues are important as they are directly related to livelihoods - and climate change will influence our projects. We are doing more drip irrigation and we have plans to do more terracing in mountain areas."*
Photo: Anita Swarup



Oxfam: Passive Solar Greenhouses

Cold winters or summer droughts jeopardise agriculture. One solution is growing vegetables in greenhouses, which use the abundance of solar radiation and provide an environment that can be more easily controlled.

Christophe Viltard, Oxfam Livelihoods and Food Security Programme Co-ordinator, notes, "We concentrate on small plots that are intensive farming – and where people can have control over their land." With greenhouses, people are able to produce vegetables off-season and generally produce more vegetables over the year. They can also grow seedlings in the spring, which can be sold at the market for a decent price.

Oxfam has a programme to help people build passive solar greenhouses, based on a design by the French NGO, Geres. 'Passive' means that there is no active heating – their architecture makes them energy efficient whereby they soak in solar radiation during the day, store the heat in double walls and release it during the cold nights. These have proven to be successful with its owners having profitable harvests. It costs around 900 Euro for a 70 square metre greenhouse and some owners have been able to pay back the money in as little as 2 years. Almost 80 greenhouses have now been completed in southern Tajikistan.

Geres first started these greenhouses in Ladakh, northern India, and recently won an Ashden International Award for Sustainable Energy *(see www.ashdenawards.org/winners/GERES09)*

Below: An Oxfam built solar greenhouse, Vose District, south Tajikistan. Photo: Anita Swarup

Climate Change and Water

The IPCC (2007) predicts that up to 1.2 billion people across Asia will experience increased water stress by the 2020s. Central Asia is a region that is already water stressed and climate change will exacerbate this in a number of ways beyond reduced precipitation.

"Previously the drought was for one year and it was better the next but now the drought goes on for 4 or 5 years,"
Khurshed Namozov, NGO and Oxfam partner, Kulyab

"When rain starts, its good, its like humanitarian aid"
Qurbonov Sobir, a farmer in Hansanbek village in Temurmalik District

Increased temperature increases evaporation, while at the same time causing an increase in demand (for irrigation purposes). Warmer temperatures mean that glaciers are receding and will continue to recede. Although, in the short term, basins that rely on glacial melt for summer water may see increased water flow from melting glaciers, the long-term implications for summer water availability are of greater concern.

The melting of the glaciers of Tajikistan is alarming, particularly since its glaciers contribute 10 to 20 percent of the runoff of the major river systems of the region (up to 70 percent during the dry season).[31] Many farmers rely on glacial melt water in rivers when there is little rain in summer.

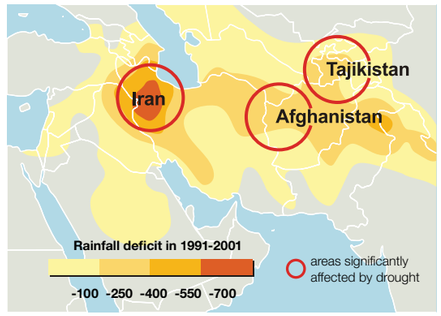
The Amu Darya River also impacts water supplies to neighbouring countries. According to some model predictions, the availability of water may decrease in Amu Darya by up to 40 per cent.[32] This may leave Tajikistan with enough water for its own needs but not enough for its downstream neighbors. Tajikistan has 40 percent of total water resources for the countries in Central Asia (Uzbekistan, Turkmenistan, Kyrgystan, Kazakstan).[33] Changes in the runoff of river basins such

The Nurek Dam on Amu Darya River supplies most of the electricity for Tajikistan. Photo: Anita Swarup



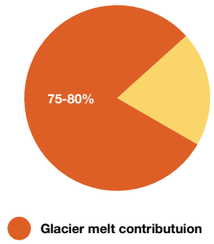
Contribution of glacier melt to water supply during severe drought

Severe drought in central Asia

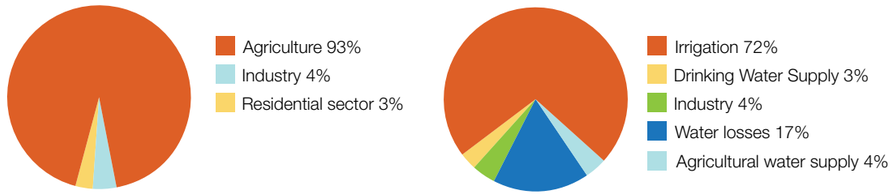


Glacier water in the rivers during the dry years

Contribution of water from glaciers into river flow of Vaksh and Pyanj during the dry years in June - Sept



