

**CLIMATE CHANGE:  
BEYOND COPING**

**Women smallholder  
farmers in Tajikistan**

*Experiences of climate  
change and adaptation*

*Oxfam Field Research*

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# Executive Summary

Evidence from scientific research and from previous qualitative research into the experiences of farmers in Tajikistan makes it clear that climate change is already impacting the country and the lives of people from rural Tajikistan.

As climate change strikes with increasing frequency, ferocity and in different forms, we are witnessing patterns and evidence that show time and time again that there are important differences in the gendered roles that rural men and women assume in these situations. *Appreciating and supporting* these roles can be the deciding factor as to whether rural adaptation or mitigation is an efficient use or a waste of resources, and whether community responses are reactive or proactive, spontaneous or planned, sustainable or unsustainable. This report expands on these points further through the eyes of women farmers in Tajikistan. The reports key findings and recommendations for action not only focus on the current and future climate change impacts and needs of women farmers in Tajikistan but also on wider food security, water and energy needs and the future of a sustainable food economy in the country.

This report draws on a sample of women farmer perspectives on climate change gathered over a period of three weeks in early 2011 through a combination of guided group discussions, survey responses and interviews. The field research conducted with women's farming groups in three regions (Annex 1) of the country provides a portrait of the interconnectedness of climate-related realities and impacts that rural women are facing in Tajikistan. The study is divided into four main sections that analyze: (I) the context and background of gender issues in relation to experiences of climate change in Tajikistan; (II) What women smallholder farmers say; (III) How smallholders are coping and can be further supported; (IV) Conclusions and recommendations. The research findings are supplemented by a literature review (Annex 2).

## Key Findings

- There is a widespread view amongst smallholder farmers that climatic patterns are becoming more unpredictable and that this is making planting decisions a riskier undertaking than ever before.
- Women farmers interviewed listed their access priorities as water, energy, seeds and information on agriculture and climate. This reflects the workload of rural women – in securing water, energy and food resources for the household.
- Women headed households are frequently amongst the poorest in rural areas – and often have very limited capacity to cope with or recover from weather-related losses.
- Agricultural practice has placed eco-systems under immense stress.
  - Unrestrained exploitation of land in this region since the 1950s, compounded by climatic stress in the form of droughts, has compromised the productivity of this otherwise bio-diverse rich area.
  - Large scale monoculture (single crop) plantations, the diversion of unprecedented amounts of water to feed these plantations and the overuse of chemical fertilizers and pesticides have left soils exhausted and exposed.
- The dominant socio-economic features highlighted by recent research consist of:
  - the out-migration of able-bodied men;
  - the high numbers and particular vulnerabilities of female-headed households in rural areas;
  - the heavy reliance on small scale farming by rural people for their basic food needs in the face of negligible formal support;
  - the triple burden for rural women and women farmers in Tajikistan, where they must work for income, care for their community and family, and grow food for their own consumption.
- Two main trends are discernible in the farming sector in Tajikistan. First is the growing feminization of agricultural labour on Dehkan<sup>1</sup> farms; the second is the profound role that women play in local food security, particularly where rural diets are concerned as food farming has become de facto their main independent production activity and mode of survival. The small household plots that women grow on are the mainstay of their year-round food source<sup>2</sup>. As farmers, they are at the mercy of stresses that climate change will place on the natural resources that they draw from. As consumers, they face rising prices for staples such as wheat or sugar.
- At the policy level, while there is some acknowledgement by senior officials of gender differentials and the importance of engaging with women, in practice
  - there is limited interest in or understanding of gender differentials in rural livelihoods, in food production or in the context of climate change policies;
  - current climate investment attention is focused on capital-intensive mega-projects such as hydro dams and the refurbishment of meteorological stations, and as a result climate change implications for the rural poor, and women in particular, have been given a much lower priority

- the voice of civil society on climate change issues, while growing, is not yet strongly influential with government and lacks a unified voice.

## **Recommendations**

The Government of Tajikistan, private sector, donors and civil society actors need to recognize and support the central role that women small holder farmers play in the food economy.

Allocation of resources to women farmers and their agencies, however, is not enough on its own.

This constituency of farmers are an invaluable actor in mitigating and adapting to climate change. The day-to-day actions of smallholder farmers can either add value through safeguarding natural resources or run up huge costs and ecological debt by denuding natural resources.

As old farming and management systems are dismantled, this is an opportune moment to bring in concerted support, training and investment into agro-ecological farming methods that could both reverse and address climate change impacts on natural resources, water and land. This requires urgent investment in an interlocking water/energy/farming system that builds on smallholder farmer's resilience, industriousness, innovations and willingness to take risks.

### **Recommendations to the Government of Tajikistan:**

1. Prioritize vulnerable women farmers in agricultural, food security and climate change-related adaptation policies and practices and respond effectively to their needs
2. Develop early warning systems designed to save lives and reduce suffering from climate-

related events and ensure timely information systems that includes the targeting of rural women in their role at the household and community level and roll out local weather radio programs that ensure farmers can access targeted weather information.

3. Agricultural policies and practices must move urgently to a diversified farm economy that supports local food production, promotes agro-ecological farming systems and small-scale labor- intensive forms of farming. A regulatory seed body should be set up to record, protect and further develop local seed varieties that are climate hardy.
4. Relevant government ministries should prioritise the implementation of reforestation policies that include the promotion of diverse local tree species and indigenous shrubs to regenerate natural water ecology. Government policies and practices must place women at the centre of community water management at the local level. An emphasis must be placed on small hydro power production and the natural capture and conservation of water sources

### **Recommendations to local NGOs, CSOs and Women agencies in their responses to the challenges rural women and communities face:**

1. Prioritise food security by engaging rural women in participatory research into viable alternatives for land use; work with women farmers to identify seed and crop choices that address environmental variations and economic risks; build women's marketing expertise and capacity to market fresh organically grown produce;
2. Build women's awareness of the key role they can play in water management and rain

water capture

3. Work with rural women locally to address their energy needs through: training in insulating homes, heat capture and stove efficiencies and building technical know-how and maintenance of rural renewable energy sources
4. Address climate change risks by: helping farmers to discern and choose indigenous hardy species as well as hybrid 'climate-smart' varieties; promote seed exchange and storage programs; ensure mechanisms are in place for women to receive timely weather information and forecasts that draw from national and local sources

**Recommendations to international and national NGOs and donor agencies:**

1. Develop participatory training materials and support for women farmers focused on local alternative farming, energy and water systems with incubation funding to build their capacities to steward land, water and biodiversity
2. Promote women farmers' storage and marketing capacity on local produce for local markets
3. Support women's village water committees to identify and manage alternate natural water sources including pilot mitigation projects that bring science and geo-water knowledge

into women's hands

4. Identify local climate-hardy seeds and traditional crops for development at scale for distribution that are appropriate and sustainable for women to invest in
5. Promote the central role that women can play in addressing food security and climate change risk responses across all sectors in Tajikistan and support local NGOs in monitoring these risks and evaluating responses

**Recommendations to investors:**

1. Invest in appropriate information and communication technologies including SMS messaging and, potentially, computer centres accessible to rural women farmers for up-to-date information on critical issues such as market prices, weather forecasts and farming practices
2. Invest in a rural finance infrastructure that enables women to develop cash reserves
3. Develop rural to city infrastructure to enable local transport to urban markets and invest in food storage systems locally
4. Invest in decentralized small-scale mitigation projects that source local water for harvesting, storage and conservation

# Introduction: Climate Change impacts on Society

As climate change and its weather-related events such as extensive flooding, intense drought or sudden landslides take hold with increasing frequency, ferocity and in different forms, we are witnessing patterns and evidence that show time and time again that:

- Those whose livelihoods are directly dependent upon natural resources and land are often the most vulnerable to the adverse impacts of climate change. They are also a key interest group with immediate stewardship, adaptation and mitigation roles which can affect not only their own livelihoods but the country's economic and ecological resilience as a whole;
- Those with the means and the capacity can make arrangements to shelter through an emergency or to insure against hard times; those without these means will be left stranded or in positions of even greater precariousness than before. Those who are least educated, the last informed and who are consistently left out of any kind of decision making, will be least able to understand, prepare for, or take actions to tackle both the immediate and the long term impacts of climate change;
- While climate change is global in nature, its manifestations are very localized. In mountainous areas like Tajikistan where micro-climates prevail, the most appropriate and effective responses take place at the micro-level. It is the community that must first deal with the aftermath of climate shocks and it is often the communities who have innovative solutions at hand to manage both recovery and long term planning.

For each of these factors, there are important differences in the gendered roles that rural men and women are responsible for. Appreciating and supporting these roles can be **the** deciding factor as to whether rural adaptation or mitigation is an efficient use or waste of resources, and whether community responses are reactive or proactive, spontaneous or planned, sustainable or unsustainable. This brief report will expand on these points further through the eyes of women farmers in Tajikistan.

# Part 1 - Gender and climate change issues in Tajikistan

## Why focus on women?

*Climate change will affect all countries, in all parts of the globe. But its impacts will be distributed differently among regions, generations, age classes, income groups, occupations and genders. The poor, the majority of whom are women living in developing countries, will be disproportionately affected. Yet most of the debate on climate so far has been gender-blind. (IUCN, 2007)*

Two main trends are discernible in the farming sector in Tajikistan. First is the growing feminization of agricultural labour on Dehkan farms; while this might arguably strengthen the economic independence of women in rural society, it does not necessarily equate with their social or political empowerment. Apart from the complexities of the land reform process and women's land access, as farm *laborers*, rural women are at the mercy of the commodity markets which will fluctuate with climate change. The second trend is the profound role that women play in local food security, particularly where rural diets are concerned. Food farming has become de facto their main production activity and mode of survival. The small household plots that women manage are the mainstay of their year-round food source. As *farmers*, they are at the mercy of stresses that climate change will place on the natural resources that they draw from. As *consumers*, they face rising prices for staples such as wheat and sugar.

These trends are common to rural women all over the developing world. The last few decades have seen women increasingly shoulder the responsibility for household sustenance while also securing an income from farm-related activities. Rural women in Tajikistan have joined these ranks and face three concurrent burdens, they must work for income, they must care for community and family, and they must grow for their own consumption. They carry two jobs, one self-employed and the other for wages or exchange. Increasingly they are seeking to grow their own surplus produce to market, although a weak rural marketing network (among other things) makes this extremely difficult. The range of activities that women engage in is diverse and region specific. Wherever opportunities present themselves, whether it is sericulture, dairy products, vegetable oils (from flax, safflower and sesame seed), selling of vegetable and seeds or engaging in other cottage industries, women will take on as much as their day will allow them to.

“Small-scale private farms produce much of Tajikistan’s food supply and employ a significant part of the labor force. By 1 January 2006 dehkan farms numbered 27,040 of which 18,300 were individual or family based and 8,740 were collective dehkan farms (data from the Agency for Surveying, Cartography, and Land Use). These small farms control over 60% of arable land. In 2007 the number of women-headed farms constituted 13.4%”.<sup>3</sup>

## Discussing climate change with rural women

'Climate change' is a technical term; it is not one that rural peoples are familiar with. At first introduction to the term, the typical response is a quizzical look, because farmers are constantly working with shifting seasons and weather conditions – in that way climate is always changing! While farmers might not draw the links between climate change and green house gas emissions or glacial melt, they will articulate about weather phenomenon in two ways, seasonal variations and weather related shocks. For the most part, farmers consider these as 'acts of nature', and so, beyond their control. Their initial response is to react to and plan for these variations and shocks (adaptation). The mitigation aspects of improved methods of farming are not immediately apparent to them. In the course of discussions, three broad consensus points emerge.

- Local memorable weather phenomena such as heavy hail storms, consecutive drought seasons, unfamiliar pest infestations<sup>4</sup> and winter seed damage are identifiable as indicators of climate change;
- Longer term trends that can only be viewed in retrospect and over time, such as declining river water flows, shrinking water reservoirs, higher seasonal temperatures, disappearing forests and the frequency of locust swarms;
- These two aspects together point to an overall unpredictability of seasons, and an increased intensity and frequency of weather stress and shocks. Increased frequency means there is less time for recovery in between climate-related events.

