


AGA KHAN FOUNDATION U.S.A.
*An agency of the Aga Khan Development Network*

# Opportunities for Climate Change Adaptation Programming

## Afghan Badakhshan

Desk Study

A report to the Aga Khan Foundation, Afghanistan
Prepared by Laurie Ashley

February 2016

*This document is made possible by the generous support of the American people through the United States Agency for International Development (USAID) and the Aga Khan Foundation (AKF). The contents are the responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government and/or AKF.*

## Table of Contents

## List of Abbreviations

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|---|---|
| AKF-A | Aga Khan Foundation- Afghanistan |
| AKU | Aga Khan University |
| CBA | Community Based Adaptation |
| CBNRM | Community Based Natural Resource Management |
| CC | Climate Change |
| CCA | Climate Change Adaptation |
| CDC | Community Development Council |
| CSDRM | Climate Smart Disaster Risk Management |
| CSO | Civil Society Organization |
| DDA | District Development Assembly |
| DRMI | Disaster Risk Management Initiative (of the Aga Khan Development Network) |
| DRR | Disaster Risk Reduction |
| FEWSNET | Famine Early Warning System Network |
| FFS | Farmer Field School |
| FOCUS | FOCUS Humanitarian Assistance |
| GIRoA | Government of the Islamic Republic of Afghanistan |
| GLOF | Glacial Lake Outburst Flood |
| INDC | Intended Nationally Determined Contribution (to the UNFCCC) |
| IPCC | Intergovernmental Panel on Climate Change |
| MAIL | Ministry of Agriculture, Irrigation and Livestock (GIRoA) |
| MDP | Market Development Program |
| MSRI | Mountain Societies Research Institute (University of Central Asia) |
| NRM | Natural Resource Management |
| PTD | Participatory Technology Development |
| SNG | Sub-National Government |
| SWC | Soil and Water Conservation |
| UCA | University of Central Asia (Aga Khan Development Network) |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VSLA | Village Savings and Loan Association |

**Executive Summary**

The Aga Khan Foundation, Afghanistan (AKF-A) is doing much to address climate change impacts through programming to build local resilience that is already being affected by climate change. While this substantial work is impressive, lacking is an explicit and forward-looking view to the evolving multi-faceted impacts of climate change. Robust efforts to increase system resilience in climate change sensitive places like Badakhshan must now include more direct and systemic attention to climate change impacts.

Afghanistan is among the countries most vulnerable to climate change (Kreft et al 2015; Center for Global Development 2015). Communities in Badakhshan are particularly vulnerable to climate risks due to natural resource dependent livelihoods with a reliance on rain-fed agriculture, the dynamic mountain geography and climate, and low adaptive capacity related to poverty, lack of basic services, limited alternative livelihoods, and limited access to information. Natural resources, the built environment, health, biodiversity, and even levels of conflict are likely to be affected by climate change trends, particularly those that exacerbate the frequency and magnitude of drying, drought, and flooding.

Work to address climate change impacts is embedded in complex socio-ecological systems with multiple factors of influence. Isolating causal relationships between climate change and local-level conditions is rarely possible; rather climate change trends in Badakhshan exacerbate existing vulnerabilities. Climate change adaptation (CCA) programming identifies and addresses vulnerabilities related to, but not exclusively caused by, climate change. CCA programming often looks very similar to other development efforts. The difference is that CCA uses climate change information (scientific and local experience) in program and project selection, planning and implementation to explicitly take into account climate trends, impacts and adaptation.

A proposed goal for AKF-A CCA programming is to increase the resilience of Badakhshan communities in the context of local climate change risk through multi-sectoral CCA programming. The programming would aim to 1) reduce livelihood sensitivity to climate change impacts and 2) build local adaptive capacity. An accompanying framework posits that when climate change information and participatory vulnerability assessments are effectively used to inform actions to *reduce livelihood sensitivity* and *build adaptive capacity*, then levels of vulnerability to climate change will decrease and system resilience will increase.

Adaptation can be readily integrated into much AKF-A programming through including a climate change dimension in assessments, planning and capacity building at scales from the household to local governance to AKF-A strategy. New initiatives to address climate change impacts could include expanding access to weather and disaster forecasting, piloting index insurance and designing CCA school curriculum. To support AKF-A's adaptation efforts, there is also a need to institutionalize CCA thought leadership and capacity and improve climate change information through research and assessment. To optimize impact and opportunities for partnership and funding, AKF-A CCA initiatives can readily be aligned with government adaptation priorities as outlined in Afghanistan's 2015 Intended National Determined Contribution submission to the United Nations Framework Convention on Climate Change (UNFCCC).

## 1. Introduction

Afghanistan is among the countries most vulnerable to climate change (Kreft et al 2015; Center for Global Development 2015). Existing and projected climate change trends have significant implications for Afghanistan's agriculture, water resources, natural disaster occurrence, and public health (Hijoka et al. 2013, GIRoA 2009). Communities in Badakhshan depend on agro-pastoralism and are sensitive to climate change impacts. While climate change impacts are expected to increase in the coming century, locally relevant and strategic adaptation efforts can significantly increase community resilience. The Government of the Islamic Republic of Afghanistan (GIRoA), recognizes this need as demonstrated by its 2015 Intended Nationally Determined Contribution (INDC) submitted the UNFCCC describing adaptation needs and its current effort to finalize the country's National Adaptation Plan and Climate Change Strategy and Action Plan (GIRoA 2015).

AKF-A, Focus Humanitarian Assistance (FOCUS) and the AKDN Disaster Risk Management Initiative (DRMI) are doing substantial work relevant for climate change adaptation (CCA) in Badakhshan that can be enhanced by explicitly integrating climate change information. This report mainly focuses on opportunities related to AKF-A programming with some attention to FOCUS and DRMI work. AKF-A is uniquely situated to address CCA in its program areas given its in-depth and long-term engagement with local challenges and solutions. It is widely recognized that adaptation solutions are often site-specific, a characteristic that makes AKF-A well-positioned implement CCA. In some cases, AKF-A is also doing work to *mitigate* climate change (i.e. addressing the causes of global climate change), mainly through alternative energy. And some efforts simultaneously address climate change mitigation and adaptation, mainly activities related to sustainable land management that reduce land-based carbon emissions (mitigation) and increase natural resource resilience to climate trends (adaptation). This report is focused solely on efforts related to climate change *adaptation*, which is of primary concern in places like Badakhshan that are very sensitive to climate change impacts yet have contributed nearly nothing to the causes of global climate change.

The diverse people of Badakhshan have long adapted to climate variability in addition to multiple other stressors including conflict and marginalization. This adaptation experience is a key strength for local adaptive capacity.

### 1.1. Climate change adaptation and resilience

In today's context of climate change, CCA is an integral part of enhancing overall system resilience. Around the globe, climate change is increasing pressure on social and ecological systems and exacerbating existing vulnerabilities. Adaptation efforts aim to reduce sensitivity to climate change impacts and increasing adaptive capacity. Adaptation is "the process of adjustment to actual or expected climate and its effects" where efforts moderate or avoid harmful impacts or exploit beneficial opportunities (IPCC 2013). Like other work to support resilience, adaptation initiatives must be responsive to local context including existing strengths, weaknesses, threats, and opportunities. Adaptation is an iterative, ongoing process that requires an approach of careful problem assessment and experimental solutions. CCA is distinguished from other resilience efforts by the use of climate change information (local knowledge/observation and scientific information) in decision-making.

### 1.2. Adaptation in the global context

> *"Parties hereby establish the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an*

*adequate adaptation response in the context of the temperature goal."*
— Article 7.1 of the 2015 Paris agreement on climate change

2015 brought the strongest mandate to address climate change in history. The 2015 UNFCCC Paris agreement galvanized global efforts towards climate change mitigation and adaptation. The agreement recognizes that climate change impacts are here and that support for adaptation efforts is critical in addition to reducing greenhouse gas emissions. The Agreement contains a global goal for enhancing adaptive capacity, strengthening resilience and reducing vulnerability. 2015 also brought finalization of the new sustainable development goals in the form of the "2030 Agenda for Sustainable Development." Goal 13 of the Agenda calls for "urgent action to combat climate change and its impacts" and its first target is to "strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries." Additionally, targets 1.5, 2.4, and 11.b explicitly call for climate change adaptation efforts.