Water consumption and water use in Tajikistan



Tables based on data 1991. During 1990s water consumption and water use were virtually the same as in the year 1991. Source Ministry for nature protection RT

as reductions in flows during the summer months could also have a significant effect on hydropower output, currently the source of around 95 per cent of the country's energy. Nearly 70 percent of total capacity comes from the Nurek generating station on the Amu Darya River, near the capital Dushanbe.[34]

Some local inhabitants have observed less snow in the winter – which means less water. Saidshoev Abdualim, a village elder in Vose District, notes, *"Five years ago there was much more snow, now we are not having so much snow. This climate change is affecting everyone badly. We think things will get worse, not better."*

Less water availability in general implies less water for irrigation and more pressure on the irrigation system, which consumes 94% of the nation's water. Almost two-thirds of the crop production[35] is under irrigation but much of the irrigation system is in poor condition.

Out of 718,000 ha of irrigated land under cultivation, 20% experiences water shortages right now.[36] Droughts and hotter temperatures also affect irrigation. Alimatova Zulfia, Chief of the Women's Committee in Togoyak village, Spitamen, says drought, particularly in 2008, *" affected our irrigation in these dry periods and we didn't get good harvests as expected. There is a natural lake nearby which had 50 percent less water than this year."*

Many farmers are not lucky enough to have irrigated water and have to rely on rainfall. These farmers are on the frontline of climate change as during dry years or drought, it is extremely difficult to grow anything and they have to buy their water. Communities in Hansanbek village, Temurmalik district told Oxfam researchers how they have to buy their drinking water at 1 somoni per 40 litres from a truck that brings water from the river. Some springs in the area have also dried up, for example in Davat village – partly due to lack of rainfall over the years.

Extreme cold also impacts water systems. During the winter of 2008, in particular, water pipes froze and access to drinking water worsened. Khurshed Namozov, Director of the NGO and Oxfam partner Hamkori Bahri Taraqqiyot, notes, *"the winter of 2008 was very cold at minus 20 and many people got sick and went to hospital. People were saying we hope that the spring and summer would be better – but it was dry. And it didn't snow in the mountains so there was less water in the rivers for irrigation."*

Strategies for efficient water management are now crucial in light of climate change. According to the Tajikistan National Action Plan for Climate Change Mitigation (2003), the outlook is that the country *"will need more water, especially for irrigation, in view of climate warming and increased evaporation. Water needs for irrigation of basic agricultural crops will rise by 20-30 percent compared to present climate conditions."*



There is no longer any water running from this spring in Davat village, Temurmalik District, partly due to lack of rainfall over the last few years. Photo: Anita Swarup

Oxfam-built concrete water storage tank

Oxfam has built 10 concrete water tanks in two villages in Temurmalik District and is building another 10 in Qumsangir, further south. Several families club together and buy water and store it in a tank. The tanks also catch rainwater from rainfall harvesting devices in the spring and autumn.

In winter people rely on snow for their water needs. Each tanks costs around 2334 Somoni (about US $ 667) to build and Abdulloev Kamoliddin, Oxfam Community Mobiliser, says that, such is the demand that the people are ready to contribute financially to building more. *Photo: Anita Swarup*



Climate Change and Disaster Risk Reduction

Droughts and other climatic hazards have the potential to disrupt people's lives, leading to losses of income, assets and opportunities. Events of hydro-meteorological origin are implicated in the large majority of disasters.[37] But natural hazards are not by definition disasters. A disaster is created when natural phenomenon have serious adverse impacts on people's lives and assets, because of their vulnerability to the hazard and their inability to cope. Disasters in turn often increase vulnerability, putting people in a downward spiral of deepening poverty and increasing risk. Poverty increases vulnerability.

Supporting community resilience to hazards and awareness of threats such as extreme weather events is key to reducing the impact of disasters in Tajikistan. Disaster preparedness and risk reduction is a crucial part of Oxfam's work, and the effect that climate change can have on vulnerable communities is one of the risk factors that has to be prepared for in the future. Oxfam's objectives in disaster risk management are:

- To accompany at-risk communities to plan, get support for and implement long-term risk reduction initiatives.
- To enable at risk-communities to respond rapidly and efficiently to a disaster situation.