As the impacts of climate change intensify, direct and uncompromising impacts on small-holder farmers become apparent in two ways:

- Where farmers are exposed to high risk of loss from weather shocks because they have no reserves to buffer against such shocks.

### Estimated Agronomic Impacts of Climate Change to 2050 – Central Asia

#### *Unchanged or increased winter rainfall, decrease in rainfall and surface water in spring/summer/fall, with droughts*

- Major stress on water resources for irrigation
- decline in cereal yield from water shortage from spring to fall, and from thermal stress†
- drought, desertification, soil erosion, sali-nization
- widespread crop failures during droughts
- increased suitability for drought-resistant tree crops.

#### *Hotter summer, milder winter*

- Greater water demand for rice production with higher temperatures
- despite CO<sub>2</sub> fertilization, increased heat and significant water shortage cause decline in cotton yields.

#### *Livestock*

- Marginal grasslands at risk for aridization, desertification.
- Heat stress reduces milk production.

*Source: World Bank 2009*

Already existing vulnerabilities would be further compounded by climate change.

This applies to those men and women who have little to fall back on. A lost harvest for instance, could be disastrous for a farmer with minimum reserves;

- Where climate change directly affects the natural resources that women draw on to keep their home and family plot. Water-related changes have noticeable and immediate effects on women's options for collecting water. When water sources become scarce, those farmers who are situated furthest from irrigation systems or who do not have the ability to negotiate their water rights, or who are unable to protect their water access, will lose out first. Similarly as women are responsible for combustible fuel in poor households, their search for wood and brush is affected when there is drought. If harvests are damaged or lost a household's food supply for the entire year could be threatened.

## Risks and Vulnerabilities Unique to Women

There are a few common features that define rural women in Tajikistan – with variations from region to region:

- Women who work in cotton farms often do so in return for dried cotton stalks (*guzapoya*) remaining after harvest for combustible fuel, women who work in silk worm farming using mulberry tree leaves also typically do this in return for the branches that can be used as fuel for heating the home. These are highly exploitative labour systems that do not conform with international labour principles;
- To compensate for the lack of income earning opportunities in-country, able-bodied men and some women - migrate to seek employment across the former Soviet Union. This places stress on the family, can lead to family breakdown and dependence on remittances that might not be forthcoming. Multi-generational migrant households are common in rural areas. Families may be made up of a male migrant's wife, children and aged parents, and may include a brother

and his family. In regions affected by war and high levels of labour migration, migrant households may comprise of three or four generations of families consisting solely of women and children (with widows and orphans);

- Due to the pronounced gender imbalance in regions with labour migration, a significant and growing number of households are headed by women. These women fall into one of three categories: 1) women who head their households during the migrant husband's absence; 2) women abandoned by their migrant husbands; and 3) women whose migrant husbands return to the family every few years. In all three cases, these households are usually poorer than those headed by men. Even during a father's absence, if a group of migrant families is under male authority, be it the head of the *avlod*, grandfather or brother, they are still financially better off than migrant households consisting only of women and children. Widows and female-headed households are in a particularly precarious situation and are dependent on other households for charity or security in times of difficulty;

“The most vulnerable to poverty and extreme poverty are households that have a large number of children, are headed by women, and or have a poorly educated and/or unemployed head of household. So among households headed by men 19% are extremely poor, and among the ones headed by women the percentage is 23%. (Tajikistan Living Standards Survey 2007)”

- The number of women-run Dehkan farms is also growing. When compared to male-managed farms, their farms are generally smaller, they have a lower number of shareholders - many more of whom are women,

they have a lower average level of education and they comprise an older age-group with ages ranging from 40 to 55 years<sup>5</sup>.

“The largest and fastest growing group (in numbers) is the small, family farm, which produces for the commercial market but at a small scale. These farms make up the bulk of agricultural income and output in ... Central Asia. These farms will likely continue to serve as the engine of the rural economy in the coming decades, but they may be highly vulnerable to climate change given their size, the farmers’ limited technical knowledge<sup>6</sup>, and poor access to public and private information and financial services”<sup>7</sup>.

### **Small holder farming in Tajikistan**

As a group, small farmers in Tajikistan already start from a disadvantageous position. They are living on marginalised lands which are environmentally stressed, the irrigated and more fertile lands having been allocated to monoculture crops<sup>8</sup> and orchards. They have to coax harvests from these lands, graze their livestock, and draw water and fuel, while being ignored by agricultural policy because they are ‘sub-standard’, considered to be too small to be of any economic value, and not producing ‘export quality’. Other factors, such as the declining health and vitality of the rural poor due to aging and outmigration of the young, the higher costs of imported food, and the vagaries of climate change, compound this status.

Without adequate support strategies, poor households are ensnared in a cycle of poverty, with the most desperate selling assets, or taking on loans at exorbitant interest rates and engaging in increasingly risky activities to sustain themselves and their families<sup>9</sup>. Against this back-drop, women headed households fare worse in times of stress. A 2006 study by the London School of Economics found that where women and men enjoy the same economic and social rights - both sexes are affected by natural disasters equally. Where women do not share the same rights - their death rates outnumber men’s.<sup>10</sup>

## Division of labor in the rural sector

When asked to describe their farm roles, men and women will say that they work side by side on a wide range of farm tasks, and that a married couple works together like a “pair of old boots”<sup>11</sup>. In reality, there are particular roles that women are expected to fulfill, both on the Dekhan farm and on the family plot. In female-headed households, women need to hire (male) farming services that involve physical strength or mechanization, such as tractor ploughing. When asked if women were the ones responsible for fetching water, one woman replied; “Yes! After all, it is we women who are using all the

water!” And as women are in fact using water for cooking, washing clothes, feeding children and making dung briquettes, (no matter that it is for the entire household), they know how much water they need and so they organize for it to be collected accordingly.

Whether it is from springs, or wells or public pumps, whether it is by donkeys with plastic canisters or on foot with metal pails, the collection of water for day-to-day use is invariably by women and girls, and sometimes by boys. Women are responsible for water allocation and management within the household – a fact typical to most rural households around the world.

Boys and girls alike start collecting water for household consumption at an early age, from about 6 years. When the boys complete secondary school around the age of 17 however, they are unlikely to continue that chore, whereas a woman can expect to continue carrying water into the house until she is no longer able to. This 21 year old can transport 100 litres in a wheelbarrow in one trip, or makes four to five trips if she is carrying the containers by hand. The water source is one kilometre away. She commented that men in the household are much more wasteful in their use of water compared to the women.



Water carriers (Photo: Dehqonobod Village, Gissar – Feb 03 2011)

## Farm work distribution by season and gender

The table on the following page provides an example of gender-divided farming roles from the

Sughd region. Men typically do the heavy work and women typically the tending and caring. When it comes to water carrying, however, women still carry the load.

**Table I: Seasonal calendar, Sughd region, Spitamen district, Association Andarsoy Dehkan Farms' D/F "Namuna"**

Season/ months		What men typically do	What women typically do
Winter	December	Ploughing /tillage/turning up the soil, and watering the lands/or wheat	Gathering the harvest, usually cotton stocks; preparing natural fertilizer/compost
	January	Applying natural fertilizer/manure to the lands	House work; looking after the cattle
	February	Digging/making ditches, planting the young trees, plants	Preparing for farming according to the weather conditions
Spring	March	Preparing the lands for sowing	Planting fruit and decorative trees; cleaning and maintaining the irrigation canals/ditches
	April	We begin to plant/sow crops; applying fertilizer to the new planted	Bleaching/whitening the trees trunks; planting different kinds of vegetables
	May	If the rain makes our lands surface solid, we loosen the soil	We plant cotton
Summer	June	Harvesting wheat; Preparing the land for the second crop	Caring for the cotton plants, loosening the soil, weeding etc
	July	To plant the second crop and to fight with plant-illnesses by bio methods	Grain harvest time
	August	Organizing the harvesting	Preparing for the second crop
Autumn	September	Cotton harvest time	We help pick the cotton
	October	We harvest any other grain yield	Harvest of vegetables
	November	We harvest cotton and prepare land for ploughing	We prepare for our family events like weddings



**Figure 1: Not a Man's Job**

Depending on the region, rural women typically work two harvests in the Dehkan farms and two harvests in their family plots. In the Sughd region, women sow up to three times a year in their family plots. The family plot is almost entirely the woman's domain. She must manage the tension between working on the Dehkan farms to earn an income, and farming in her plot to produce food for the year. In the pursuit of both, the longer term issues of environmental protection become secondary.

This visual representation is less about what women's primary roles are around food, farming and income and more about the tasks that men as a rule do not engage in. In other words these are women's tasks over and above the usual seasonal activities related to planting, harvesting, gathering and storing on the Dehkan farm.

## Part 2 -Insights from the field – women’s narratives and perspectives

When asked to list recent weather experiences and how these impacted their farming activities, women in one village<sup>12</sup> outlined the following in their own words. A good proportion of these impacts are water-related.

**Table 2: Group discussion summary - impacts of weather incidences**

Evidence	Impacts (indicators)
Drought	<ul style="list-style-type: none"> <li>- Water springs dried up</li> <li>- the wheat were damaged, not a good harvest</li> <li>- all winter saving (food) were damaged</li> <li>- couldn't plough the land</li> <li>- because of the drought many livestock suffer from disease</li> <li>- fruit tree flowers fell off - not enough fruits</li> <li>- having problems with food security meant that many people had problems with their health</li> </ul>
Heavy rains and hail storms	<ul style="list-style-type: none"> <li>- had to replant seeds because plants were destroyed (economic cost)</li> <li>- wheat with too many weeds</li> <li>- bad harvest (very little)</li> <li>- bad quality wheat (low in calories)</li> <li>- fruits were damaged by hail</li> </ul>
Unpredictable cold weather	<ul style="list-style-type: none"> <li>- vegetables damaged</li> <li>- food saving (for winter) was damaged</li> <li>- usual ploughing of the land in autumn could not be done</li> </ul>
Lack of irrigation water	<ul style="list-style-type: none"> <li>- arable lands were damaged: as were vegetables, wheat, potato</li> </ul>
Landslide	<ul style="list-style-type: none"> <li>- total damage of homes with properties (5hhs, in each 7 family members)</li> </ul>
Flood	<ul style="list-style-type: none"> <li>- damaged kitchen gardens</li> <li>- damaged cattle sheds</li> </ul>

According to smallholder women farmers interviewed, their key priorities were<sup>13</sup>:

- a) Water related issues
- b) Energy related concerns
- c) Seed supplies
- d) Information (on seasonal times, on plant types, farming methods, climate etc)

## On Water – dependence on a mountain-river system

*“When there is much snow in winter time, we will have much bread” (Local proverb)*

Tajikistan’s population has the lowest level of access to clean water among the countries that make up the former Soviet Union. Less than 33% of residents have access to piped water, and more than 40% of drinking water samples tested were considered unclean in 2004. In local surveys of issues of food security and vulnerability, access to safe drinking water for households, agriculture and livestock was consistently ranked as a high priority<sup>14</sup>.



Map 1.

For many women farmers in Tajikistan, reliable availability and access of water are the main stress point. Food security and water security go hand in hand. Without water farmers cannot process food, much less grow it.

Tajikistan has an extensive mountain river network - the hydro-graphic network of Tajikistan comprises of significant number of rivers with a total length of 69,200 km. Most of the rivers in Tajikistan originate from glaciers and are fed by a combination of snow, melting snow and rainfall. The river system, however, is threatened by climate change, in the form of precipitation changes and by retreating glaciers<sup>15</sup>. The water flow in the Amu Darya seven to ten per cent in the next 50 years, and this could trigger a sharp reduction in the overall supply of water in the country. For the moment, the increase in river water flow in the spring brings with it the threat of floods (see map 1) and heavy sedimentation which also increases erosion.