There is now wide recognition that as climate change impacts advance, they are undermining development progress. Additionally assessments are showing that inaction often will be more costly than adaptation. Adaptation efforts mainly focus on: agricultural productivity, water supply, infrastructure, and ecological systems (biodiversity and function). While the emissions reduction commitments are crucial, greenhouse gases already released have 'locked-in' climate change trends for the coming decades making adaptation imperative.

## 2. AKF-A/AKDN activities in Badakhshan related to climate change adaptation

AKF-A, FOCUS, and DRMI are doing substantial work relevant for CCA in Badakhshan. While the AKF-A Rural Development strategy contains only passing mention of climate-related shocks, to some extent AKF-A has inherently been addressing the existing climate change impacts by designing programs to build local resilience already affected by climate trends. Lacking is an explicit and forward-looking view to the evolving multi-faceted impacts of climate change. Robust efforts to increase system resilience in climate sensitive places like Badakhshan must now include more direct attention to climate change impacts and associated adaptation. Adaptation has a role in all four of the Rural Development strategy's focus areas[1] through incorporating climate change information into decision-making at scales from the household to local governance to AKF-A programming.

In most AKF-A programming, including a climate change dimension will increase program/project resilience. Climate change impacts are occurring and some people are already adapting on their own. AKF-A needs to understand these existing local level dynamics to most effectively add value. Critical areas for including a climate change dimension are NRM, MDP, DRM, and local governance. Health, particularly in the longer, will benefit from a climate change dimension. Integrating CCA into education programming will support all other CCA efforts through increased knowledge and information.

### 2.1. Programming gaps

The key gaps in AKF-A programming are:

1. Lack of a climate change dimension in:
    a. Assessments,

[1] Strengthening Voice and Representation; Food security and Nutrition; Diversified Livelihoods and Income; Increased Resilience and Reduced Risk

b. Planning processes (internal and program-supported such as SNG, CSO, CBNRM),
c. Capacity building and innovation initiatives (trainings, extension services, FFS, PTD, etc.) and
d. Overall project selection, design and implementation.

2. Lack of organizational CCA capacity among AKF-A staff. Once staff have a CCA perspective, they will be great contributors to identifying opportunities for integrating and initiating CCA efforts.

Other gaps are not critical, however, AKF-A can increase and improve (with climate change information) efforts in these areas to provide additional CCA opportunities.

1. A clear focus on community and/or regional level water security:
    a. Watershed or river basin level efforts that address drivers of land degradation and support rehabilitation on common and private lands.
    b. Water capture and storage.
    c. Efficient irrigation practices and technologies.
    d. Clean drinking water.
2. Flood and drought early warning systems (including existing systems such as FEWSNET). Optimal application of the new DRMI weather station network through information distribution and uptake.
3. Educational component on CCA for schools (potentially based on DRMI/AKU's Institute for Educational Development DRR teacher development curriculum in Pakistan and/or AKF-Kyrgyz Republic's interactive CCA curriculum).
4. Increase focus on energy efficiency options for home/building heating to reduce biomass needs from trees, shrubs, and animal dung.
5. Index insurance at the household or local government level for crops, livestock, or reconstruction after disaster.

### 2.2. Description of activities related to CCA

AKF-A's extensive work on natural resource management including work on water, soils, animal health, and crop productivity have all increased local resilience in the context of climate change impacts. Work on micro-finance, local governance, health and education are also highly relevant as is DRMI and FOCUS work on DRM. Table 1 outlines these activities, their relevance for CCA and their relationship to the CCA Framework (p. 20).

| AKF-A Sector | Activity | Relevance to CCA | Comment | Component of CCA Framework (p. 20) |
|---|---|---|---|---|
| **NRM & Market Develop-ment** | FFS, PTDs for horticulture and livestock management and farmer field days | High | Strong opportunities for experimentation, innovation, and peer learning | Increase ag system resilience; Innovation; Knowledge & Information |
| | Crop and livestock workshops, trainings, awareness campaigns; | High | Access to information, seed varieties, and improved technologies provide important opportunities for adaptation | Increase ag system resilience; Knowledge & Information |

| | | | | |
|---|---|---|---|---|
| | Agriculture extension services | | | |
| | Fodder production support to farmers (including trials of drought resistant varieties) | High | Important to sustain livestock through weather variability including drought | Increase ag system resilience; Knowledge & Information |
| | Research trials of cereal seeds (irrigated and rain fed) | High | Important for identifying seeds with various adaptive characteristics | Increase ag system resilience; Innovation; Knowledge & Information |
| | Developing agriculture input supply systems | High | Access to vet services, soil improvement products, and other inputs increases options for adaptation | Increase ag system resilience; Diversify livelihoods |
| | Support farmer associations, coops, and interest groups | High | Increased capacity of local institutions through trainings, workshops, and linkages with service providers creates a platform for sharing CC related problems and ideas and information for adaptation | Increase ag system resilience; Knowledge & Information; Equitable resource access |
| | Supporting pasture, water, and forest management committees | High | Supporting resource management committees is an important opportunity to understand CC impacts on key local resources and incorporate CC information into planning | Increase ag system resilience; Knowledge & Information; Flexible forward-looking decision-making |
| | Access to employment opportunities | High | Off-farm employment is less sensitive to climate change trends and diversifies household income | Diversify livelihoods |
| | Rangeland rehabilitation (including SWC measures) | High | Degraded rangelands are at high risk for accelerated degradation from climate change related drought or heavy precipitation events | Increase ag system resilience; Asset base |
| | Improving veterinary services | High | Through diversifying household production and being more resilient to weather variability than rain | Increase ag system resilience; Knowledge & Information |

| | | | | |
|---|---|---|---|---|
| | | | fed lands, healthy livestock are important for adaptation | |
| | Tree planting for fruit and fuel | High | Trees provide multiple adaptation benefits including diversified production, fuel source, wind breaks, increased soil moisture, and slope and riverbank stabilization | Increase ag system resilience; Asset base |
| | Riverbank stabilization | High | Riverbank stabilization (green and grey infrastructure) can protect fertile land and the built environment from increased flooding. Critical to implement such that river flow is not accelerated thus increasing downstream erosion. | Asset base; Increase ag system resilience |
| | Efficient stoves and biogas to reduce fuel collection pressure | High | Reducing pasture and forest degradation from fuel collection and allowing animal dung to be used for fertilizer rather than fuel are important for climate resilience | Innovation; Increase ag system resilience |
| | Introduce appropriate technologies to increase off-season production | High | These technologies can also support production in the context of increase weather variability and unseasonal weather | Innovation; Increase ag system resilience |
| | Market promotion and linkages (honey, fruits, high value niche crops & vegetable value chains) | High | Market linkages can promote product and income diversification increasing resilience to variable weather | Increase ag system resilience; Diversify livelihoods |
| | Facilitate smallholder access to new production methods, input supply, technologies, emerging | High | Reduces sensitivity of agriculture-based livelihoods to climate change impacts | Increase ag system resilience; Knowledge & information; |