Oxfam's programme in the district of Farkhor is an example of the effectiveness of this approach in the face of floods and mudflows. Heavy rain, a large rise in temperature and sudden snowmelt were behind a catastrophic flood on the Pyanj River in 2005. Ramazon Nematov, Head of Committee of the Emergency Situations, Kulyab Zone, says *"the warm weather started in 2005 and the level of water in the Pyanj River increased because of melted glaciers and there was a flood in the Hamadoni district."* As a result, thousands of people were displaced and crops destroyed. In the nearby district of Farkhor, where a tributary from the Pyanj River flows into the Sukhob River, there there were no serious casualties because the riverbank had been repaired and reinforced the previous year, after the river had burst its banks in 1998 and 2004. One villager, Azizova Gulsara, said *"We remember the flood in 2005 when the Pyanj River again overflowed and flooded but the damage was limited here because we had rehabilitated the riverbank."*

Tajikistan faces the possibility of more glacial lake outburst flows (GLOFS) that occur when glacial melt water overflows or bursts through natural dams made of mixed ice and moraine material. These can be sudden and catastrophic events. Malik Ajani, Senior Programme Officer with the NGO, FOCUS Humanitarian Assistance (FOCUS), which works with communities in the Pamir mountain region, says there needs to be more research on where these glacial lakes are forming - there could be hundreds, and most are not known to village communities or to local authorities as they may form several kilometres up mountain valleys. In 2002, a whole village, Dasht, was completely destroyed by a glacial lake outburst that killed 25 people and displaced around 450 more Climate change is causing glaciers to melt faster thus increasing the risk of GLOFS. Focus is now undertaking a project as a response to climate change to identify risks from GLOFS in mountain communities. Once these risks have been identified, Focus will stimulate mitigation activities such as awareness raising, monitoring, early warning, community and government capacity building, structural works such as mudflow channels and non-structural strategies such as tree planting.



In Farkhor Oxfam has also been training the community in evacuation procedures, in monitoring water levels and in other aspects of disaster preparedness. In 1998, when there was a mudflow due to heavy rain, many of the inhabitants managed to escape but without taking any belongings or important documents. "I wanted to take one chicken," said Azizova Gulsara "but I was in the mudflow up to my neck and the chicken was on a tree – but I managed to save it!" Now, with Oxfam's assistance, they are trained in disaster preparedness.
Azizova Gulsara. Photo: Anita Swarup

Climate change and the issue of melting glaciers in particular – and how to include it in planning – is now important for the Committee for Emergency Situations which is responsible for disaster risk management in Tajikistan. But the Committee lacks the resources and funding to deal with all the natural disasters that have happened or that may happen in the future. For example, according to Alisho Mardonovich Shomamadov, Committee of Emergency Situations, the waters of Lake Sarez are very high and if the natural dam bursts, the water could cause devastating flooding along the Pyanj River and the Amu Darya. He notes, *"we need monitoring of these issues and the hydromet network needs capacity building and we need awareness raising with people living in the worst affected areas."*



Young boy herding cattle to the fields walking along the road at the side of the surging Surhob river in Khatlon Region after 24 hours of rain in 2004. Oxfam rehabilitated the nearby pump station and also strengthened the river bank to prevent potential damage to the station caused by flooding from the river. Photo: Karen Robinson

Challenges of adapting to climate change

Tajikistan has ratified the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. It has also developed a First National Communication (2003), a Second National Communication to the UNFCCC (2008), and a National Plan of Action for Climate Change Mitigation (2003) that provides a way for the country to identify key aspects of climate change and priority activities that respond to urgent needs to adapt.
Even if global emissions of greenhouse gases are drastically reduced in the coming years, the global annual average temperature is expected to be 2 degree C above pre-industrial levels by 2050. It could be double that by the end of the century. A 2 degree C warmer world will experience more frequent and intense droughts, floods, heat waves and other extreme weather events. What is needed is 'no regrets' adaptation – policies and actions that will generate net social benefits that will help people withstand today's climate shocks and prepare them better for future climate changes.