The reservoir above used to extend all the way beyond the left side of the picture – only a quarter of the water surface remains. Farmers plant and graze there now, which could put the remaining reservoir at further risk.  
 (Ghonchi district, Jan 2011)

Many small rivers, especially in the Ferghana Valley (see map 2) are depleted long before they reach their destination point. Manmade reservoirs and the channelling of water to irrigate cotton crops have had an overall detrimental effect on the natural water eco-system of this region<sup>16</sup>.

The immediacy of water stress falls directly on women. Like women in most developing countries, rural women in Tajikistan are responsible for water management at the domestic and community level, and water is also needed to make fuel. Men's relationship with water has more to do with agricultural work, with watering the livestock and with the storage of water.

Successful adaptation to water use and distribution will depend largely on how women are engaged in planning and managing this adaptation.

Enabling farmers to draw the links between maintaining vegetative cover, soil health and moisture content will be key in reversing a process that, if allowed to continue, will exacerbate water loss in the context of climate change. Communities that rebuild their top soils build their long term wealth; a nation that de-



**Map 2.**

stroy its soils destroys its wealth<sup>17</sup>. On current trends, small holder farmers are pushed into a vicious cycle that depletes natural resources closer towards a tipping point where it will become extremely difficult to recover resource loss.

The two sectors in the world that use the most water are chemical intensive agriculture and fossil fuel-based energy production. Irrigated agriculture accounts for almost 70% of world water withdrawals and close to 90% of the total consumptive water use (the portion that is lost to the immediate environment for use)<sup>18</sup>. More efficient and effective water management for agriculture as a way to coping with climate-related water-stress, particularly in rain-fed agriculture, is a top priority agenda item for all stakeholders. Crop productivity will depend upon sufficient precipitation to meet both evaporative demand and soil moisture needs.



At mid-day, a young girl collects drinking water in two yellow containers from an open irrigation channel (Sughd region – Jan.30.11). These open channels feed the rice paddies and when there is a water shortage, farmers have to ‘wait their turn’ as the flow of water allocated to each village is determined by the village water chief (who is invariably a man). The irrigation channels (centre image) are cleaned regularly by the women and the paddy water has to be renewed each day. The picture on the right is a river bed in January which turns into a fast flowing glacier-fed river in the spring. Some glaciers, however, are receding and while there is still water now, it is not clear what the implications will be in the next decades. During periods of accelerated melting there is more water entering the river systems and this can lead to extensive flooding downstream. However, once the glaciers have melted there is a substantially reduced flow of water into the rivers and this leads to water shortages.<sup>19</sup>

## On Energy – exposure, erosion and emissions

Energy, water and land use are inter-dependent. Although 73% of Tajikistan’s population is rural, they consume only 8.58% of national electricity<sup>20</sup>. Their primary source of energy is traditional biomass which has contributed to a serious and dramatic loss of forest cover<sup>21</sup>. The loss of forest cover leads to increased vulnerability to soil erosion, makes steep lands more prone to natural disasters, and increases the rate of desertification. The phenomenon of desertification in non-forested, non-mountainous areas is also a growing concern. Poor agricultural practices (both cropping and grazing) damage fragile soils, particularly in the south-western part of the country.

Rural women share the responsibility for gathering wood and brush for combustible fuel

with men – practically all year round. Given that women are responsible for cooking however, it is safe to assume that ensuring there is enough stored fuel for cooking throughout the year essentially lies with women. The use of cow dung-and-hay briquettes is common by those who own livestock, poorer farmers who do not own livestock have to purchase briquettes. The making and storing of briquettes lies entirely with women and is labor intensive. In many poor households, animal dung can make up 100% of energy source. Studies have estimated an annual consumption of dried animal dung as energy source at about 20 tonnes per household<sup>22</sup>.

On current global trends, the number of people globally relying on biomass for cooking and heating is set to rise by 200 million, to 2.6 billion, by 2030. The actual percentage of the world's population relying on biomass is projected to decline, but the rate of decline will not keep up with population growth. It is not just countries that have never had access to more modern forms of energy that are suffering. Countries whose economies are in transition, the most striking examples of which are Tajikistan and the Kyrgyz Republic, which have, in rural areas, conditions that are rapidly becoming similar to those in developing countries.

Political change and economic downturn have resulted in the collapse of much of the infrastructure. Rural populations are reverting to the use of wood, dung, crop residues and low-quality coal for fuel. The most striking example of this is in Tajikistan where the coverage of gas and electricity has reduced. People are now reverting back to using biomass. The impact of this is all too familiar - between 1991 and 2000 there has been a dramatic 35% increase in cases of acute respiratory infection, 'largely as a result of burning wood indoors'.



1. In the spring, women will gather in each other's homesteads to help with the task of making dung briquettes. This is not a job for men!



3. The briquettes are an important store of fuel for the cold months of the year. The downside is that this removes an important ingredient for top soil renewal.



2. Water is added to the steamy mass and the briquettes are formed and patted into shape and laid out to dry in the sun. Those without livestock may resort to buying these if the winter is severe.



4. The briquettes are stored in a shed, this farmer typically burns 15 dried briquettes and some plant material to heat and cook on a cold day. In some areas, women might make 5000 briquettes for the year!

Apart from the vicious spiral of land degradation that combustible fuel fosters, biomass fuel smoke contains several pollutants including carbon monoxide, hydrocarbons and nitrogen oxides. These gases are often responsible for the high levels of respiratory diseases women get in households where there is poor ventilation. Studies have shown that burning one kilogram of wood on a typical wood-fired stove will only generate about 18% heat to the pot, 8% as smoke and 74% is waste heat. Simple adapted stoves can considerably enhance efficiency of fuel use.

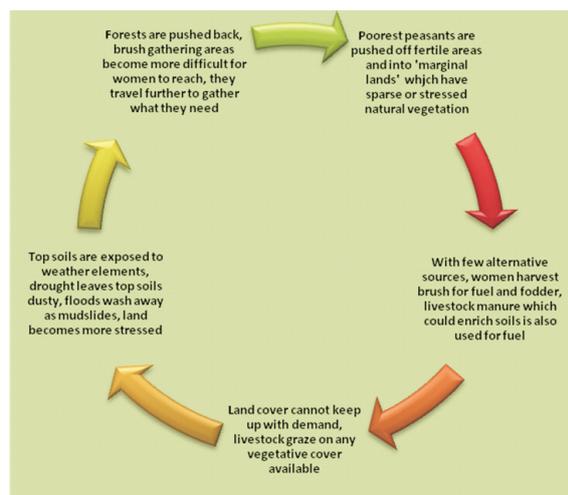


Figure 2: Viscous Spiral: spending and depletion

## On Farming methods, Biodiversity and Seeds

*Any progress achieved in addressing the goals of poverty and hunger eradication ... and environmental protection is unlikely to be sustained if most of the ecosystem services on which humanity relies continue to be degraded.*  
(Millennium Ecosystem Assessment)

The farming memory and traditional knowledge common to most agrarian societies has been forgotten in Tajikistan. The Soviet system of production effectively meant that many people were *no longer farmers but farm laborers*, who may have grown some vegetables and fruit trees in their family plots, but had no real farming knowledge. This poses both a challenge and an opportunity; it is a challenge because people have been driven back to subsistence farming out of necessity with a thin base of knowledge. It is an opportunity because there is an openness and willingness to learn new methods of climate-sensitive ways of farming. Given the mountainous terrain, farmers need to be constantly learning about farming methods sensitive to micro-climates.

Because most smallholder farmers cannot afford to purchase chemical fertilizers or pesticides, the food farming sector is, by default, bio-organic in nature. Farmers are re-acquainting with mulching practices and with

making manure-based fertilizers, drawing inputs from within the farm. These small oases of bio-friendly farming, however, could be compromised if surrounding farms and fields continue to be farmed with high levels of chemical inputs as they become more commercially oriented. Local NGOs, like the Youth Ecological Centre and HBT (Hamkori Bahir Tatqqiyot) are successfully working with smallholder farmers to incorporate local knowledge with eco-friendly planting methods, training them in making pesticides using local plant tea- mixtures, and promoting the benefits of intercropping (such as sunflowers and corn).

Small-holder female-headed households are actually more active, more successful and therefore more resilient...

Tatiana Novikova, UNDP, Tajikistan

Tajikistan is the homeland for dwarf wheat, sphere grain wheat; the homeland of most legumes, like peas, lentil, chickpea, common bean, golden bean, horse bean. It is also the center of origin and diversity for rye, mustard, flax, safflower, cotton-guza, melon, pumpkin, carrot, onion, reddish, garlic. In Tajikistan huge diversity of fruit crops like pistachio, apricot, pear, apple, almond, walnut, fig and pomegranate are concentrated. From this centre major fodder crops – lucerne, sainfoine, Persian clover and others originate. (Source: Muminjanov 2008)

A UNDP initiative, ‘sustaining agriculture in a climate change regime’, now in its third year, is collaborating with the National Biodiversity and Bio-Safety Centre, paying more attention to wild species which are already adapting to climate shocks – the farms involved in this capacity building are essentially living laboratories testing out the viability and productivity of these wild plants. At the same time, they are regenerating traditional knowledge, compiling information from cartographers, scientists and archives. Their capacity building activities include raising awareness of farmers so they understand and can discriminate between plant species and seed types. The original landscape, climate and millions years of evolution have resulted in a rich mosaic of terrestrial and freshwater ecosystems, flora, fauna and microorganisms in this region. In Tajikistan alone, there are more than 25 types of ecosystems, including water reservoirs and anthropogenic ecosystems. The country is recognized as one of the centers of origin and diversity for many crop species.

There are about 5,000 plant species found here that are closely related to wide variations in geography, altitude, soil, climate and culture. This rich biodiversity has to be brought to bear on future food security plans<sup>23</sup>. A recent expedition to Tajikistan led one genetic resource scientist to a remote village where farmers handed him a collection of wheat seeds, one of which offered resistance to “Sunn” pest, an insect that favors and destroys cereal crops in warm areas. These scientists are continually on the hunt for novel sources of resistance.<sup>24</sup>

“We used to have a type of sweet watermelon here but I have not seen the seeds for this watermelon in five years!”

“We have stopped growing the original rice (Devzira) for which this region is renowned; we now grow a cheaper rice variety that grows faster and that sells quicker in the market. We realise that the older grain is hardier and requires less oil to cook, but it is also more difficult to thresh”.

Quotes from farmers to show how local seed species are losing ground

At the same time, there has been a huge loss in agricultural biodiversity during the last decades due to the introduction of seed varieties in major crops like wheat, rice, cotton and vegetables. Women farming groups’ representatives have to ensure that the local and international scientists working on genetic diversity of seeds and plants take into account the growing, nutritional and marketing priorities of smallholder farmers<sup>25</sup>.

## On traditional knowledge and indigenous solutions

In most regions of the world, farmers can refer to legends and fables to explain weather phenomena that are so important to their planting and harvesting decisions. These legends, folklore and traditional ways of forecasting weather make up the collective farming wisdom gathered over several thousands of years and in times of uncertainty. In Tajikistan this ancient knowledge needs to be unearthed and revalued. Farmers need to build their own confidence and credibility in dealing with climate change by their own signals and evidence.

In traditional agrarian societies, crop diversity was not an accident but a product of management and stewardship of particular cultures and communities. First Nation groups across North



**Photo caption: an example of traditional bio-organic farming methods in the region**

In the last days of October, horns from the milking cow filled with manure are buried until the Spring time, when they are unearthed and the contents mixed proportionally with water and sprayed on the soil and around the newly planted crops.

As more and more technologies are developed to be ‘climate smart’, there are a wide range of appropriate models to draw from. Often it is less about the technology itself and more about the engagement of rural women in its design and use. Time and again, urban and technological (and male) biases assume that rural women have neither the interest nor the capacity to work with technologies. In fact, the opposite is true. The most successful popularization of rural technologies takes place

America for instance, grew a combination of corn, beans and squash together (referred to as the ‘three sisters’) whose converging properties took care of both soil and crop. Farmers need to be able to build upon their own traditional agricultural systems drawing on historical information and their farm ‘memory’ of time-tested risks and trials while adopting new approaches and practices based on current scientific data and our understanding of the climate system.