| | | | | |
|---|---|---|---|---|
| | market opportu nities and services | | | |
| | Piloting potential high value niche crops (indigenous medicinal & aromatic species) | Medium | Indigenous species are often better adapted to climate trends; diversification of product and income | Increase ag system resilience; Innovation |
| | | | | |
| **Finance** | Improve access to finance (VSLAs, microfinance, etc.) | High | Increases ability to withstand climate related shocks through saving mechanisms | Asset base; Equitable resource access |
| | | | | |
| **Local Govern-ance** | Support capacity of sub-national governance institutions and district development plans | High | Local governance is a critical player in planning and leading adaptation efforts and making adaptation information and resources available | Flexible forward-looking decision-making |
| | Improve electrical power access | Medium | Reduce pressure on fuel, improve access to information | Asset base; Increase ag system resilience |
| | | | | |
| **Health** | Improve access to safe drinking water | High | Addresses increased risk of poor water quality (flood & warming) | Asset base |
| | Improve health knowledge & practices (nutrition, hygiene and sanitation) | High | Addresses increased risk of diarrheal disease (flood & warming) | Knowledge & information |
| | Disease surveillance (within government system) | High | Enables timely response to changes in disease distribution | Flexible forward-looking decision-making; Knowledge & information |
| | Improved health system capacity to address acute | Medium | Particularly relevant for drought-related impacts | Asset base; Equitable resource access |

| | | | | |
|---|---|---|---|---|
| | malnutrition | | | |
| | Improved access to health, eHealth, and mHealth services | Medium | Improved treatment options for climate-related health issues | Asset base; Equitable resource access |
| | | | | |
| **Education** | Vocational Training | High | Supports livelihood diversification and off-farm income less sensitive to CC trends | Diversify livelihoods |
| | Access to educational facilities | Medium | Access to learning to build overall adaptive capacity | Knowledge & information |
| | Improved capacity of educational stakeholders | Medium | Access to learning to build overall adaptive capacity | Asset base; Knowledge & information |
| | | | | |
| **DRMI** | Weather observation network across Afghanistan, Pakistan and Tajikistan | High | Important information for flood and drought management and early warning systems and possibly relevant for CC research | Disaster risk management; Knowledge & information; Asset base |
| | DRR Master Training Program (Pakistan) | Medium | The two week training program for teachers includes a section on CC | Disaster risk management; Knowledge & information |
| | | | | |
| **FOCUS** | CBDRR (HRVA, DRM planning, community response team) | High | Current work to integrate a CC component into the assessment; important for understanding dynamics of drought and flood risk | Disaster risk management; Knowledge & information; Flexible forward-looking decision-making |
| | Support community-based & SNG institutions & schools to develop disaster preparedness plans | High | Increases resilience to climate exacerbated flooding & landslide | Disaster risk management; Flexible forward-looking decision-making |

Table 1. AKF-A, DRMI and FOCUS activities relevant to CCA.

## 3. Priority climate change induced risks and vulnerabilities in Badakhshan

The impacts of climate change are already being felt across South Asia (CDKN 2014, GIRoA 2015) and in AKF-A program areas (Sinha 2015). The IPCC (2014) identifies key climate related risks for South Asia as: drying and drought related food and water shortages; flood damage to infrastructure and livelihoods; and heat-related health impacts. With its ability to affect vast numbers of people across development sectors, drought and associated desertification and land degradation is the most pressing climate change impact in Afghanistan (Savage et al. 2009). In Badakhshan, local vulnerability to climate change is linked to natural resource dependent livelihoods with a reliance on rain-fed agriculture, the dynamic mountain geography and climate, and low adaptive capacity related to poverty, lack of basic services, limited alternative livelihoods, and limited access to information.

### 3.1. Climate trends and projections

In the diverse agro-ecological zones (elevation, slope, and aspect) of Badakhshan, climate change impacts may manifest differently over relatively short distances. The lack of weather data collection, lack of research and the dynamics of climate in mountainous areas limit climate change projections in Badakhshan. While the climate projections are imperfect, temperature and precipitation data from regional sources indicate that the mean annual temperatures in Afghanistan have increased 0.6-1°C (McSweeney et al. 2010). In Badakhshan, the greatest warming has occurred during winter months (+1.5-2℃) (AKDN 2013). Climate projections suggest continued warming and possibly reduced precipitation (Table 2). The more important driver of drying (decreased soil moisture and water source productivity), however, is likely warming rather than overall precipitation. Warming is leading to reduced snowpack (winter rain rather than snow) and thus reduced spring/summer runoff.

| Climate Parameter | Trend | Projection | Comment |
|---|---|---|---|
| **Temperature** | ↑<br><br>(+0.6-1°C country-wide; +1.5-2°C in winter in Badakhshan) | ↑<br><br>(+1.4-4.0°C by 2060 and +2.0-6.0°C by 2090) | More warm & hot days, fewer cold days, more heat waves. Most pronounced warming in autumn & winter. |
| **Precipitation** | ↓<br><br>(-2%/decade since 1960s country-wide; greatest decrease in spring with -6.6%) | small ↓ (High Uncertainty[2])<br><br>(-5-8% by 2090; for Badakhshan: -5-10% in spring between 2006 and 2050 but a slight increase in autumn/winter precip) | Likely increase in heavy precipitation events; there are mixed precipitation projections for the area, including a *potential increase* through 2050-precipitation is difficult to assess and may vary significantly even over relatively small areas |

Table 2. Temperature and precipitation trends and projections in Afghanistan and Badakhshan. Sources: IPCC 2014, McSweeney et al. 2010, GIRoA 2012 and AKDN 2013.

[2] Climate change dynamics in this region are understudied and precipitation is notoriously difficult to predict. Understanding will improve with focused research targeted at the most relevant models. The region is at a crossroads of climate influences, however, so there will always be a level of uncertainty.

### 3.2. Climate change sensitivity in Badakhshan

Climate change sensitivity in Badakhshan is related to natural resource dependent livelihoods, mountainous geography, and low adaptive capacity as a function of poverty. Sensitivity to climate change is heightened in Badakhshan by existing land degradation and pressure on natural resources related to natural resource dependent livelihoods and limited alternatives to locally accessed fuel and grazing.[3] These combined characteristics can lead to further impoverishment and migration.

**Natural resource dependent livelihoods and prevalence of rain fed agriculture.** Agriculture and agriculture-dependent communities are highly sensitive to climate change and its impact on productivity. Rain fed agriculture is particularly sensitive to weather events and changes in climate patterns. Extreme events (drought, flood, storms) pose a direct threat to agriculture and to the transportation routes critical for market access. In some areas, existing levels of land degradation increase local vulnerability to climate trends likely to perpetuate degradation.

**Mountainous geography.** Globally, mountain regions have experienced above average warming, a trend projected to continue (IPCC 2007). Warming induced earlier and more rapid snow melt can lead to spring flooding but later season water shortage as well as increase avalanche risk. Glacial melt also increases flood risk in the short-term and will change seasonal and decrease overall water availability in the medium to long term. Following drought, mountainous areas are particularly vulnerable to land slides and mud flows. Mountain terrain limits opportunity to increase arable and irrigable land and water storage.

**Low adaptive capacity.** While the people of Badakhshan have demonstrated striking resilience in the face of numerous stressors, existing poverty limits local adaptive capacity.[4] People are particularly vulnerable to shocks such as drought and flood. The Badakhshan social and political context of conflict, marginalization and limited access to basic government, social and technical services (including health care, education and agricultural extension) also constrains adaptive capacity. Also limited is access to alternative livelihoods less sensitive to climate trends and access to information to support adaptation. Within a community, it is often the already vulnerable and marginalized (e.g. ultra poor) who have the least capacity to adapt and thus will be most impacted by climate change.

### 3.3. Likely climate change impacts in Badakhshan

Badakhshan is prone to drought (e.g. 1999-2001, 2006, 2007-2008, 2011), flood (e.g. 2012, 2013, 2014, 2015), and in some areas, landslides (e.g. Argo district, 2014). Climate change trends are likely to exacerbate these tendencies. Temperature and precipitation trends are likely to lead to:

- increased drying and drought,
- increased extreme precipitation events,
- more frequent heat waves,
- winter precipitation increasingly falling as rain, and
- more hot days and fewer cold days (Hartmann, et al 2013).

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[3] For a thorough country-wide assessment of climate change impacts and resource vulnerability see page 70-71 in: GIRoA (NEPA), UNEP, GEF 2009. National Capacity Needs Self-Assessment (NCSA) for Global Environmental Management and National Adaptation Programme of Action for Climate Change (NAPA). Final Joint Report. http://unfccc.int/resource/docs/napa/afg01.pdf

[4] Adaptive capacity can be understood as five characteristics: asset base, institutions and entitlements, knowledge and information, innovation, and flexible forward looking decision making (Jones et al. 2010).

