# REQUEST FOR PROJECT
# FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project must be fully prepared (i.e. fully appraised for feasibility) when the request is submitted. The final project document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

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MSN P4-400
Washington, D.C., 20433
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## Table of contents


List of acronyms and abbreviations ..... 4
PART I: PROJECT INFORMATION ..... 7
Project Background and Context: ..... 7
Introduction ..... 7
Geographical context ..... 8
Socio-economic context ..... 10
Environmental context ..... 12
Kofirnighan River Basin ..... 16
Ecosystem goods and services ..... 23
C*limate change context* ..... 27
Non-climatic problems ..... 36
Problem statement ..... 37
Alternative solution and barriers ..... 38
Project Objective: ..... 40
Project Components and Financing ..... 41
Projected Calendar: ..... 42
PART II: PROJECT JUSTIFICATION ..... 42
A. Project components ..... 42
Component 1. Integrated catchment management to build climate resilience. ..... 42
Component 2. Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes ..... 50
Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the Kofirnighan River Basin ..... 57
B. Economic, social and environmental benefits ..... 60
C. Cost-effectiveness ..... 66
D. Consistency with national priorities ..... 68
E. Consistency with national technical standards ..... 75
F. Duplication in project design ..... 75
G. Knowledge management ..... 80
H. Consultation process ..... 80
I. Funding justification ..... 82
Component 1. Integrated catchment management to build climate resilience. ..... 82
Component 2. Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes ..... 83
Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the KRB. ..... 83
J. Sustainability of the project ..... 84
K. Environmental and social impacts and risks ..... 85
PART III: IMPLEMENTATION ARRANGEMENTS ..... 87
A. Implementation arrangements ..... 87
B. Financial risk management ..... 94
C. Environmental and social risk management ..... 95
D. Monitoring and evaluation ..... 103
E. Results framework ..... 107
F. Alignment with Adaptation Fund Results Framework ..... 111
G. Budget ..... 111
H. Disbursement schedule ..... 116

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY ..... 117
LIST OF ANNEXURES ..... 118

## List of acronyms and abbreviations

| | |
|---|---|
| **Adaptation Strategy** | Strategy of Adaptation to Climate Change, Prevention and Minimization of its Adverse Effects |
| **ADB** | Asian Development Bank |
| **AF** | Adaptation Fund |
| **AFA** | Administrative/Finance Assistant |
| **ALRI** | Agency for Land Reclamation and Irrigation |
| **AWP** | Annual Work Plan |
| **BCPR** | Bureau for Crisis Prevention and Recovery |
| **BMU** | Federal Ministry for the Environment, Nature Conservation and Nuclear Safety |
| **CAC** | Central Asia and the Caucasus |
| **CACAARI** | Central Asia and the Caucasus Association of Agricultural Research Institutions |
| **CA-CRM** | Central Asian Multi-Country Programme on Climate Risk Management |
| **CAFT** | Climate adaptation through sustainable forestry in important river catchment areas in Tajikistan |
| **CAREC** | Central Asian Regional Economic Cooperation |
| **CBD Strategy** | National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity |
| **CBOs** | Community-based organisations |
| **CCA** | Climate change adaptation |
| **CDP** | Combined Delivery Report |
| **CEP** | Committee for Environmental Protection |
| **CGIAR** | Consultative Group on International Agricultural Research |
| **CIA** | Central Intelligence Agency |
| **CSA** | Climate-smart Agriculture |
| **DDPs** | District Development Plans |
| **DoG** | Department of Geology |
| **DRMP** | UNDP Disaster Risk Management Programme |
| **DRR** | Disaster risk reduction |
| **EDB** | Eurasian Development Bank |
| **EbA** | Ecosystem-based Adaptation |
| **EIAs** | Environmental Impact Assessments |
| **EPs** | Enterprise Plans |
| **ESMF** | Environmental and Social Management Framework |
| **ESP** | March 2016 Revision of the Environmental and Social Policy of the Adaptation Fund |
| **FAO** | The Food and Agriculture Organisation of the United Nations |
| **FFSs** | Farmer Field Schools |
| **GBAR** | Gorno-Badakhshan Autonomous Region |
| **GCF** | Green Climate Fund |
| **GDP** | Gross Domestic Product |
| **GEF** | Global Environment Facility |
| **GHG** | Greenhouse gas |
| **GHG Strategy** | Greenhouse Gas Abatement Strategy |
| **GINA** | Global Database on the Implementation of Nutrition Action |
| **GIZ** | *Deutsche Gesellschaft für Internationale Zusammenarbeit* |
| **GLOFs** | Glacial lake outburst floods |
| **GoT** | Government of Tajikistan |
| **Hydromet** | State Agency for Hydrometeorology |
| **ICAS** | Initiatives in Critical Agrarian Studies |
| **ICARDA** | International Center for Agricultural Research in the Dry Areas |
| **ICR** | Intelligent Character Recognition |