“Our grandparents used to say, “...for every tree you cut down you must plant ten”. We do not do that anymore – but we should!

**Farmer, Seed Association**

In other words, the evidence of climate change should be made a part of farmers’ future planning scenarios and realities, without refuge to climate change jargon, but in terms familiar to farmers who are thousands of miles away from the centers of climate change discussion and negotiating. Climate change must be integrated with energy, with water, with farming – as an “extra string to one’s bow”<sup>26</sup>.

when women ‘appropriate’ the technology – they become the agents of their distribution. In other words, if women are trained to build, maintain and repair appropriate technologies - from smokeless stoves to solar panels - they are more likely not only to use these technologies, but to demand them, and to train other women in their usage. Over time, the users become empowered to adapt and improve upon initial designs.

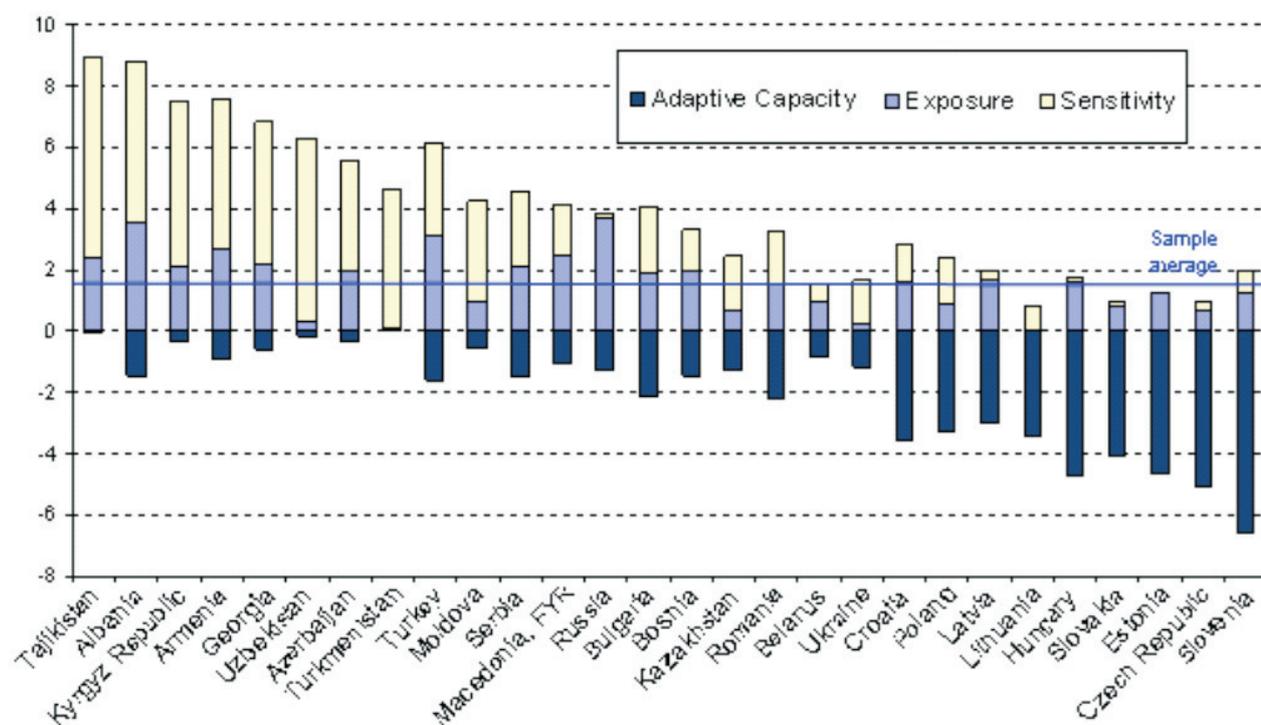
# Part 3 - “We are part of the solutions”!

## How women are responding to climate change

Climate risk management in the agricultural sector is a key priority. The mono-crop, high synthetic input agriculture practiced in the region runs counter to conserving and nurturing land and water, and optimizing natural resources and natural defense mechanisms. The combination and convergence of a number of factors has left

agriculture in the region in serious crisis and food / water security compromised. Regional studies on climate change adaptation rate Tajikistan as having very low adaptive capacity (see figure (4)). Given this negative starting point, how can rural women be supported in their responses to climate change?

**Figure 3: The Drivers of Vulnerability to Climate Change for Different ECA Countries<sup>27</sup>**



Note: Adaptive capacity decreases vulnerability hence is shown here as taking negative values. Slovenia has very high adaptive capacity, which is therefore large and negative, while Tajikistan has very low adaptive capacity, close to zero.

One first step is to establish a strong presence of organic farming in the country. Organic farming<sup>28</sup> presents a viable and important opportunity to the region<sup>29</sup>, not only because of the non-chemical nature of the overall productive system, but also because data gained from modeling both long-term field trials and pilot farms show:

- it's considerable potential for reducing

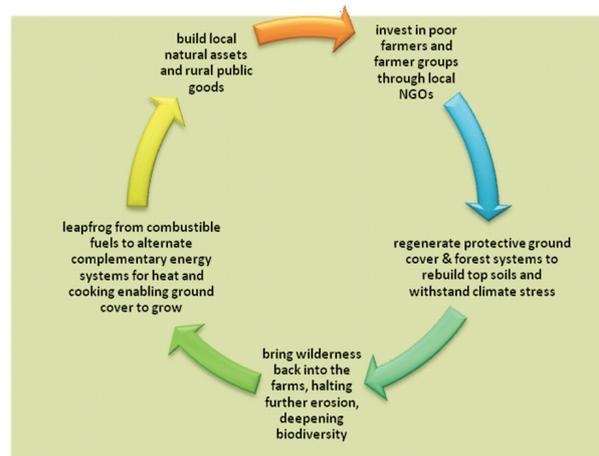
emissions of greenhouse gases (because it uses less energy than conventional farming);

- it's significant contribution to sequestration of CO<sub>2</sub> in the soil.

The FAO recommends organic farming because it "... performs better than conventional agriculture on a per hectare scale, both with respect

to direct energy consumption (fuel and oil) and indirect consumption (synthetic fertilizers and pesticides)”. Its 2002 report states that organic agriculture enables ecosystems to better adjust to the effects of climate change and has major potential for reducing green house gases. Other positive factors include:

- Organic soils have better water-retaining capacity which explains why organic production is usually more resistant to climatic extremes such as floods or droughts
- Carbon sequestration in soils is promoted by organic methods due to the addition of compost, mulches, manures and cover crops
- Where they are certified, organic farming systems require regular and methodical recording of farming data such as compost production and harvest records for organic farm inspectors to monitor. This systematized data collection method lends itself to systematic recording of weather-related data for use by local and national meteorological stations.
- As organic farming comprises highly diverse farming systems, the diversity of income sources also increases, potentially buffering farmers to adverse effects of climate change and variability such as changed rainfall patterns
- Organic approaches may make it easier to link economic value, cost and payments to future carbon sequestration programmes that



**Figure 4: Conservation and renewal - virtuous spiral**

seek to offer farmers environmental fees for stewardship of soil, land and biodiversity

- Biodiversity of flora and fauna (including bees and birds)
- Organic farming offers a low-risk farming strategy with reduced input costs and lower dependence on external inputs such as fertilizers. By extension, this often means reduced financial risk and reduced indebtedness, alongside increased diversity
- Other related benefits - healthy eating, local foods, lower overall food carbon footprint.

## Existing coping strategies and capacities

Rural women quickly grasp the holistic nature of farming and offer examples and solutions that they are already engaging in to adapt to climate change. A sample of suggestions offered by the women farmers include:

### Immediate (reactive) adaptation measures

- Changing activities in response to shifting seasons or seasonal variations; e.g. sowing or planting a little earlier than normal
- Protecting plants against frost such as covering onions and potatoes with hay
- Storing more fuel and preserved vegetables, and other reserves for colder winters
- Storing seed reserves in warmer conditions or in the home (to protect from frost damage)
- Construction of green houses to protect vegetable growing
- Harvesting, saving and storing water for irrigation and for drinking
- Recycling plastic bottles to use as drip irrigation feeders
- Securing water catchment areas in mountainous regions to prevent erosion and secure water supply
- Establishing and accessing early warning systems – and making women farmers an integral part of that information system
- Organizing women farmers into collaborative groups, fostering voice and advocacy capacities among women’s groups.

### Longer term (proactive) adaptation measures – which require more investment and training

- Shifting away from combustible fuels to cleaner energy sources



Figure 5: Reserves and preserves from surpluses

- Systemized rainwater harvesting and protection of catchment areas
- Shifting away from chemical fertilizer use to organic manure and mulching and bio-organic methods, rebuilding and protecting topsoils
- Changing the ways homes are built for floods
- Establishing early warning systems that women can access (many women have cell phones, this is an instant relaying channel that could reach many in a timely manner)
- Community weather stations and information systems that involve rural women in the design,

“Can we have an early warning system”?

“Should we be growing trees”?

Questions from women farmers after discussion on climate change

monitoring and recording can be key to adopting contingency plans, and could be the basis for establishing climate risk insurance programs for the Dehkan farms.

- Growing more diverse tree species and indigenous shrubs to promote top soil cover
- Developing integrated crop-livestock and pastoral management systems that also encourage tree replanting
- Learning to work together for communal wealth (e.g. seed exchange systems or communal seed storage)
- Exploring and articulating what farming legacy for future generations should look like

## Mitigation measures

- Promoting and strengthening biodiversity of seed sources – to nurture hardiness, drought resistance, and indigenous species that might adapt better than ‘exotic’ species
- Shifting away from water-hungry crops to crops that grow in semi-arid regions but that
- Shifting away from chemical agricultural systems and into bio-organic systems, (this could be one way to keep and add value to the cotton sector)
- Rebuilding and protecting top soil health

**These lists of potential interventions come from women’s groups interviewed for this report – clearly most of them would require political will, financial investment and locally managed action research. The recommendations of this report list some of the ways in which these, and other, approaches could be taken forwards. Typology of possible adaptation strategies**

**Table 3: Examples of options for women farmers in Tajikistan**

<p><b>Bear the loss</b> “Do nothing,”</p>	<p>Where there is no capacity to respond, or the cost of adaptation is too high in relation to risk or expected damage e.g., loss of coastal areas, loss of a species.</p>	<p>Prepare for difficult times by expanding reserves and stocking up seed &amp; surplus Prepare for floods by maintaining irrigation canals and relocating up stream Strengthen women’s community self-help groups Seek alternative livelihood options</p>
<p><b>Share the loss</b></p>	<p>Private insurance, public relief, reconstruction, and rehabilitation paid from public funds.</p>	<p>Strengthen women’s farming groups to secure and manage financing through collaboration with CBOs &amp; micro-banks Change <i>ad hoc</i> compensation and assistance programs to share publicly the risk of farm-level income loss associated with disasters and extreme events Enable women to conduct their own detailed needs assessment and budget estimations</p>
<p><b>Modify the threat</b></p>	<p>Flood control measures; migration of people from high risk areas; new agricultural crops; change location of new housing, of water intensive industry, of tourism; improve forecasting systems to give advance warning of hazards and impacts; contingency and disaster plans.</p>	<p>Shift away from row-planting to farming methods that capture rain water such as pot hole farming &amp; permaculture learn to harvest and store rainwater use fuel-efficient cooking stoves that capture more heat bring weather forecasting systems directly onto the farm</p>
<p><b>Prevent effects</b></p>	<p><i>Structural and technological changes</i> needing more investment— increased irrigation water; increased reservoir capacity; water transfers; water efficiency; scale up coastal protection; upgrade wastewater and storm water systems; build resilient housing; modify transport infrastructure; and create wildlife corridors.  <i>Legislative, regulatory, and institutional changes</i> change traditional land use planning practices; more resources for estuarine and coastal flood defence; revise guidance for planners; include climate change risks in criteria for site designation for biodiversity protection; and amend design standards.</p>	<p>Change crop choice &amp; location and livestock production to address the environmental variations and economic risks Learn and promote alternative rotation and tillage practices to address climate change-related moisture and nutrient deficiencies Address those issues that contribute to climate change, that rest within women’s spheres of activity and influence  Continue to raise awareness of rights among women Certify women’s land ownership status Ensure that smallholder farmers do not lose out on intellectual rights on seeds and biodiversity</p>