Each of these conditions has implications for water, agriculture, natural disaster occurrence, health, biodiversity, the built environment, and conflict.

**Water**

Water is heavily influenced by climate through precipitation, temperature, and evaporation. Reduced snow cover and glacial melt in Badakhshan are expected to contribute to water scarcity.

Major water resource trends projected for South Asia include.

1. Diminished precipitation and snowmelt component of summer river flow and shift in peak river flow from late spring/early summer to late winter/early spring due to warming, evaporation and winter precipitation increasingly falling as rain.
2. The glacial melt component of river flow increases through about 2030 and then decreases. River flow becomes more variable after this point due to the lack of an annual glacial component.
3. Seasonal or permanent drying of streams and springs.

**Agriculture**

Rain-fed lands in particular are strongly influenced by climate conditions and weather events but pastures and irrigated lands are also affected. Changes in the frequency, intensity, spatial extent, and duration of weather events can result in unprecedented extremes through slow onset disasters (e.g. consecutive years of drought) and severe events (e.g. heavy flooding) (IPCC 2012). Production may be negatively affected by drought, heat waves, heavy precipitation events, and natural disasters yet positively affected by a longer growing season and warmer temperatures.

*Negative impacts*

1. Drying, drought, and heat stress. Increased temperatures, variable precipitation, and decreased or untimely water availability. Drought impacts rain fed lands as well as irrigated crops when irrigation sources dry up or diminish. In pastures, water sources may diminish or disappear.
2. Flood, mudflow. Increased heavy precipitation events and rapid snowmelt may cause flood and mudflow that lead to crop and pasture land erosion and damage.
3. Altered pest and disease occurrence. Warming temperatures can lead to the spread of disease into new areas and an increase in disease when disease-carrying insects are able to survive milder winters in greater numbers. Higher temperatures and milder winters could contribute to the spread of infectious diseases in livestock such as anthrax, brucellosis, and leptospirosis (Forman et al. 2008). (Alternatively, dry conditions may reduce the occurrence of certain plant pathogens.)

*Positive impacts*

1. Longer growing season and decreased limitation from cold temperatures. Increasing temperatures may benefit crops and pastures otherwise limited by cold and a short growing season. Warmer temperatures may allow an increase in area suitable for cultivation, improve production potential, and/or allow for cultivation of new crop types and varieties. Pastures with sufficient precipitation may experience increased productivity due to a longer growing season and the reduced impact of cold temperatures. Livestock experience decreased cold stress.

**Natural disaster occurrence, slow and rapid onset**

Badakhshan faces increased risk from changes in natural disaster occurrence including rapid onset disasters—flood and debris flow, landslide, and glacial lake outburst floods (GLOF)—

and slow onset disaster—drought. ODI (2013) reports that "extreme weather linked to climate change is increasing and will likely cause more disasters" and these disasters "especially those linked to drought, can be the most important cause of impoverishment, cancelling progress on poverty reduction." Many Badakhshan communities already live in drought sensitive areas with agriculture that is on the fringe of viability. Climate change is also expected to lead to an increase in the frequency and severity of heat waves and intense precipitation events that can cause floods, debris flows, and landslides. Rapid snowmelt and/or glacial melt may also lead to dramatic flooding such as the event in Tajikistan's Gorno-Badakhshan in 2015.

**Health**

The main climate related health risks in Badakhshan involve decreased water and air quality. Increased flooding decreases water quality and, combined with rising temperatures, increases the risk of diarrheal disease. Drying and drought lead to higher air particulate matter which can lead to respiratory, eye, and skin infection and irritation. Elevated ground level ozone levels and increased allergens resulting from longer growing seasons can also exacerbate asthma and respiratory infections. Other impacts will likely include changes in the geographic range of disease carrying insects, such as mosquitoes, bringing diseases such as malaria to new areas. While heat waves and heat stress are less important in temperate mountain environments, temperature extremes may have an impact, particularly on those that work outdoors. Malnutrition related to reduced agriculture productivity is also a concern.

**Built environment**

Changes in the flood regime have the potential to impact roads, bridges, buildings, dams, and irrigation infrastructure. Infrastructure inside the historic floodplain that has withstood flooding may be at risk from larger, stronger floods. In some cases, infrastructure outside the historic flood plain may be at risk as larger floods impact new areas. Heavy precipitation events may also lead to landslides and avalanche that threaten infrastructure.

**Biodiversity**

Climate changes is already affecting the range and abundance of certain species. In Badakhshan, local reliance on edible and medicinal plants as well as fuel plants may be impacted by these changes (Kassam 2010). Drying may lead to forest decline.

**Conflict**

Just as climate change exacerbates existing livelihood-related vulnerabilities, it may also elevate low-lying conflict or civil unrest through increased competition for scarce resources or dissatisfaction with the state's ability to support climate-affected communities (USAID 2015b). There is strong evidence (Gleick 2014, Kelley et al. 2015) that climate change played a role in the Syrian conflict (in addition to numerous and complex social, political, religious, and resource management factors). The multi-year drought (the worst recorded) caused widespread displacement and food insecurity by 2011 when violence broke out. In Afghan Badakhshan, climate change may have implications for opium poppy production.

## 4. Regional best practices

These are still somewhat early days for the practice of climate change adaptation. Best practices are being developed and documented but there is much room for innovation and experimentation to determine which adaptation approaches and measures will be most effective in particular areas. The

2015 Paris Agreement states the need for ongoing attention to developing and sharing adaptation best practices and calls on all parties to engage in adaptation planning and implementation.

Initiative for adaptation is influenced by a change in perception of risk (Adger et al. 2009). CCA interventions thus often work best where people are already noticing weather trends and experiencing the related impacts. Identifying these places and the locally important trends and impacts requires initial assessment that is critical to long-term success. Building on local initiatives and motivation is key.

### 4.1. CCA best practice criteria

There is no single blueprint for adaptation; rather adaptation arises from the unique climate impacts and available assets of each locale. Appadurai et al. 2015, however, describe six indicators of good adaptation practice. These are:

- Incorporates findings from vulnerability assessments,
- Incorporates analysis of past and future climate trends,
- Provides climate information services,
- Promotes knowledge sharing,
- Addresses uncertainty, and
- Ensures community ownership of the project.

Effective adaptation efforts need also to follow overall development best practices such as focus on poor and vulnerable community members, involve diverse stakeholders, and engage existing institutions. Effective adaptation strategies can, and should, strengthen livelihoods, enhance wellbeing and human security, and reduce poverty.

### 4.2. Categorizing adaptation—sector, scale, and form

To consider the range of adaptation options, initiatives can be categorized by sector, scale, and form.

**Adaptation by sector**

Adaptation options are often categorized by sector including agriculture (crop and livestock), water, governance, health, and infrastructure.

**Adaptation by scale**

Adaptation options vary among scales of implementation from household to international. In response to drought risk, for example, household level adaptation may include changes in crops or pursuing off-farm income opportunities while community or government adaptation options may include fodder banking, improving access to financial tools (insurance, credit, or savings) or improving distribution of weather forecasting.

**Adaptation by form**

Adaptation can also be considered by various forms (Table 3) such as technological, behavioral, financial, institutional, and informational (Smit et al. 2000).

| Adaptation Forms | Examples |
|---|---|
| Technological | Flood control; drought resistant crop varieties; restore degraded lands; water efficient irrigation system |
| Behavioral | Build surplus food, fodder, livestock, and savings for use after losses; diversify crops and income sources; increase fodder |

| | |
|---|---|
| | production and storage; shift the crop calendar according to new conditions; relocate outside hazard areas |
| Financial | Improve access to insurance, credit, and/or savings |
| Institutional | Establish early warning and emergency response systems; utilize appropriate building standards |
| Informational | Improve access to climate change information or seasonal weather forecasting |

Table 3. Adaptation forms, adapted from Smit et al. 2000.