The National Plan of Action for Climate Change Mitigation strategies include:

- Scientific research programs on climate change, its impacts on natural resources, the economy and public health, and development of specific adaptation measures.
- Improvement of the data collection system and analysis, interpretation and dissemination of the results among end users.
- Enhancing of the system of forecasting, modeling and early warning on natural disasters, especially catastrophic floods and mudflows.
- Building institutional and technical capacity on adaptation issues.
- Training of personnel in adaptation-related fields such as climate and hydrological research, geographical information systems, environmental impact assessment, protection and re-habilitation of lands, rational water use, conservation of ecosystems, agricultural and infrastructure development and health protection.

The Second National Communication under UNFCCC includes:

- Breeding of agricultural crops resistant to drought and salinity
- Sprinkling and drip irrigation.
- Planning and introducing water saving activities

The government of Tajikistan recognises the fact and importance of climate change and its impacts, but it faces serious challenges in terms of funding and lack of capacity to cope with such a potentially overwhelming phenomenon. Lack of research and data also present problems in tackling the impacts. Planning in high-risk environments requires investments that are beyond the financing capacities of most governments acting alone.

"I think the climate situation is now the most important problem for Tajikistan. The bottom line must be the real needs of people and people must come up with adaptation measures by themselves i.e. village development plans. National documents do not think about the real needs of people and their adaptation."
Yuri Skochilov,
Youth Ecological Centres

Adaptation projects and activities take a number of forms. Building or reinforcing infrastructure projects such as water pipes and bridges are only part of the solution. Activities like community resilience and improving capacity in all relevant ministries at national and provincial levels will have to be part of the national plan and international funding priorities.

The people of Tajikistan are hardworking, resilient and stoic in the face of harsh weather conditions – and when conditions are good, as in 2009, they have shown how adept they are to take advantage and increase production. People are already adapting to climate risks – but the future is worrying.

When small-scale farmers were asked what they would see as 'adaptation', they identified several measures, notably:

- More water through storage of water in concrete tanks and/or drilling more boreholes.
- Ability to store food for difficult times ahead
- Assistance with buying seeds and developing drought resistant varieties

Communities must be at the heart of efforts to build resilience through strengthening food and water security. Scaling up community-owned approaches where people come together for training and awareness raising will be central to successful national strategies.

Women must also be at the core of adaptation strategies and for this, gender-disaggregated data and research is necessary. In Tajikistan, many households are female-headed as males migrate to Russia. Women in Tajikistan have to work on the farms as well as having the responsibility of managing the household, fetching water or firewood and growing much of the food. Therefore, women and men will experience climate change differently.

Climate-change impacts and policies are not gender neutral because of differences in responsibility, vulnerability and capacity for adaptation. The value of and entitlement to assets, access to education and participation in local organizations shape gender-based patterns of vulnerability. In some circumstances, women are more vulnerable to climate shocks. Empowerment and participation of women in decision-making can lead to improved outcomes for all.

It is important to strengthen local institutions, which are short of staff, resources and capacity. Local officials will have to anticipate more erratic growing conditions in agriculture and more challenges to water management. Disaster Management officials will have to prepare for more emergencies.

Climate change also needs to be factored into national planning and budgeting, and adaptation must be integrated into development-planning processes, for example strengthening institutions, and providing early-warning systems, analysing and mapping risks as well as establishing emergency contingency plans for communities at risk. Climate risks should be integrated into national and local disaster-risk reduction plans. The aim is to tackle the underlying vulnerabilities that put communities at risk in the face of the increasing number of climate-related disasters.[38]

Planning for climate change must consider both types of climate related risks - those have a slow onset, such as changes in temperature and precipitation leading to agricultural losses and drought, and those that happen more quickly and unexpectedly such as floods.

In the face of environmental and climatic challenges, Tajikistan government resources and capacity are limited. The government has developed a structure for disaster response that can be built upon and reinforced. The Committee for Emergency Situations is responsible for ensuring good coordination in disaster risk management. In collaboration with international NGOs working in the field of disaster preparedness, it currently supports initiatives to prepare communities for imminent disasters and provide for their immediate needs during times of disaster.