<b>Change use</b>	Where continuation of economic activity is impossible or extremely risky e.g., substitute for more drought tolerant crop, return crop land to pasture or forest.	Diversify crop types and varieties, including crop substitution to address environmental variations and economic risks Change timing of farm operations to address the changing duration of growing seasons and associated changes in temperature and moisture Explore and invest in viable off-farm livelihood or economic. Conduct benchmarking of strategies and lessons in comparable regions/conditions in other countries Engage rural women in participatory research into viable alternatives for land use
<b>Change location</b>	Relocate major crops and farming regions away from areas of increased aridity and heat.	Help women test for and identify the crop mixes appropriate for the right land / water factors Conduct cost-benefit assessment <i>with</i> farmers.
<b>Research</b>	New technologies and methods of adaptation; improve short-term climate forecasting and hazard characterization; more information on frequency and magnitude of extreme events; better regional indicators for climate change; more risk-based integrated climate change impact assessments; better knowledge of relation between past and present climate variation and system performance; produce higher resolution spatial and temporal data on future climate variability from model based climate scenarios.	Engage and empower women farmer groups in lab-to-farm research, plant observation, data collection, seed selection and know-how Establish simple meteorological on-farm stations managed and monitored by women to record and feedback data Farmer groups can be proactive in collaborating with scientists on development of new crop varieties including types, cultivars and hybrids
<b>Educate, inform and encourage behavioural change</b>	Lengthen planning timeframes; reduce uneven awareness by stakeholders; increase public awareness to encourage people to take individual action (health, home protection, flood awareness) and to accept change to public policies (coastal protection, landscape protection, biodiversity conservation).	Women participate in training of trainers in local alternative and renewable energy development including technical know-how and maintenance Women should adopt principles of 'life long learning' and use of digital access for learning, communicating and networking

Source: Developed and Adapted from World Bank (2009) Table 1.2

These strategies can be strengthened at various levels. At the household level, women household members and women heads of household need to be targeted for comprehensive awareness raising and technical training that link adaptive and mitigative farm practices with their immediate water and energy concerns. At the farm level, local/national best practice sharing on natural resource management, on adaptive and mitigative farming, and information on rights to land need to be facilitated alongside formal support in the form of investment, accessible credit,

appropriate technologies and small –scale mitigation projects. At the policy level, women representative groups need to be directly engaged in cross-cutting project and policy design and implementation. Energy initiatives need to go hand in hand with reforestation projects – involving women at all levels. Climate change vulnerability analysis will need to become a standard feature of all programs and related policies.

# Part 4 - Investment Imperatives and Alternatives

*The gains from improved agricultural practices would be many times more significant than changes expected from climate change (World Bank 2009).*

The following strategies and recommendations are categorized by sector. Each will require a pro-active approach that needs national level endorsement and political will, capacity building at the farmer and agency levels, and the solidarity of the international community.

## Reframing the approach to agriculture

There is a ‘mind set’ among policy makers and financiers that casts the ‘*low-productivity subsistence farm*’ as a burden on the economy. In fact, these family plots are far from ‘low-productivity’, their productivity range and level is incredibly high and they form the bedrock of the nation’s food security.

Commercial sector bias, however, persists – as evidenced by statements made and conclusions drawn such as: “*The impact of climatic factors is observed in spring when precipitations cause formation of soil crust, wash out the crops, irreparable damage to agricultural products, particularly cotton*”. The small-holder farming sector in Tajikistan is still in its infancy. It grew out of necessity, need and urgency, with little support. Its overall management is weak and in the process of its expansion it has depleted available resources almost entirely. One silver lining is that because chemical fertilisers and pesticides are beyond the affordability of these farmers, they are de facto prime candidates for more bio-friendly forms of farming.

The farming sector in Tajikistan sits at a decisive juncture. The country can decide to follow “business-as-usual” practices which will take its

ecology, economy and food security down one (disastrous) trajectory, or it can adopt a more long-term vision, which invests in the country’s food economy while preparing the resilience of both economy and ecology for climate change. The “business-as-usual” practice will continue to favour capital-intensive technological solutions above all else, and will disregard units of production considered economically ‘unviable’. In other words, women smallholder farmers will continue to be ignored. On the other hand, if allowed to pursue the full extent of their innovation, ecologically sound farming methods and nurturing of local biodiversity, both Dehkan farms and family plots could lead a new way to farm in the era of climate change.

## Putting women at the centre of Community Water Management

As irrigation and drinking water is such a stress point for rural women, there is an urgent need to integrate water issues into women’s awareness and control. Dependence on an antiquated water pumping infrastructure which is expensive to repair is unsustainable. There are a few attempts at drip irrigation (which still require women to source the water from pumps to fill up water tanks) and at piped irrigation which do not really address long-term water security. Some village communities had installed homestead water wells, which address the short-term demand for water.

There needs to be national support for a village-by-village approach that works with a women's water committee to identify alternate natural water sources, nurturing and protecting these water sources through a combination of eco-management, local governance and communal trust. Rural women representatives could be trained and made responsible for water affairs at the Jamoat level, to save and protect water for the wellbeing of all members of the community.

Gravity irrigation, rainwater harvesting, protection of water catchment areas, conversion of mudslide areas into small dams – these are part of a range of small-scale mitigation projects that could source local water such as springs, seasonal ponds, groundwater, derivation of smaller streams and the harvesting of water from snow and episodic rainfall. Establishing these decentralised “small scale solutions” would address water scarcity at the community level while empowering women to maintain their water security.

## Leapfrogging to Clean Renewable Energy

There is an analogy to be drawn between the energy and telecommunications sectors. Where

Utilization of small-scale renewable, especially micro and small HPPs (Hydro-Power Plants) would ease the burden on small communities to collect traditional biomass and to buy kerosene for cooking and heating. Such small installations require little, if any, international products, and using local goods and services would result in returning the money to the local economy thus inducing progress. Jobs would be created and people, especially women and children, would have more time for studying and “money making” activities as the result of decreased need for firewood and dung collection. Availability of lighting would allow better quality of life and longer hours for various indoor activities.

The reduced need for firewood would decrease the damage on local ecosystems. It would reduce the already devastating rate of deforestation which, on the slopes of mountainous Tajikistan, results in highly increased susceptibility to soil erosion, salinization and in the end desertification. Such land cannot be used for agricultural activities nor does it even offer possibility for reforestation. Decrease of dung collection would leave more dung to be used for fertilizing the agricultural land which would then have higher yields. Overall it is clear that turning to the small-scale renewables would improve the overall quality of life while decreasing the rate of energy poverty in Tajikistan<sup>30</sup>.

Not only is there local scientific research and technological know-how in solar, wind and biogas energy production - there are also numerous promising examples and ‘pilot projects’ dotted around

“Women want access to clean water. They have a vested interest in protecting water against pollution. Since Soviet Union times their “traditional monitoring role” has been replaced by machines, pumps and other technical devices. Unfortunately, even in the Soviet Union times, women were not so much involved in advisory functions in water management administrations in Tajikistan (and the other Central Asian states).

Prof. Frank Schrader, Transboundary Water Management in Central Asia, GIZ  
Feb 05 2011

communities and indeed entire countries have leapfrogged from no telecom munications to wireless, (skipping the land-based fibre optic infrastructure altogether), Tajikistan rural communities could benefit from a direct leap into clean and renewable energy systems, skipping the fossil-fuel generated electrification almost entirely.

the country that demonstrate what is possible and the positive impacts of these interventions<sup>31</sup>. How far these interventions actually involve and engage women, however, is questionable.



Alternate energy sources could reduce greenhouse gas emissions, increase the natural use of manure for renewing top soil, enable women to use the time that they would have been spent gathering and storing fuel on other things, reduce indoor pollution with smoke-related health problems and provide energy security.

*(left photo)*

Here a home with an insulated basement and roof (using hay) and south west facing windows is better protected against the cold; less fuel is burned for heat. Windows facing the SW are a natural heat trap, the temperature difference between these two windows (framed in black) and the window to the far end of the home is noticeable to the family. The head of household is a widow, a nurse and a mother of five children.



## Bringing farmers into the Information Age

Now, more than ever, there is a direct correlation between security of livelihood and timely and accessible information. Those who are marginalized from information or who have incomplete information are essentially disempowered and disengaged from forming decisions about their long term security. The confluence of rural poverty and environmental degradation are well documented - but the reverse is also true - environmental degradation and poverty become more widespread often because documentation and information is lacking.

When knowledge resources are readily available, farmers will refer to them and strive to conserve

those assets that sustain their livelihoods. From field evidence, it is clear that women are not only keen to get information, they are swift to apply what they learn and are pragmatists when it comes to securing assets, natural resources, capital and markets for the livelihoods of their communities. As they become more comfortable with using these tools, women farmers will generate and distribute information that is valid for their own farming and livelihood needs. Broadly speaking, women farmers often face:

- Incomplete information and poor access to data and intelligence;
- Limited recourse to regulations or legal

instruments that support their interests;

- Limited access to land tenure and services including credit, computer access;
- Limited access to insurance or disaster relief benefits; and
- Limited negotiating power as a result of the above.

With the spread of wireless into rural areas, (many women have handheld mobile phones) information communication technologies (ICTs) provide an important set of tools for addressing information gaps because they have the potential to allow women to be part of the communication value chain and to break through information bottlenecks. In the digital age, sources of information should no longer be ‘top-down’ nor single-sourced. They are multidimensional and multi-sourced and women can be key providers and users of information.

ICTs are an integral part of any climate change management plan. Three main aspects that ICTs are:

- **Localized information:** *Time sensitive, simplified and multiplied* localized information is the bedrock to planning for and managing climate change. Farmers depend on daily weather reports or the Farmer’s Almanac to forecast weather, as farm security is increasingly linked to the ability to forecast or anticipate climate change, dependable, localized and current information is needed. The micro-climatic nature of weather in Tajikistan means that information needs to be drawn from a range of sources for it to be valid and useful to farmers.
- **Data collection, record keeping and transparency:** *Verification, benchmarking and measuring* agricultural, natural resource and climatic data requires a solid commitment by scientists, farmers and analysts alike to share information and data. This means a continual

flow of information – a feedback loop – from ground up to satellite and back down. The old system of extension service from the urban to the rural is no longer valid. At the same time, it is clear that government legislation needs to be updated to conserve forests and farmlands alike and to respond to the needs of land management in the context of climate change. There is, furthermore, a clear link between organic farming and its record-keeping, transparency and data collection aspects - organic farmers are already acclimated to this type of process and required to do so. They therefore are very likely to be in the vanguard of localized data collection such as weather data collection systems.

- **Networking, cooperation and advocacy:** *distribution and engagement* of information among farmers, within communities and beyond the country will strengthen the regions’ resilience and capacity to handle climate change. Local media, community radio and phone use are increasingly important as new ways of sharing and learning. Radio is a 21<sup>st</sup> century media solution as it couples up with other technologies such as Global System for Mobile Communications (GSM) phones and Short Messaging Service (SMS) technology. As farming women are already collaborating among and within groups, ICTs lend themselves to simplifying as well as multiplying the process.

ICTs afford relatively inexpensive access to a wealth of information and networks, market information; comparative data on farm gate prices; consumer analyses, as well as farming methods. To help women take advantage of computerization and digitization, there is a need to build on current initiatives. Existing nodes of ICT access, such as the SASPEM (State Agency for Social Protection, Employment and Migration) need to provide

customized women-only training sessions in basic ICT skills.