### 4.3. Adaptation best practices

These following best practices were selected based on a literature review that included documentation from projects and publications from across South and Central Asia. Criteria for their selection included a) evidence of application, b) information available about the practice, c) ability to be integrated with a holistic development approach, and d) relevant to the social, environmental, and economic issues of Badakhshan. Key resources for planning and implementing the approach and process best practices are included.

**Approach and process best practices**

1. **Participatory climate change vulnerability assessment.** Effective CCA is demand-driven and tailored to local context. A key finding of the four year USAID funded Climate Change Resilient Development Project was that successful adaptation engages local people and uses their considerable knowledge about climate stressors and adaptation options (USAID 2015c). Critical to initiating CCA programming is understanding what and how climate trends are impacting local resources. Participatory knowledge sharing of local experience with climate change trends, impacts, and autonomous adaptation measures is key to designing programming to address climate stressors. Vulnerability assessment should include a focus on the most vulnerable and marginalized parts of the population.
   Key Resources: CARE Climate Vulnerability and Capacity Assessment 2009, Fritzsche et al. 2014

2. **Build adaptive capacity at multiple levels and within existing institutions.** Capacity building should start within AKF-A, including a designated and motivated CCA lead, and then extend to beneficiaries. An initial capacity building effort for AKF-A, partners and beneficiaries is to conduct participatory vulnerability assessments to gain real-world understanding of CC impacts in Badakhshan. Additional capacity building should include principles such as: focus on where there is already commitment and interest in CCA; involve peer learning; link key stakeholders across AKDN, government, beneficiaries, and other partners; and combine trainings with longer-term mentorships and partnerships.
   Key Resources: CDKN 2015; Oxfam 2012; USAID 2013a

3. **Link adaptation efforts with existing processes and in multiple sectors.** CCA efforts, whether related to planning, agriculture, markets, disaster risk management, or other sectors should be linked with existing processes. This supports CCA actions responsive to local context and increases uptake. Additionally, CCA is more likely to be effective when addressed in multiple sectors by multiple stakeholders (this makes MIAD an ideal approach for CCA integration). An isolated or stand-alone CCA initiative is likely to be misunderstood and/or dismissed.
   Key Resources: USAID 2015c

4. **Combine indigenous and scientific knowledge**. The most effective and innovative CCA efforts are likely to come from the intersection of an intimate understanding of place (local and indigenous knowledge) and the evolving ability to more accurately identify climate change projections and solutions (scientific knowledge). Local and indigenous knowledge support longstanding traditional practices for managing climate variability. Adaptations such as planting techniques, crop types and varieties, early warning systems, and more secure infrastructure all benefit from combing knowledge types. Access to scientific climate change information and short and medium term weather forecasting will support all adaptation activities. Climate change communication and awareness raising should be based on local knowledge of associated trends, impacts, and adaptation. Use discussion of local efforts to adapt to climate variability to introduce ideas of longer-term adaption planning for climate trends.
   Key Resources: Eldis Indigenous Knowledge and Climate Change Website

5. **Attention to land tenure.** Climate change impacts are changing the value of certain natural resources. Land at risk from increased flooding, for example, may become less valuable while land value outside flood zones may increase. With increased scarcity and demand, resources such as water and certain tree and plant species may become more valuable. Adaptation efforts need to take changing resource values into account work to protect those most vulnerable to these changes. In Badakhshan where land and resource rights are already often unsettled or insecure, attention to how the most vulnerable are affected by changes in resource value is particularly important.
   Key Resources: USAID 2011, FAO 2008

6. **Future looking.** Best practice in CCA means considering the immediate and longer-term consequences of climate change and opportunities for adaptation. CCA helps communities prepare for the future. Local and regional adaptation planning is one way to incorporate short-, medium-, and long-term options for addressing climate change impacts.
   Key resources: Sterrett 2011

7. **Attention to gender.** Women and men often experience climate change differently because of their different work and domestic responsibilities. In some places there is evidence that women are disproportionately affected by climate change because of their responsibilities in collecting diminishing resources such as water and fuel. Understanding how climate change impacts women and men differently will inform more equitable and effective adaptation measures.
   Key resources: Jost et al. 2014, Anderson et al. 2015

8. "**No regret" measures.** There is always level of uncertainty in climate change projections and this is particular true for areas like Badakhshan where there is a dynamic highly variable local climate and a lack of historic climate information. One way to account for this uncertainty is through "no regret" adaptation measures that yield benefits across a range of climate change scenarios.
   Key Resources: Willows & Connell 2003

9. **Community-based adaptation (CBA).** Climate change impacts and the resources and capacity available for adaptation are locally defined. CBA uses a systematic and participatory

approach for selecting and designing adaptation interventions that combine scientific and local knowledge to identify the most relevant and appropriate adaptation options.
Key Resources: Eldis Community-Based Adaptation Exchange Website, CARE 2010

10. **Climate-Smart Agriculture.** Climate-smart agriculture is an approach to address food security in the context of climate change. The approach aims to sustainably increase productivity, adapt agriculture and food systems to climate change, and reduce greenhouse gas emissions from agriculture. The approach includes techniques for water, soil, energy, crop, and livestock management.
Key Resources: FAO 2013, Lipper et al. 2010

11. **Climate-Smart Disaster Risk Management (CSDRM).** Improve disaster risk management programs and projects by increasing their responsiveness to current and future climate variability. CSDRM combines concepts from DRM and CCA to build an approach that emphasizes strategies to manage uncertainty and enhance adaptive capacity.
Key Resources: Mitchell et al. 2010; Harris et al 2012; Bahadur et al. 2010

**Activity best practices**

Sector-based CCA best practices are very similar to sector-based best practices outside of CCA. The main distinction is that climate change information is used to select, design, and implement programs and activities.

1. **Health.** Climate Change Hazard & Impact: Increased frequency and intensity of extreme precipitation and rapid spring warming (flooding) and increased high temperatures and heat waves (drying, drought, poor air quality) contribute to increased water-borne disease such as diarrhea, increased respiratory infection, heat-stress, and changes in malaria distribution.
    a. Access to clean drinking water and sanitation including under flood conditions.
    b. Awareness raising about option to reduce respiratory infection during dust storms/poor air days.
    c. Disease surveillance (including malaria detection system).

2. **Water.** Climate Change Hazard & Impact: Changes in precipitation timing/amount and decrease glacial melt contribution (medium to long term) contribute to water scarcity.
    a. Watershed management—protect and rehabilitate sensitive areas (catchment for springs, etc.), erosion control techniques (reforestation, check dams), and sustainable water use among stakeholders.
    b. Improved irrigation and water-use efficiency (including reduce water losses).
    c. Strengthen water governance.
    d. Increase or strengthen water capture and storage.

3. **Built environment.** Climate Change Hazard & Impact: Increased frequency and intensity of extreme precipitation and rapid snowmelt with flooding and landslides contribute to damage to infrastructure including roads, bridges, and buildings.
    a. Hazard assessment and mapping.
    b. Combine green (planting vegetation, soil and water conservation measures) and grey (gabion walls, rip rap, etc.) infrastructure in slope stabilization and flood protection.
    c. Analyze transportation infrastructure for weaknesses and secure roads and bridges to withstand projected changes in natural disaster occurrence.

d. Consider climate impacts over the duration of infrastructure investment lifespan.
e. Early warning systems and disaster preparedness.
f. Land-use planning, relocation, flood protection for infrastructure and services, and assistance for vulnerable sectors and households.
g. Improve energy efficiency in buildings (insulation, stoves) to reduce biomass demand on forests and pastures, and from animal dung.