| | |
|---|---|
| **IDA** | International Development Association |
| **IDS** | Institute for Development Studies |
| **IEF** | Impact evaluation framework |
| **ILO** | International Labour Organisation |
| **IMCC** | Inter-Ministerial Coordination Council |
| **IMS** | Information Management Systems |
| **INDC** | Intended Nationally Determined Contribution |
| **ISS** | International Institute of Social Studies |
| **IW** | Inception Workshop |
| **IWRM** | Integrated Water Resources Management |
| **KRB** | Kofirnighan River Basin |
| **KRBMP** | Kafirnigan River Basin Plan and Management Plan |
| **LITACA** | Livelihood Improvement in Tajik-Afghan Cross-border Areas |
| **LSIS** | Living Standards Improvement Strategy of Tajikistan for 2013–2015 |
| **LUP** | Land-use planning |
| **M&E** | Monitoring and evaluation |
| **Masl** | Metres above sea level |
| **MEWR** | Ministry of Energy and Water Resources |
| **MFIs** | Microfinance institutions |
| **MHCRM** | Multi-Hazard Climate Risk Model |
| **MLRWR** | Ministry of Land Reclamation and Water Resources |
| **MTDP** | Mid-term Development Programme 2016–2020 |
| **MTR** | Mid-term Review |
| **NAPCC** | National Action Plan of Tajikistan for Climate Change |
| **NCCAS** | National Climate Change Adaptation Strategy Tajikistan: Building Capacity for Climate Resilience |
| **NDRMS** | National Strategy on Disaster Risk Management for 2010–2015 |
| **NDS** | National Development Strategy |
| **NEAP** | National Environmental Action Plan |
| **NHDR** | National Human Development Report |
| **NIM** | National Implementation Modality |
| **NPACD** | National Programme of Actions to Combat Desertification |
| **NPC** | National Project Coordinator |
| **NPD** | National Project Director |
| **OCSE** | Organisation for Security and Cooperation in Europe |
| **PES** | Payment for Ecosystem Services |
| **PGRFA** | Plant Genetic Resources for Food and Agriculture |
| **PLAAS** | Institute for Poverty, Land and Agrarian Studies |
| **PM** | Programme Manager |
| **PPCR** | Pilot Programme for Climate Resilience |
| **PPR** | Project Progress Report |
| **PRISE** | Pathways to Resilience in Semi-arid Countries |
| **PRS** | Poverty Reduction Strategy |
| **PSC** | Project Steering Committee |
| **PUUs** | Pasture User Unions |
| **Ramsar Convention** | Convention on Wetlands of International Importance especially as Waterfowl Habitat |
| **RBCs** | River Basin Councils |
| **RBOs** | River Basin Organisations |
| **DRS** | Districts of Republican Subordination |
| **SDC** | Swiss Agency for Development and Cooperation |
| **SIDA** | Swedish International Development Cooperation Agency |
| **SIWI** | Stockholm International Water Institute |