## Capacity building at all levels

While adaptation is often considered as a government policy response in agriculture, it also involves decision-making by producers at the farm-level. As is clear from the preceding notes, capacity building is needed at several different levels, a sample listing includes:

### At national level

- Mirzoeva V (2009) “Land Reform and Women’s Rights to Land in Tajikistan” study demonstrates that the state needs more practical guidance on implementing country-wide land reform legislation and gender equality
- Tajikistan Poverty Reduction Strategy and National Development Strategy needs to intersect sector analyses, such as section on agriculture development and food security, with gender analysis, rather than treat gender equality separately
- The 2010 World Bank household survey (Tajikistan: Key Priorities for Climate Change Adaptation) of nationally representative public perceptions of, and spending priorities for, climate change was a missed opportunity to focus on what women/farmers say (given their established statistical significance among those affected)
- State bureaucrats charged with the PPCR<sup>32</sup> and similar climate adaption processes need sensitization and gender training.

“It is expensive for women to get land, and even when you have your land it is difficult to finance farming, especially on irrigated lands. So we must work in the rice farms for income”.

**Farmer, Langar Village**

### At farm level

- Sustainable land management practices through participatory training methods – that build on women’s expertise that has developed so far, while promoting peer-to-peer exchange and value of indigenous crops, seeds and methods
- Weather forecasting capacities. In the rainfed uplands of peninsular India for instance, community observatories are established on common land to facilitate easy sharing of information, with local institutions providing technical support. Farmers interpret local weather observation in combination with the localized weather and climate forecasts to adopt appropriate decisions regarding farming. Community-level weather stations are suitable for all types of farming systems, irrespective of farm size, and are especially useful for areas prone to drought, localized floods (water stagnation) and wind storms. Local farmers are the major beneficiaries of this kind of weather station. By utilizing location specific observations, community level disaster preparedness actions and contingency cropping may be planned. Total estimated costs for establishing a community based weather station are 400 US\$. Weather stations with a minimum of instruments, such as manual rain gauges, thermometers and wind anemometers, cost even less. Capacity building activities are

necessary to improve the monitoring and record of weather parameters by farmers and by the local community<sup>33</sup>

### **At CBO, women’s agency and advocacy levels**

Rural women and their representative agencies need to identify those individuals within government bodies and institutions who understand and champion small-holder farm interests. These institutions often function at a policy making level, not at the grass roots level and do not involve or engage farmers. This includes those responsible for solid waste management, national security forces, national water commission, forestry, meteorological office, climate risk insurance bodies, lands management and environmental legislature. In other words, the policy context, while still evolving, needs the strong and vocal advocacy *from and for* women farmers.

The emphasis then is that “sustainable development” means that we need to continue to be proactive and deliberate about focusing on the

adaptive capacity of societies to respond to climate change. *Policymakers and practitioners alike* have a responsibility to ensure that any work with community organizations on rural development and infrastructure issues, resource management issues and development policy in general should be built on efficient use of conservation information and knowledge, on proven risk management practices and on sharing local experiences and lessons learned. It is an ongoing dialogue. This is easier said than done, especially as women are so often excluded from the mainstream dialogue. Considerably more investment of time and money is needed to support and engage women in all aspects of working with community and civil society organizations. International NGOs have an invaluable role to play in building the capacity of a range of civil society organizations, including farmer organizations, water user unions, producer and marketing groups.

# Concluding remarks

## A positive momentum to build on

There is positive momentum to build on - one factor is the government's declared recognition of the role of women. The decree of the Government of the Republic of Tajikistan "About changes and additions to the State programme Main Directions of the State Policy to Ensure Equal Rights and Opportunities for Men and Women in the Republic of Tajikistan for the Years 2001-2010" includes the following text:

*"The current status of women in Tajikistan contains limitations, in comparison with that of men, in various spheres of socio-economic life, including labour opportunities, property and land rights, etc. To ensure equal economic opportunities and equal access of men and women to property, including land, it is necessary:*

- *To strengthen women's awareness as regards their economic rights;*
- *To facilitate access to credit and develop microcredit systems for women;*
- *To develop intermediary networks for the sale of agricultural products and home-made products;*
- *To conduct studies and regular monitoring of gender inequality in this field".*

There have been some positive changes<sup>34</sup> in the agricultural sector that also need to be built on, such as:

- Agricultural output continued to grow in 2009, boosted mostly by a sharp increase in *non-cotton agricultural production*
- The government, with the help of donors, has resolved a *long-standing farm debt problem*. As a result more than US\$350 million of debt owed by the cotton farms to a conglomerate of domestic and international investors have been written off, the remaining US\$ 114 million will be restructured.
- Agriculture may be a driving force for growth if land reform is completed and freedom to farm is guaranteed. A strong growth in agriculture sector in 2009 was largely due to efforts to *diversify agricultural production*. This has also increased domestic food production, partly easing the burden of high food prices. However there should be a sustainable policy shift towards greater freedom to farm to ensure sufficient levels of domestic food production and a lasting effect on poverty reduction.

# Priority Recommendations and Action Items arising from field research

Thematic Priority	Principles underlying recommendations and action items	National Government responsibility/lead	Recommendations		
			Local NGOs, CSOs and Women's Agencies	International community and donor agencies	Investor opportunities for both private sector and donor agencies
Central roles of women in food security	<p>Organic farming approaches are recognized as the default and preferred farming system across Dekhan farms and family plots</p> <p>Women household members and women heads of household are targeted for awareness raising and technical training linking adaptive and mitigative farm practices equally with their immediate production concerns</p> <p>Women's views about food security and climate change are sought out, valued and applied to policy decisions on food economy in a climate change context</p>	<p>Continue to shift agricultural policy towards a diversified farm economy that supports local food production</p> <p>Continue to secure women's land certification and ownership status</p> <p>Support and promote agro-ecological farming systems and learning that nurtures local biodiversity</p> <p>Build government capacity and sensitivity on the gender, climate change and food security nexus</p> <p>Develop baseline data and indicators on gender roles and food economy</p> <p>Promote small-scale labor-intensive forms of farming</p>	<p>Engage rural women in participatory research into viable alternatives for land use</p> <p>Identify seed and crop choices that address environmental variations and economic risks, conduct cost benefits <i>with</i> women farmers</p> <p>Build women's marketing expertise and facilitate contracts between farmers and citizens for fresh organically grown produce</p> <p>Build mutual exchange knowledge on micro-climate change bringing women farmers together with climate scientists</p>	<p>Develop training materials drawing from experience of women farmer groups in lab-to-farm research, plant observation, data collection, seed selection and know-how</p> <p>Support peer-to-peer participatory training for women farm leaders in local alternative farming, energy and water systems</p> <p>Provide incubation funds to support farmer groups that can grow their capacities to steward land, water and biodiversity</p> <p>Promote women farmers' storage and marketing capacity of local produce for local markets</p>	<p>Invest in appropriate information and communication technologies including SMS and computer centers that are made accessible to rural women</p> <p>Invest in rural finance infrastructure that enables women to develop cash reserves</p> <p>Develop infrastructure that connects cities with adjacent agricultural areas, invest in storage know-how and local transport for urban markets</p>
			<p>Integrate local water issues into women's awareness and control as an integral part of their central roles in food security</p> <p>Demonstration training to enable women farmers to shift from row planting to methods that capture and store rainwater</p>	<p>Support a village-by-village approach that works with a women's water committees to identify and manage alternate natural water sources</p> <p>Support pilot mitigation projects that bring science and geo-water knowledge into women's hands</p> <p>Invest in decentralized small-scale mitigation projects that source local water for harvesting, storage and conservation</p>	
Water security for farming and rural households	<p>Successful adaptation to water use and distribution will depend on engaging women in the design, planning and management of water resources</p>	<p>Place women at the centre of community water management at the Jamoot level</p> <p>Place policy emphasis on small hydro power production and natural capture and conservation of water sources</p> <p>Promote farming methods that work with land contours and that capture and store rainwater</p>	<p>Integrate local water issues into women's awareness and control as an integral part of their central roles in food security</p> <p>Demonstration training to enable women farmers to shift from row planting to methods that capture and store rainwater</p>	<p>Support a village-by-village approach that works with a women's water committees to identify and manage alternate natural water sources</p> <p>Support pilot mitigation projects that bring science and geo-water knowledge into women's hands</p> <p>Invest in decentralized small-scale mitigation projects that source local water for harvesting, storage and conservation</p>	

<p>Rural energy poverty is addressed through a combined policy of changes to farming methods, community reforestation, a shift away from combustible fuels and the development of renewable energy systems that cater to women's needs and burdens</p> <p>Rural energy systems</p>	<p>Mainstream local technical solutions, such as solar energy or insulated construction, that harness energy through renewable sources</p> <p>Promote through subsidies or shadow-pricing small-scale, decentralized off-grid renewable energy projects</p>	<p>Work at local levels with women to identify indigenous plants for long term process of re-growing forests</p> <p>Train women in insulating homes, heat capture and stove efficiencies</p> <p>Train women farmers in technical know-how and maintenance of rural renewable energy sources</p> <p>Advocate the use of CIF/PPCR funds for small-scale, decentralized off-grid renewable energy project investments</p>	<p>Compile best practice examples from the region that have engaged rural women in design and development to show case what is viable and sustainable, including pastoral management</p> <p>Support the use of CIF/PPCR funds for small-scale, decentralized off-grid renewable energy project investments</p> <p>Instruct/train women on how best to apply for and access rural energy support schemes financing</p>	<p>Invest in local 'clean green' investments in renewable energy systems customized to the region, its climatic zones and micro-climate priorities, target micro-energy applications</p>
<p>Rural women are engaged as a matter of course in the design and use of climate risk management systems, participation will permit them to set their own priorities based on their appraisal of their needs.</p> <p>Evidence of climate change is made an integral part of farmer's planning scenarios and realities using language and terms familiar to them (end-users must be involved in CRM design)</p> <p>Climate risk management's</p>	<p>Develop early warning systems which could save human suffering as well as costs, develop on-time information systems that target rural women</p> <p>Develop weather forecasting radio programs that ensure farmers can access weather information</p> <p>Establish regulatory seed body to record, protect and further develop local seed varieties that are climate hardy</p> <p>Develop gender sensitivity among all policy makers and civil servant responsible for climate change processes</p>	<p>Develop capacity of farmers to discern and choose indigenous hardy species as well as hybrid 'climate-smart' varieties depending on micro-climatic requirements</p> <p>Enable women to combine resources and knowledge, including seed exchange and storage programs</p> <p>Train women to read and record weather data and to use these to forecast weather over time and to apply this to farm and water management practices</p>	<p>Identify local climate-hardy seeds and traditional crops for development at scale for distribution that are appropriate and sustainable for women to invest in</p> <p>Bring visibility to women's roles through building linkages across sectors and solidarity among local and international NGOs to reinforce interlocking activities on climate risk management</p> <p>Organize regular periodic reviews /monitoring and evaluation meetings with local NGOs, facilitated by climate change specialists</p>	<p>Develop micro-climate insurance programs that target and benefit clusters of women farmers or larger farm entities</p>

## **Summary of specific recommendations to key actors in Tajikistan**

### **Recommendations**

The Government of Tajikistan, private sector, donors and civil society actors need to recognize and support the central role that women small holder farmers play in the food economy.

Allocation of resources to women farmers and their agencies, however, is not enough on its own. This constituency of farmers are an invaluable actor in mitigating and adapting to climate change. The day-to-day actions of smallholder farmers can either add value through safeguarding natural resources or run up huge costs and ecological debt by denuding natural resources. As old farming and management systems are dismantled, this is an opportune moment to bring in concerted support, training and investment into agro-ecological farming methods that could both reverse and address climate change impacts on natural resources, water and land. This requires urgent investment in an interlocking water/energy/farming system that builds on smallholder farmer's resilience, industriousness, innovations and willingness to take risks.