4. **Cultivated Agriculture.** Climate Change Hazard & Impact: Increased frequency and intensity of drought; changes in seasonal precipitation contribute to failed crops and reduced yields from rain fed agriculture.

a. Identify drought resistant seed varieties and alternative crops (including niche crops) in partnership with local experts, government, academic and civil society stakeholders. Consider changes in agro-ecological zones, seed/crop ability to tolerate drought and flood conditions and its positive impact on soil stability.
b. Soil water conservation/micro water harvesting techniques.
c. Protect arable land from flood, mudflow, and landslide with grey and green infrastructure.
d. Promote and strengthen input supply and credit.
e. Diversify production systems.
f. Create off-farm employment.
g. Radio and/or SMS based weather and climate information services.

5. **Livestock/Pasture.** Climate Change Hazard & Impact: Increased frequency and intensity of drought and heat waves contribute to pasture drying, decreased fodder production, heat-stressed livestock.

a. Sufficient fodder production and storage.
b. Sustainable pasture management including soil water conservation and micro water harvesting techniques.
c. Build livestock resilience through improved breeding, access to veterinary services, and secure pasture water points.

6. **Livelihoods.** Climate Change Hazard & Impact: Increased frequency and intensity of drought, intense precipitation, heat waves, and associated hazards contribute to decreased viability of local livelihood systems.

a. Diversify livelihoods through diversified crops and off-farm income options including small and medium enterprise development.
b. Backup options for market access when roads and bridges are damaged or lost.
c. Financial services and financial literacy including micro-finance designed for adaptation options.
d. Index-based insurance for crops, livestock, or property (Greatrex et al. 2015; USAID 2013b, I4 website, WFP & IFAD 2011).

7. **Cross-cutting: soil and water conservation (SWC) and agroforestry.** SWC and agroforestry approaches and techniques are central to sustainable land management in the context of climate change. These practices can increase productivity of irrigated, rain fed, and pasture lands; increase water quality and quantity; and decrease flood and landslide risk. Resources: WOCAT website, World Agroforestry Centre website.

- For cultivated land: Plant wind breaks; incorporate perennial crops; minimize the time and amount of bare soil through managing crop residue, mulching, and using cover crops; utilize crop rotation; utilize manure and compost for fertilizer; use contour ripping; and minimize tillage.
- For pasture land: Improve grazing rotation; protect degraded pasture; reseed highly impacted areas; reintroduce woody perennial species; use gully plugs; and, in the most degraded areas, conduct soil surface treatments such as pitting, furrowing, or contour trenches.

## 5. Recommendations

Climate change in Badakhshan is unlikely to change AKF-A's carefully identified development priorities. Climate change does have implications for addressing these priorities. Understanding of climate change impacts over relevant time scales can be incorporated into current programming to increase system resilience in the face of climate trends. Priority actions in the AKF-A Rural Development strategy such as supporting sub-national government in planning, improving and diversifying agricultural production, improving water and sanitation, supporting off-farm livelihoods, promoting sustainable land management, and developing savings and finance options are essentially CCA measures. The only thing missing is tailoring these activities by using climate change information in assessment, planning, and implementation processes. Targeted new initiatives can complement existing AKF-A work to further enhance resilience.

### 5.1. Integrating CCA into programming

Integrating CCA into programming reduces program vulnerability to climate change impacts. Increasingly donors are requiring an evaluation of climate risk for projects to safeguard their investments. Within USAID, the Executive Order on Climate-Resilient International Development (EO 13677) requires "the integration of climate-resilience considerations into all United States international development work to the extent permitted by law." DFID and others are likely to employ similar requirements.

OECD (2009) suggests employing a "climate lens" to identify opportunities to integrate CCA into programming. AKF-A can use a "climate lens" to examine existing and new programming and identify climate related risks and opportunities. This approach includes questions such as:

1. Is an activity vulnerable to climate change-related risks?
2. How can climate change risks be taken into account in formulating an activity?
3. Could the activity increase climate vulnerability?
4. Could the activity increase climate resilience, or take advantage of opportunities arising from climate change?

In some cases, AKF-A may determine that more information is needed to answer these questions and this need can guide AKF-A and AKDN climate change related research and assessment work.

### 5.2. CCA and the Multi-Input Area Development (MIAD) approach

Integrating CCA into programming is a natural fit with the AKDN MIAD approach. The MIAD approach also makes AKDN well positioned to develop and implement a CCA strategy. CCA is inherently multi-disciplinary and appropriate for integration into activities ranging from agriculture to health to finance to education and much more. Local capacity and initiative for innovation and adaptation are bolstered when communities have access to multiple sources of climate change

information and multiple examples of how CCA works with a range of initiatives. Integrating CCA with MIAD will both strengthen MIAD's goal of resilient development and create robust multi-dimensional adaptation initiatives that build local adaptive capacity in a holistic manner.

### 5.3. Aligning with GIRoA adaptation priorities

CCA initiatives can readily be aligned with government adaptation priorities to optimize impact and opportunities for partnership and funding. GIRoA is currently preparing it's second National Communication to the UNFCCC (to be submitted in 2016) and is finalizing its' National Climate Change Strategy & Action Plan and National Adaptation Plan. Current GIRoA adaptation priorities are outlined in the 2015 Intended National Determined Contribution (INDC) and those with the most relevance to AKF-A include:

- Develop **water resources** through rehabilitation and reconstruction of small-, medium-, and large-scale infrastructure.
- Improve **watershed management** through community-based natural resource management.
- Increase **irrigated agricultural land** to 3.14 M-ha, through restoration and development of Afghanistan's irrigation systems.
- Promote **alternative and renewable energy sources** to reduce reliance on unsustainable use of natural resources and fossil fuels.
- **Regenerate degraded forests and rangeland** (GIRoA 2015).

Additional adaptation needs outlined in the Afghanistan INDC include: **build adaptive capacity, deploy disaster risk reduction approaches, sustainably manage environmental resources, and raise awareness about climate change and CCA** (GIRoA 2015). In the 2009 National Adaptation Program of Action, GIRoA also identified priority adaptation actions including **improved water management and use efficiency; horticulture development; improved rangeland management and livestock production; and off-farm employment** (GIRoA 2009).

Another government priority is protecting 10% of Afghanistan land area and the habitat of selected species in a system of conservation (GIRoA 2015). While this isn't directly related to AKF-A priorities, it may provide an opportunity to partner with a conservation organization for holistic programming addressing conservation and community development (e.g. Nepal's Hariyo Ban program implemented by CARE and WWF).

### 5.3. A CCA framework

Efforts to address climate change impacts are embedded in Badakhshan's complex socio-ecological system where there are multiple factors of influence. Isolating causal relationships between climate change and local-level conditions anywhere is rarely possible (sea-level rise being an exception). Rather, climate change exacerbates existing vulnerabilities. Climate change adaptation programming identifies and addresses vulnerabilities related to, but not exclusively caused by, climate change.

Vulnerability to climate change can be understood through the level of sensitivity to climate change and the level of adaptive capacity to address climate change impacts (IPCC 2014). To increase the ability of Badakhshan communities to cope with climate change, AKF-A actions can *reduce livelihood sensitivity* and *build adaptive capacity* (Figure 1). Current and future AKF-A activities related to CCA will fit into one or both of these categories. It is critical to use climate change information and participatory vulnerability assessments to inform both categories of activities. Use of these inputs

into activity planning is what distinguishes climate change adaptation activities from other development activities.