It will be important to see the good rains of 2009 as a window of opportunity and utilise the extra income generated by the record harvest to strengthen investments in agriculture, food security and climate change adaptation, especially as prices for wheat and other food items remain above pre-food crisis levels and this, coupled with the drop in remittances from migrant labor, continues to hamper the ability of vulnerable populations to buy food.[39]

As well as adaptation, Tajikistan is making contributory efforts to mitigate climate change and reduce global warming. Tajikistan ranks 129th out of 211 in the list of nations when it comes to greenhouse gas emissions per capita. More than 98% of its electricity comes from hydro. Agriculture is currently responsible for the largest proportion of the country's greenhouse gas emissions (notably methane), with energy close behind. Despite its tiny contribution to global emissions, Tajikistan believes in the importance of trying to minimise emissions as it develops, to fulfil its international obligations under the UN Framework Convention on Climate Change, to demonstrate international leadership and solidarity with other nations and also in the interests of efficiency. Local NGOs in Tajikistan have called for a raft of measures, including energy efficiency in housing (heating and insulation) and industry and the further development of renewable energy, including small (micro and pico) hydro and biogas and energy efficient stoves.[40] Much better waste processing and recycling is also crucial to reduce methane emissions.[41]

Conclusions

Climate change is an international injustice. Poor countries such as Tajikistan that have done the least to cause current global warming and consequent climate change are the first to begin to suffer the impacts.

Oxfam International believes that delivering climate justice must be at the heart of a post 2012 agreement on climate change, in particular through rich countries committing to deep and rapid emissions cuts and ensuring a massive transfer of resources and technology to vulnerable countries.

Annual public financing from developed to developing countries should be at least US$200 billion for adaptation and low carbon development. As climate change constitutes an extra burden on the development paths of poor countries, funds should be additional to official development aid. Oxfam International is calling for a fair and safe deal in which:

- Global emissions are cut by 80 per cent from 1990 levels by 2050.
- Rich countries cut emissions by 40 per cent below 1990 levels by 2020.
- Rich countries provide at least US$200 billion per year to help developing countries adapt to climate impacts and develop in a low-carbon way. This includes the immediate provision of at least $50 billion per year for adaptation, with rich countries´ contributions increasing in line with the latest economic and scientific estimates to at least $100 billion per year for adaptation by 2020.
- An adaptation financing mechanism is established, which generates a predictable flow of new funds, additional to existing aid targets of 0.7% of Gross National Income (GNI).

The United Nations conference on climate change in Copenhagen in December 2009 was a huge disappointment. The talks were characterized by chaos, near-collapse and the pursuit of a narrow self-interest by the major powers that has left the world heading towards 4^{0}C global warming – a catastrophic prospect. Negotiations must get straight back on track to keep global warming far below 2^{0}C. The Copenhagen Accord has committed developed countries to provide new and additional “fast-start” finance for adaptation and mitigation approaching $30 billion for the period 2010-2012 but this needs to be additional to current aid pledges and commitments will be required to meet an estimated shortfall of $2billion per year with clear commitments to deliver on funds needed from 2014 to 2019. The Accord also calls for $100 billion to be mobilized for adaptation and mitigation by 2020, but this is only half the estimated minimum sum needed and there is no indication on how this money will be raised.

Until such a fund exists, ongoing adaptation and mitigation projects being carried out by countries like Tajikistan should be recognized and supported by the donor community.

Developing country governments including Tajikistan should further develop and implement a national adaptation strategy, which is properly mainstreamed across the government’s programmes for eradicating poverty, and adopted by and co-ordinated across all the key ministries. Such plans should also identify the most urgent adaptation activities and the cost of these, and secure international financing for their implementation

Disaster Risk Reduction needs to be part of long-term planning at all levels of government, across all ministries, and particularly at the departmental and municipal level. Disaster preparedness has to be stepped up. Water storage and management should be a major priority. In Central Asia, regional institutions must be strengthened to improve monitoring and cross-border co-operation on water in the light of climate change threats and growing demand.

Poor women are particularly vulnerable to climate shocks, and – through their central role in the household economy - play a critical role in protecting families and communities from climate risks. They must be at the center of national and international policies for adaptation and the reduction of poor families’ vulnerabilities to disasters.

It is Oxfam International’s experience in more than 100 countries around the world that a combination of active citizens and effective state action is the best way of securing development and poverty reduction. It is also best way of preparing for climate change. Tajikistan’s civil society organizations need to be involved in the development of concrete proposals on the content and direction of national adaptation and mitigation policy. There needs to be a concerted campaign, supported by both government and civil society organisations, to broaden awareness of the challenges of climate change and the need for action to the public at large.

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Young girl working in the cotton fields in Khatlon Region. Women workers wear their headscarves across their faces to protect them from the heat and the dry, dusty earth. Photo: Karen Robinson

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Oxfam International take all responsibility for the content of the report.

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