#### **Recommendations to the Government of Tajikistan:**

1. Prioritize vulnerable women farmers in agricultural, food security and climate change-related adaptation policies and practices and respond effectively to their needs
2. Develop early warning systems designed to save lives and reduce suffering from climate-related events and ensure timely information systems that includes the targeting of rural women in their role at the household and community level and roll out local weather radio programs that ensure farmers can access targeted weather information.
3. Agricultural policies and practices must move urgently to a diversified farm economy that supports local food production, promotes agro-ecological farming systems and small-scale labor-intensive forms of farming. A regulatory seed body should be set up to record, protect and further develop local seed varieties that are climate hardy.
4. Relevant government ministries should prioritise the implementation of reforestation policies that include the promotion of diverse local tree species and indigenous shrubs to regenerate natural water ecology. Government policies and practices must place women at the centre of community water management at the local level. An emphasis must be placed on small hydro power production and the natural capture and conservation of water sources

#### **Recommendations to local NGOs, CSOs and Women agencies in their responses to the challenges rural women and communities face:**

1. Prioritise food security by engaging rural women in participatory research into viable alternatives for land use; work with women farmers to identify seed and crop choices that address environmental variations and economic risks; build women's marketing expertise and capacity to market fresh organically grown produce;
2. Build women's awareness of the key role they can play in water management and rain water capture
3. Work with rural women locally to address their energy needs through: training in insulating homes, heat capture and stove efficiencies and building technical know-how and maintenance of rural renewable energy sources
4. Address climate change risks by: helping farmers to discern and choose indigenous hardy species as well as hybrid 'climate-smart'

varieties; promote seed exchange and storage programs; ensure mechanisms are in place for women to receive timely weather information and forecasts that draw from national and local sources

5. Promote the central role that women can play in addressing food security and climate change risk responses across all sectors in Tajikistan and support local NGOs in monitoring these risks and evaluating responses

**Recommendations to international and national NGOs and donor agencies:**

1. Develop participatory training materials and support for women farmers focused on local alternative farming, energy and water systems with incubation funding to build their capacities to steward land, water and biodiversity
2. Promote women farmers' storage and marketing capacity on local produce for local markets
3. Support women's village water committees to identify and manage alternate natural water sources including pilot mitigation projects that bring science and geo-water knowledge into women's hands
4. Identify local climate-hardy seeds and traditional crops for development at scale for distribution that are appropriate and sustainable for women to invest in

**Recommendations to investors:**

1. Invest in appropriate information and communication technologies including SMS messaging and, potentially, computer centres accessible to rural women farmers for up-to-date information on critical issues such as market prices, weather forecasts and farming practices
2. Invest in a rural finance infrastructure that enables women to develop cash reserves
3. Develop rural to city infrastructure to enable local transport to urban markets and invest in food storage systems locally
4. Invest in decentralized small-scale mitigation projects that source local water for harvesting, storage and conservation.

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# List of Annexes

1. Regions and villages of participatory research
2. Literature Review
3. Research / participatory methodology
4. Key sources and people consulted

## Annex 1. Regions and villages of participatory research

Region	District	Village	Supporting local NGO	Meeting with
<b>Khatlon</b> (24 <sup>th</sup> to 27 <sup>th</sup> January)	Temurmalik Jamoat Vatan	Hasanbek		Women Dehkan Farm
	Vose Jamoat Tugarak	Larkhobi		NGO Durandesh
	Vose; Jamoat Pakhtakor	Kaftarkhona		Women Dehkan Farm
	Vose Jamoat Michurin	Anoriston	BAKHT	NGO staff
	Kulob town		HBT	NGO staff
	Vose	Chorbog	HBT	Association of Seed Producers
	Khovaling	Darai Mukhtor	MSDSP	Bio-gas pilot
	Khovaling	Shekhmizon	MSDSP	Women's self-help group
<b>Sughd</b> (28 <sup>th</sup> to 31 <sup>st</sup> January)	Spitamen	Yangoobod	SAODAT	DF Namuna
	Spitamen Jamoat Nau	Spitamen	SAODAT	DF Karaulteppa
	Spitamen	Langar	SAODAT	Women Dehkan Farm 100 members
<b>Districts of Republican Subordination</b> (3 <sup>rd</sup> Feb)	Gissar	Dehqonobod	Youth Eco-centre	Women's farming group

## **Annex 2: Literature Review - Women Smallholder farmers in Tajikistan – Experiences of Climate Change and Learning to Adapt Agricultural Practice**

This literature review is guided by the following research questions:

- How is weather and climate change currently experienced by smallholder farmers, and how is it impacting women and men differently? Do existing institutional/cultural arrangements and inequalities between men and women in Tajikistan increase/decrease the impact of climate change on production/resilience by women and men?
- What is the status/evolution of existing data, disaggregated by sex? What percentage of women is engaged in agriculture and what do they produce?
- What adaptive approaches and coping strategies are already being used? What is working/not working and what are adaptive alternatives that might meet women's needs?
- How do women smallholders obtain their knowledge in climate change adaptive agricultural techniques? What barriers do they face? How do women organize themselves to gain and share knowledge?
- Why should decision-makers and donors focus climate change investment on small-scale food producers, particularly women?
- What are some key gaps in current knowledge and planning related to gender and small holder agriculture in Tajikistan?

### **I. Climate Change - General and Gender Dimensions**

- In recent years, research has increasingly focused on analysing gender and climate change as correlated phenomena; on improving understanding by creating guides and toolkits; and on reinforcing future research by identifying under-researched variables (e.g. data collection and true participation by women).
- The reality of climate change is well-established in the literature. Increased exposure to droughts, floods and storms has already negatively affected opportunity and reinforced inequality in many parts of the world. Women and girls tend to suffer more from the consequences of climate-related disasters. Tajikistan is representative of this situation.
- Generally, vulnerability to climate change over the next ten to twenty years will be dominated by socio-

The review scanned over 100 publications and other research materials. The majority of the materials are available online and sponsored or produced by multilateral and regional development agencies, international NGOs or by the Tajikistan government. The remainder consisted of scholarly journal articles, online news media, as well as research mentioned in the TOR. The literature review features articles published in or after 2008, with exceptions for key articles that remain pertinent.

Research keywords and combinations included: climate change; Tajikistan; farmers; women; agriculture; and gender. Research results are organized below according to the following five themes:

- I. Climate Change: General and Gender Dimensions
- II. Climate Change & Food Security in Tajikistan
- III. Gender in Tajikistan
- IV. Agriculture, Water & Energy: Cross-sections with Climate Change and Gender in Tajikistan/Central Asia
- V. Gender-Sensitive Policy and Practical Responses to Climate Change: Mitigation and Adaptation; Technology Transfer; Financing

Salient points found in the literature under each theme are summarized by bullet points and followed by the list of research results and online links.

- economic factors and legacy issues, rather than by the changing climate itself. Vulnerability spans food security, hydraulic resources and human health.
- Understanding how the different social expectations, roles, status and economic power of men and women affect--and are affected differently by--climate change will improve the effectiveness of actions taken to reduce vulnerability and combat climate change in the developing world.
- There is a continued need to expand and improve collection of sex-disaggregated data pertaining to the effects of climate change. Better monitoring and evaluation processes are required to integrate gender analyses and principles of equal participation across multiple areas of governance and the cycle of project design.

REFERENCE	LINK
52nd session of the Commission on the Status of Women (2008). “ <b>Gender perspectives on Climate Change,</b> ” Issues paper for interactive expert panel on Emerging issues, Trends and New Approaches to Issues Affecting the Situation of Women or Equality between Women and Men.	<a href="http://www.un.org/womenwatch/daw/csw/csw52/issuespapers/Gender%20and%20climate%20change%20paper%20final.pdf">http://www.un.org/womenwatch/daw/csw/csw52/issuespapers/Gender%20and%20climate%20change%20paper%20final.pdf</a>
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C, Pincha (2008) <b>Gender-sensitive Disaster Management: a Toolkit for Practitioners.</b> Oxfam America and the NANBAN Trust, Mumbai: Earthworm Books	<a href="http://www.reliefweb.int/rw/lib.nsf">http://www.reliefweb.int/rw/lib.nsf</a>
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International Institute for Sustainable Development. (2007). <b>CRISTAL: Community-based Risk Screening – Adaptation and Livelihoods.</b> IISD, IUCN, SEI-US & Intercooperation.	<a href="http://www.cristaltool.org/content/download.aspx">http://www.cristaltool.org/content/download.aspx</a>
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Oxfam GB (2008). <b>‘Sisters on the Planet’, DVD and booklet</b>	<a href="http://www.oxfam.org.uk/get_involved/campaign/climate_change/sisters/index.html">http://www.oxfam.org.uk/get_involved/campaign/climate_change/sisters/index.html</a>
Oxfam GB (2010). <b>Gender, Disaster Risk Reduction, and Climate Change Adaptation: A Learning Companion.</b> Oxfam Disaster Risk Reduction and Climate Change Adaptation Resources	<a href="http://www.gdonline.org/resources/OxfamGender&amp;ARR.pdf">http://www.gdonline.org/resources/OxfamGender&amp;ARR.pdf</a>
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World Bank (2010) <b>World Development Report 2010: Development and Climate Change</b>	<a href="http://siteresources.worldbank.org/INTWDR2010/Resources/5287678-1226014527953/Chapter-3.pdf">http://siteresources.worldbank.org/INTWDR2010/Resources/5287678-1226014527953/Chapter-3.pdf</a>

## II. Climate Change & Food Security in Tajikistan/ Central Asia Context

- Tajikistan’s glaciers – mainly found in the Pamir Mountains that make up part of the Trans-Himalayan range – are retreating. In the short term this means increased risk of floods but then could also lead to greater water shortages and disputes in the wider region in the future.
  - The effects of climate change are sharply felt in rural areas of Tajikistan in recent years where 1.4 million people are already food insecure. Last summer’s good rains brought some relief to rural communities across Tajikistan that had previously suffered from three consecutive years of drought, failed harvests and one of the harshest winters on record.
  - Long-term trends are clear and ominous. If current forecasts are realized, according Tajikistan government reports such as the 2010-2012 Poverty Reduction Strategy, water resources, agriculture, transport infrastructure, and public health are among the main sectors in Tajikistan to suffer impact.
  - Tackling the problem of natural disasters both through prevention and effective natural resource management is one of the priority objectives of the country’s national development strategy. National development strategies also include commitments of gender considerations.
  - Findings from a nationally representative 2010 household survey on climate change by World Bank provides public perceptions, adaptation priorities and ideas on the impact on agriculture, energy and water. Questions also measure the perception of households in Tajikistan on the importance of climate change in relation to other problems. A shortcoming of the survey is that it does not present a gender analysis of the survey results. Interesting findings from this and other recently conducted nationally representative surveys include:
    - Public awareness of the different consequences of climate change in Tajikistan is quite high, and in fact comparable to prevailing levels in Kazakhstan and EU27 countries (Figure 3a): a majority of respondents 57 percent) in Tajikistan (felt they were either very well-informed (9 percent), or fairly well-informed (48 percent-with large variations across regions.
    - Awareness of the different causes of climate change is somewhat lower in Tajikistan compared to Kazakhstan as well as EU27 countries: about 35 percent of respondents in Tajikistan felt they were very well-informed/ fairly well-informed about the main causes of climate change, as compared to around 56-57 percent in Kazakhstan and EU27 countries
- Awareness of climate change is generally lower among women in Tajikistan than among men. 2010 Oxfam survey of Tajiki and MDB bureaucrats involved in the PPCR process identifies gender and other gaps in the design, implementation and M&E frameworks of the PPCR process in Tajikistan

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### III. Gender in Tajikistan

The latest comprehensive gender assessment focused on gender relations in Tajikistan is from 2006.