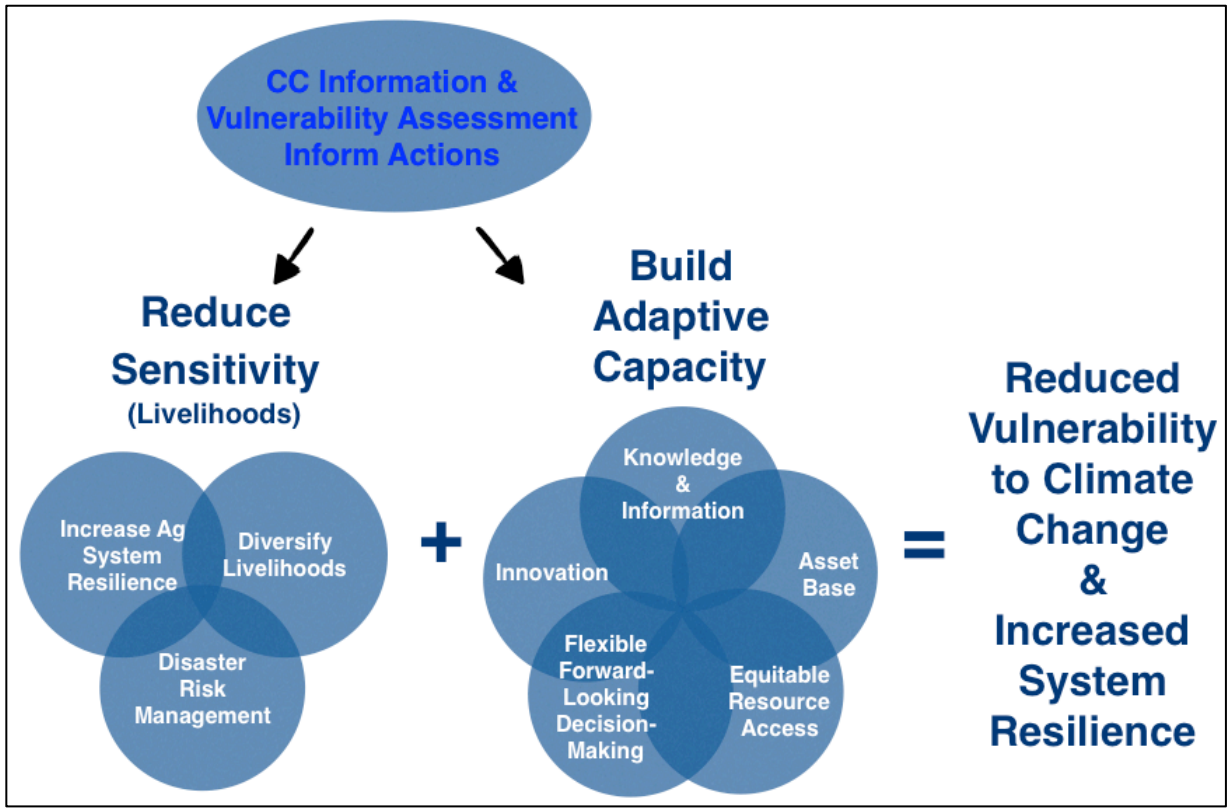


Figure 1. A framework for action to reduce climate change related vulnerability and increase system resilience. (Adaptive capacity component adapted from Jones et al. 2010.)

The CCA framework (Figure 1) posits that when climate change information and participatory vulnerability assessments are effectively used to inform actions to *reduce sensitivity* and *build adaptive capacity*, then levels of vulnerability to climate change will decrease and system resilience will increase. Each component of this framework is described below.

Framework components

- Informational Inputs to Adaptation Activity Planning:
    - *Climate Change Information*: Locally relevant, science-based information on climate change related trends, impacts and adaptation taken from research and assessment.
    - *Participatory Vulnerability Assessment*: An assessment to gain understanding of the local experience with climate change trends and impacts, existing adaptation efforts and local ideas for additional adaptation measures. Include this climate change dimension in existing assessments or conduct stand-alone climate change vulnerability assessments (see CCA best practice #1 in this report, p. 14). This assessment work also serves to build the capacity of participating AKF-A staff as beneficiaries share their experiences and lessons learned related to climate change trends, impacts and existing adaptation efforts.
- Reduce Sensitivity (Livelihoods): Efforts to reduce livelihood sensitivity include:

- *Increase agricultural system resilience* of in the context of climate change impacts through efforts that support crop and livestock productivity under climate variability and identified climate trends such as drying, drought and flooding.
- *Diversify incomes* through on-farm diversification (crops, trees, livestock) and enhancing opportunities for off-farm income less sensitive to climate change trends.
- *Disaster risk management* with explicit attention to how climate change trends are affecting the frequency and magnitude of slow and rapid onset disaster occurrence, particularly drought and flood.

- Build Adaptive Capacity: Level of adaptive capacity[5] depends on assets (such as natural, human, financial, social, and physical capital) and processes (such as innovation and forward-looking flexible governance). Many CCA measures will address more than one of these dimensions of adaptive capacity. Characteristics of adaptive capacity include:
  - *Knowledge and information*: ability to collect, analyse and disseminate knowledge and information in support of adaptation activities.
  - *Flexible-forward looking decision-making*: ability to anticipate, incorporate and respond to changes.
  - *Innovation*: an environment that fosters innovation, experimentation and the ability to explore niche solutions in order to take advantage of new opportunities.
  - *Equitable resource access*: fair access and entitlement to key assets and capitals.
  - *Asset base*: availability of key assets that allow the system to respond to evolving circumstances (e.g. building natural, physical, financial, social and human capital). Efforts to improve the asset base often have strong overlap with other elements of the framework (adapted from Jones et al. 2010).

### 5.4. Recommendations for CCA programming

Proposed Goal & Objectives: Increase the resilience of Badakhshan communities in the context of local climate change trends and associated risks through multi-sectoral CCA programming to:

- Reduce livelihood sensitivity to climate change impacts and
- Build local adaptive capacity.

There are many options for targets related to this goal and objectives including the current AKF-A, FOCUS, and DRMI activities reviewed in section 2 of this report. AKF-A should select targets related to the most *CCA relevant* and *overall effective* current activities or pursue new activities if indicated by assessment work. Following from the CCA framework components and aligning with GIRoA goals, possible targets could relate to:

1. Common property management specifically for water and pasture lands,
2. Optimal crop types/varieties, SWC measures, and grazing practices,
3. Livelihood diversification and off-farm livelihoods,
4. Locally relevant science-based climate change information for subnational government, community and household use,
5. Irrigation access and efficiency,
6. Safe drinking water,
7. Local innovation for adaptation,
8. Food security (farming practices, storage, and markets) and
9. Climate smart disaster risk management.

[5] Adaptive capacity is "the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences" (IPCC 2014).

**Integrate CCA into existing AKF-A programming**

Integrating CCA and climate change information into the ecological, economic, and governance components of relevant AKF-A programming will achieve more climate resilient development. The following actions will allow existing activities to accomplish CCA while also achieving existing objectives. Options for integrating CCA include:

1. **Institutionalize CCA thought-leadership and capacity in AKF-A.** Ensure leadership and support for CCA initiatives throughout management levels. Give staff across sectors the opportunity to assess climate change impacts on their work and talk with beneficiaries about weather trends, impacts, and adaptation ideas. Use this information as the basis of CCA workshops, trainings and ultimately program planning. Increase AKF-A technical capacity in: water security (water capture and storage, water efficient irrigation, water quality protection), drought preparedness and response, and reducing flood risk through structural (green and gray) and non-structural options.
2. **Promote local innovation through multi-sector CCA programming.** Innovation and motivation for CCA comes when diverse community members are contributing to a local conversation about climate change impacts and adaptation options (e.g. farmers, health advocates, school kids, local government, disaster risk managers, and entrepreneurs each providing perspectives and ideas). Including a climate change dimension across multiple sectors promotes local attention to the range of climate change impacts and a robust community-wide conversation that supports adaptation knowledge and innovation.
3. **Include a climate change dimension in assessments.** Climate change is impacting or will impact many of AKF-A's investments. Local and regional assessment is essential for understanding and addressing these impacts. Most local and project assessments as well as regional assessments such as the Land Tenure Assessment[6] will be more thorough and accurate with the inclusion of a climate change dimension. FOCUS's effort to integrate CCA into the Hazard, Vulnerability and Risk Assessment (HVRA) could be informative.
4. **Include a climate change dimension in AKF-A supported planning processes.** Explicitly take climate stressors into account in planning processes. Put locally relevant, science-based climate change information (decision-relevant information) into use in planning processes for local government, CSOs, and NRM. The AKF-A Rural Development strategy aims to "support sub-national government actors to develop participatory and inclusive plans that align with national priorities and resources." Addressing climate change is a clear local and national priority.
5. **Include a climate change dimension in trainings and extension services.** Existing work with DDAs, CDCs, FFS, PTD, CBNRM, and health groups, VSLAs, and more are all opportunities to engage participants about their experience with weather trends and impacts, their ideas for adaptation, and to provide information on additional opportunities for adaptation. Use locally relevant audience appropriate information. Include exchange visits and field components when possible. Consider ways to take advantage of potential positive climate change impacts such as longer growing seasons and reduced heating needs. Work with government entities (i.e. MAIL) on their Agriculture Knowledge and Information System (AKIS) to include climate change information.