Much of the gender research in Tajikistan continues to emphasize, and feature some government commitment (in public documents and international agreements) to:

- reducing inequities related to effective mechanisms for the implementation of gender policies as part of public administration reform; Enhancement of institutional mechanisms and the regulatory legal framework for gender policy, and consideration of gender issues in the drafting of budgets;
- raising the level of gender awareness and sensitivity among public employees at all levels of government;
- improvement of the statistical base for gender analysis and assessment of successful strategy implementation based on improvements in gender statistics;
- Increased representation of women and men at the decision-making level in government agencies, and participation in program design, monitoring and evaluation on the ground
- Strengthening partnerships and coordination in the implementation of gender policy.
- ensuring equal access for men and women to resources in the entrepreneurial sphere

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## IV. Agriculture, Water & Energy; Cross-sections with Climate Change and Gender

- Agriculture is central to the climate change problem, contributing about 13.5 percent of annual greenhouse gas (GHG) emissions (with forestry contributing an additional 19 percent), compared with 13.1 percent from transportation.
  - Agriculture is, however, also part of the solution, offering promising opportunities for mitigating GHG emissions through carbon sequestration, soil and land use management, and biomass production.
  - Agriculture is centre stage in Tajikistan and most often the livelihood activity of poor rural women, yet the percentage of family-style farms registered to women in Tajikistan is only 14 percent
- More investment needs to be made in agriculture, but more wisely; investments in agriculture and agricultural research for marginalized areas need to be tailored to the conditions of specific locations, participatory, and demand-driven.

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## V. Gender-Sensitive Policy and Practical Responses to Climate Change: Mitigation and Adaptation; Technology Transfer and Financing

- Funds for adaptation should ensure that gender considerations are taken into account and that initiatives are implemented that satisfy women’s needs, with their input; a gender diagnosis must be included in all projects proposed for financing, and gender must be mainstreamed into the work of agencies at the national level that are responsible for implementing commitments adopted at the international level
- Women should be given access to credit, commercial carbon funds, and information that allows them to understand and decide upon sustainable coping and adapting strategies, resources they can take advantage of and which technology meets their needs.
- Funds must place renewable energy technologies within reach of women and ensure that these technologies supplement their domestic needs.
- The literature generally encourages a more active role for women and women’s organizations in discussions and decisions about climate change, and using the knowledge and specialized skills of women in mitigation and adaptation strategies.

The literature emphasizes the importance of strategies to improve women’s access to and control over, and provide means of building, their capacities and transferring technology. (eg. property rights) and access to equitable education, information and training on climate change conditions and adaptation opportunities.

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World Resources Institute, Washington DC (2009). <b>Which is the best approach to climate change adaptation?</b>	<a href="http://www.eldis.org/go/topics/dossiers/climate-change-adaptation/themes/methods-and-tools/reading&amp;id=55398&amp;type=Document">http://www.eldis.org/go/topics/dossiers/climate-change-adaptation/themes/methods-and-tools/reading&amp;id=55398&amp;type=Document</a>

### Annex 3. Research / participatory methodology

Literature review on climate change, agriculture and gender. Desk research on current data on climate and agricultural data
Distribution of survey questions to farmer groups and women, 25 surveys were completed
One on one interviews, focus group discussions and group work on flip charts with women smallholders in villages. In some instances, men also joined the group. More often than not women were reluctant to be as vocal when there were men, especially senior village men, in the room. On some occasions we had to request that the men leave the meeting. On other occasions, having male perspectives in the room helped to draw out gender differences.
Field visits to Dekhan farms, to family farm plots, village homes, irrigation systems and biogas pilot. Photography of same to collect evidence.
Key informant interviews with stakeholders in the development sector, including the UNDP, the World Bank, UNIFEM, DFID and GIZ.
Interviews with key figures in national Government ministries and in local government in the rural areas targeted by the research

### Annex 4. Key sources and people consulted

List of Community Members Interviewed					
#	Name	Age	Region	Education	Note
22	Women	22-47	Khatlon, Temurmalik district, Hasanbek village	Mainly Secondary school	Filled questionnaire
10	Women	32-52	Khatlon, Vose district, Kaftarkhona village	Mainly Secondary school	Filled questionnaire
8	Women	40-63	Khatlon, Khovaling district, Shekhmizon village	Mainly Secondary school	Seasonal Calendar
8	Women	40-63	Sughd, Spitamen district,	Mainly Secondary school	Filled questionnaire
5	Women	21-66	Directorial districts, Gissar district, Dehqonobod village	1 Secondary school, others Higher education	Filled questionnaire

### List of Government, International Organizations and NGO Stakeholders Interviewed

Organization	
1	UNDP in Tajikistan
2	International Red Cross and Red Crescent Societies
3	UK Department for International Development (DFID)
4	Youth Ecological Centre (local NGO) Tajikistan
5	World Bank Tajikistan
6	Saodat (local NGO) Khujand, Tajikistan
7	Agricultural Training and Advisory Centre (ATAC) (local NGO) Kulyab, Tajikistan
8	HBT (local NGO) Kulyab, Tajikistan
9	Climate Change Centre, Dushanbe, Tajikistan

## Endnotes

1. Tajik land reform laws provide for the restructuring of farmland holdings into four different enterprise forms: (1) production cooperatives; (2) joint stock companies (JSC's); (3) lease share enterprises (LSE's); and (4) dekhana farms. *Dekhana* farms are the enterprise form most closely resembling private family farms. They can vary in size and in the number of shareholders farming the land. Thousands of private “dekhana” farmers are now producing between 33% and 100% higher yields than are large collective enterprises.
2. An Ogorod (literal translation from Russian is ‘kitchen garden’) is a small garden plot which every household in the USSR was allotted for private subsistence agriculture. It has a different legal status than other land. During the last years of the USSR, these Ogorods accounted for 25% of agricultural production – a significant factor in people’s food security. In Tajikistan today, these family plots are an integral part of the farming and household infrastructure, a typical plot will include an open air baking area, an area for livestock, a barn or shed for storage and shelter, a vegetable garden, some trees and an area for manure and fuel, average size is 10x10 metres
3. Mirzoeva, V (2009). Gender Issues in Land Reform in Tajikistan
4. Plant and pest species will move to higher altitudes in response to global warming, farmers were also noticing wheat rust because of high precipitation rates
5. Mirzoeva, V (2009). Gender Issues in Land Reform in Tajikistan
6. It is not clear if this includes ‘soft knowledge’ or only capital-intensive knowledge
7. World Bank (2009)
8. Cotton for instance, requires particularly intense irrigation. In Tajikistan’s cotton-growing regions, farms were established in large, semiarid tracts and in tracts reclaimed from the desert, but cotton’s growing season is summer, when the region receives virtually no rainfall. The 50% increase in cotton cultivation mandated by Soviet and post-Soviet agricultural planners between 1964 and 1994 consequently overtaxed the regional water supply. Poorly designed irrigation networks led to massive runoff, which increased soil salinity and carried toxic agricultural chemicals downstream to other fields, the Aral Sea, and other populated areas of the region.
9. As of January 1, 2009, financial sector of the country was represented by 12 commercial banks and 100 microfinance organizations offering financial credit. As of December 2008, the microfinance sector registered approximately 94,000 active clients, loan portfolio almost doubled and amounted to US\$72million. The average size of a micro-loan is just \$750.00 (source: <http://humo.tj/en/microfinanceintj.php>)
10. Neumayer, Eric. *The Gendered Nature of Natural Disasters: the impact of catastrophic events on the gender gap in life expectancy, 1981-2002*, London School of Economics 2006.
11. January 30<sup>th</sup> group discussion, Spitamen
12. Submission by Shekhmizon village, Khovaling district, Khatlon region 26.01.2011
13. Note: the issue of land rights was not raised, that may have been because the field research was conducted with established women-run farms or women farming groups. The only exception was the Association of Seed Producers (mixed male and female farmers) who had just signed an agreement in December 2010 to access one hectare for seed production and were still waiting for rights to land access.
14. Luca Barbone, Anna Reva, and Salman Zaidi for World Bank (2010). Tajikistan: Key Priorities for Climate Change Adaptation
15. See <http://ourworld.unu.edu/en/tajikistan-women/> for women’s perspectives on climate change in the Western Pamir Mountain region
16. One extreme example is in the Yavan Valley where 20% (6000 hectares) of the land has become so badly eroded since the mid-1960s—when the valley was opened for irrigation—that the terrain is irrevocably characterized by ravines 100 meters wide and 25 m deep. (ADB 2009)
17. Quote from Franklin D Roosevelt
18. *Climate Change 2007: impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, UK, pp. 173-210

19. To the south of the Tien Shan, the Pamir mountain range located primarily in Tajikistan has many thousands of glaciers, all of which are in a general state of retreat. During the 20th century, the glaciers of Tajikistan lost 20 km<sup>3</sup> of ice. The 70km long Fedchenko Glacier, the largest in Tajikistan and the largest non-polar glacier on Earth, 1000m of its length and 2 km<sup>3</sup> of its mass; the glaciated area was reduced by 11 km<sup>2</sup> during the 20th century. Similarly, the neighboring Skogatch Glacier lost 8% of its total mass between 1969 and 1986. Tajikistan and neighboring countries of the Pamir Range are highly dependent upon glacial runoff to ensure river flow during droughts and the dry seasons experienced every year. The continued demise of glacier ice will result in a short-term increase, followed by a long-term decrease in glacial melt water flowing into rivers and streams.
20. Understanding Energy Poverty – Case study: Tajikistan (2010)
21. It is estimated that, in the past 120 years, Tajikistan’s forests have been reduced by 75 percent—from 150,000 km<sup>2</sup> to 37,000 km<sup>2</sup>. The rate of deforestation has accelerated dramatically in the past 10 years, owing to lack of fuel.
22. Rehabilitation of degraded rain fed agricultural land in Southern Tajikistan through household energy efficiency improvement *Frank Löwen, Welthungerhilfe, Tajikistan*
23. Hafiz Muminjanov (2008) State of Plant Genetic Resources for Food and Agriculture (PGFRA) in the Republic of Tajikistan – Country Report Dushanbe
24. Nature Reports Climate Change Vol. 4, May 2010, [Confronting the Biodiversity Crisis](http://www.nature.com/reports/climatechange) [www.nature.com/reports/climatechange](http://www.nature.com/reports/climatechange)
25. The principles and guidelines agreed at the 2010 Conference on Biodiversity in Kyoto and the ABS (access-benefit-sharing) agreement needs to be brought to bear on this aspect
26. Quote from Gaia Allison, DFID, Dushanbe Feb 4<sup>th</sup> 2011
27. World Bank 2009 Adapting to Climate Change in ECA
28. As codified in the FAO/WHO Codex Alimentarius, Organic Agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. An organic production system is designed to a) enhance biological diversity within the whole system; b) increase soil biological activity; c) maintain long-term soil fertility; d) recycle wastes of plant and animal origin in order to return nutrients to the land, thus minimizing the use of non-renewable resources; e) rely on renewable resources in locally organized agricultural systems; f) promote the healthy use of soil, water and air as well as minimize all forms of pollution thereto that many result from agricultural practices; (Codex Alimentarius 1999) The FAO definition of “Organic” is “certified organic products are those which have been produced, stored, processed, handled and marketed in accordance with precise technical specifications (standards) and certified as “organic” by a certification body.
29. The author visited an organic cotton dekhani farm, now in its third year of operation, producing organic cotton for a German client. Organic cotton fetches a higher price on the international market than conventional cotton.
30. Understanding Energy Poverty – Case study: Tajikistan (2010)
31. There are countless examples, often donor led, such as <http://naturvernforbundet.no/getfile.php/Dokumenter/Internasjonalt/REPORT%20%20SMALLSCALE%20ENERGY%20IN%20TAJIKISTAN%200409.pdf>
32. Pilot Project on Climate Resilience
33. Capital investment in regional and national meteorological stations to refurbish old technologies will roll out in 2011, some of this under the auspices of the ‘Pilot Programme for Climate Resilience’ climate change investment funds. Parallel feasibility studies need to be developed to bring farm level weather stations in line with national weather data collection.
34. Data from World Bank Tajikistan Country Brief 2010
35. Climate risk management is a generic term referring to an approach to climate-sensitive decision making. The approach seeks to promote sustainable development by reducing the vulnerability associated with climate risk. CRM involves a broad range of potential actions, including: early-response systems, strategic diversification, financial instruments, infrastructure design and capacity building.

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