[6] Climate change trends will impact land values as disasters and drying decrease values in some areas and safe havens and longer growing seasons increase values elsewhere. Additionally, as people are displaced by disasters, there are important questions about where they will go or if they will rebuild in disaster-prone areas.

6. **Bolster programming with high relevance to CCA** (see section 2). Use climate change information to further refine programming that reduces livelihood sensitivity and builds adaptive capacity (Table 1 and Figure 1). Continue work to establish or access flood and drought early warning systems.
7. **Secure built environment investments.** Similar to efforts to protect infrastructure from earthquakes, ensure that built environment initiatives take changes in water availability, flood, landslide, and avalanche risk into account in planning and engineering phases.

**Improve CCA information through research and assessment**

1. **Improve area climate change information for use in decision-making through research and assessment.** Climate change information will support robust adaptation efforts yet it is not an end in and of itself. Rather, relevant information will support planning and programming for identified development priorities. Research and assessment may be conducted in partnership with universities or research institutions. Research activities can also include local people in data collection (citizen science approach). Local involvement in data collection can improve motivation and capacity to respond to research results. Notably, there has been very little research related to climate change in Afghanistan. Research should follow AKF-A CCA information CCA but may include:
    a. Area climate change analysis that brings together local experience with area weather data and scientific research to identify local climate stressors on development priorities and better understand climate change trends, impacts, and adaptation options (building on work such AKDN DRMI 2013, Sinha 2015, and this report).
    b. Investigate the effects of climate change on local water resources. Water dynamics in the region are complex given the important role of snowmelt and glacial contribution. Changes in the timing of snowmelt, precipitation increasingly falling as rain rather than snow, and glacial melt impact water availability.
    c. Investigate climate change influence on drought and flood occurrence in terms of frequency and magnitude.
    d. Determine what type of weather and climate information would be most useful for communities, including metrics and timescales. Use these findings to inform new research and in discussion with weather and climate services providers to advocate for more useful forecasting.
    e. Investigate optimal seed varieties and cultivation practices possibly through participatory test trials.
    f. Research current climate models' performance and how to improve the models to provide more accurate and downscaled seasonal forecasts and climate projections, including variability.
    g. Research climate-related migration patterns to better understand the role of migration (including a focus on youth) in supporting or detracting from community resilience.

**Increase CCA programming through new initiatives**

1. **Connect AKF-A staff and beneficiaries to climate change information including weather and disaster forecasting.** Ensure existing and new climate change information is available to be put to use in formats accessible for the target audience including information from the Famine Early Warning System (FEWSNET) and the DRMI weather observation network. Improve access and use of quality weather forecasting for short-term and seasonal weather potentially disseminated through mobile, ICT, and radio channels. Data and training

from the SERVIR project (regional base at ICIMOD) could potentially be useful for Badakhshan.

2. **Explore and pilot options for index insurance (micro or macro) for weather affected crops, livestock, or government functions.** The advantage of index insurance is that it eliminates the costs associated with the verification needs of traditional insurance. It can be designed for farmers or local, regional or national governments. Depending on the insurance product, the index is typically based on precipitation data, satellite information (e.g. NDVI), drought conditions, excess rainfall or river levels. Index insurance can encourage farmers to try other CCA initiatives (e.g. new crop types) by offering compensation if new efforts fail. There are four insurance companies licensed in Afghanistan, as of now they do not offer index insurance. Some reinsurers, such as Swiss Re and Munich Re, are actively promoting index insurance and work with insurance companies to expand index services.
3. **Increase educational opportunities for CCA.** In addition to including a CCA dimension in trainings and extension, a CCA school curriculum, "mobile library" (similar to the UCA model), or other education outlets that encourage students/participants to engage with family members about climate trends, impacts, and adaptation (a mini-assessment) will further promote a community-wide conversation about climate change and use cross-generational learning to prompt new thinking about climate change and how to address it.

**Principles for CCA approach**

1. **Recognize that local people are the experts on how climate change is affecting them.** In CCA related work, the starting point is gaining an understanding about if and how climate change is affecting people and how they are and are not dealing with the impacts. Effective CCA programming builds on local experience. CCA efforts should begin with reciprocal engagement between AKF-A and local stakeholders not with campaigns or other more superficial activities.
2. **Clearly communicate climate change information.** While local people are the experts on how climate change is affecting them, they often have little idea about the reality of global climate change. People may think the trends they see are part of a cycle and that things will "go back to normal" or may falsely attribute change they see. AKF-A staff should be prepared to discuss the cause of global climate change and the associated trends, impacts, and adaptation measures in an audience appropriate manner with beneficiaries, partners, and government entities. There should be overt recognition that climate change is one of many influences on local conditions. Discussions of current climate variability can be used to introduce ideas of longer-term climate trends and adaptation options.

**Opportunities for Climate Change Adaptation Programming in Afghan Badakhshan**

**ANNEXES**

## Annex 1. Documents Reviewed

*If links do not open automatically please copy and paste into browser.*

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**Annex 2. Additional Resources**

**Websites**

Adaptation Learning Mechanism (A knowledge-sharing platform with a range of country-specific adaptation related information.) http://www.adaptationlearning.net/

Adaptation Partnership (A review of adaptation actions by location that including country-specific adaptation needs and priorities and relevant policies and strategic documents.) https://sites.google.com/a/ccrdproject.com/adaptation-partnership2

Climate Compatible Development Tools (A guide for national climate planning.) http://www.climateplanning.org

ClimateLinks Website, USAID. (A Global Knowledge Portal for Climate Change & Development Practitioners.) https://www.climatelinks.org

Climate-Smart Planning Platform. http://www.climatesmartplanning.org

FAO E-Learning Tool - Community based adaptation to climate change. http://www.fao.org/climatechange/67624/en/

Eldis Climate Change. http://www.eldis.org/go/topics/resource-guides/climate-change#.Vroxfsdl2zU

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**Annex 3. People Interviewed**
Interviews conducted January and February 2016.

| Name | Location | Position | E-mail |
|---|---|---|---|
| AKF-A Staff | | | |
| Aziz Ali | Kabul | AKF-A NRM Manager | aziz.ali@akdn.org |
| Romin Fararoon | Kabul | AKF-A RD Deputy Director | romin.fararoon@akdn.org |
| Ibrahim Mawzoon | Faizabad | AKF-A BDK NRM Coordinator | ibrahim.mawzoon@akdn.org |
| Rajib Sahoo | Kabul | AKF-A MDP Manager | rajib.sahoo@akdn.org |
| Mohammadakram Azizi (Including Dr. Najmuddin Najm) | Faizabad | AKF-A BDK NRM Manager | akram.azizi@akdn.org |
| Other AKDN | | | |
| Dr. Nasrullah (referred by Dr. Daoud Khuram) | Kabul | AKF-A Health | nasrullah.orya@akdn.org |
| Horst Weyerhauser | Thailand | UCA | horst.weyerhaeuser@ucentralasia.org |
| Mark Whitton | Geneva | AKF Rural Development | mark.whitton@akdn.org |
| Firoz Verje | Dushanbe | DRMI | firoz.verjee@akdn.org |
| Arvind Sinha | Kabul | FOCUS Senior Program Manager | arvind.sinha@focushumanitarian.org |
| Unable to Reach | | | |
| Shandana Khan | Kabul | AKF-A RD Director | Shandana.khan@akdn.org |
| Akhtar Iqbal | Islamabad | AKF Pakistan CEO | akhtar.iqbal@akdn.org |