| | |
|---|---|
| **SLM** | Sustainable Land Management |
| **SPCR** | Strategic Program for Climate Resilience |
| **TJS** | Tajikistan Somoni |
| **ToT** | Training-of-Trainers |
| **TR** | Terminal Review |
| **UCA** | University of Central Asia |
| **UN Environment/ UNEP** | United Nations Environment Programme |
| **UNDP** | United Nations Development Programme |
| **UNECE** | United Nations Economic Commission for Europe |
| **UNESCO** | United Nations Educational, Scientific and Cultural Organisation |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **Watershed** | In this document, the smallest hydrological unit for management of land and water resources |
| **WAPs** | Watershed Action Plans |
| **Water Reform Programme** | Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 |
| **WB** | World Bank |
| **WBG** | World Bank Group |
| **WHO** | World Health Organisation |
| **WMO** | World Meteorological Organization |
| **WUAs** | Water User Associations |

ADAPTATION FUND

# PROJECT PROPOSAL TO THE ADAPTATION FUND

## PART I: PROJECT INFORMATION

| | |
|---|---|
| Project Category: | Regular Project |
| Country/ies: | Tajikistan |
| Title of Project | An integrated landscape approach to enhancing the climate resilience of small-scale farmers and pastoralists in Tajikistan |
| Type of Implementing Entity: | Multilateral Implementing Entity |
| Implementing Entity: | UNDP |
| Executing Entity/ies: | Committee for Environmental Protection (CEP) |
| Amount of Financing Requested: | US$ 9,996,441 |

*Project Background and Context:*

### Introduction

The Republic of Tajikistan (hereafter Tajikistan) is the most climate-vulnerable country in Central Asia. Extreme rainfall events have become more frequent and intense, the rainfall season has shortened in many parts of the country, air temperatures have risen markedly, and glacial melting is accelerating[1]. As a result, hydrometeorological disasters such as droughts, mudflows and landslides are more frequent and rates of soil erosion across the country are increasing. The socio-economic impacts of these changes are considerable: livelihoods, agricultural productivity, water availability and hydroelectricity production are all compromised[2]. Indeed, natural hazards, most of which are linked to climate change (e.g. droughts and landslides), result in annual losses equivalent to ~20% of the country's Gross Domestic Product (GDP)[3].

The vulnerability of Tajikistan to climate change is exacerbated by a low adaptive capacity as a result of ageing infrastructure, the disproportionate number of women in poverty compared with men[4], and limited institutional capacity. This vulnerability is expected to intensify in the future, and consequently the building of climate resilience across the country is of paramount importance[5].

Given the above context, the proposed Adaptation Fund (AF) project will introduce an integrated approach to landscape management to develop the climate resilience of rural communities in

[1] Third National Communication of the Republic of Tajikistan under the United Nations Framework Convention on Climate Change. 2014. Committee on Environmental Protection, State Administration for Hydrometeorology, Government of The Republic of Tajikistan.
[2] World Bank (WB). 2013. Tajikistan: Overview of climate change activities.
[3] WB 2013 Tajikistan: Overview.
[4] This phenomenon is referred to as the 'feminisation of poverty', where women bear the burden of poverty – particularly in developing countries – as a result of lack of income and gender biases.
[5] WB 2013 Tajikistan: Overview.

Tajikistan. The proposed project's activities will focus in particular within one of the most climate-vulnerable river basins, namely the Kofirnighan River Basin (KRB). An integrated catchment management strategy will be developed for this basin which will be operationalised at *raion* (district), *jamoat* (sub-district) and village levels[6]. The strategy will provide detailed guidelines for suitable landscape management interventions to reduce the vulnerability to climate change.

Important principles underpinning the strategy will include: i) climate risks will need to be managed at a range of spatial scales (catchment and watershed[7]); ii) upstream-downstream interactions at different time scales (e.g. via glacial lake outburst floods, flooding and soil erosion) will need to be understood by planners and decision-makers in the KRB; iii) long-term development plans for the KRB will need to include a focus on climate risk management; iv) a cross-sectoral and integrated approach for managing water resources, forests, pasture land and agricultural land at the watershed level will be required to build climate resilience; v) landscape management interventions will need to focus on Ecosystem-based Adaptation (EbA), which will invariably include elements of both Sustainable Land Management (SLM) and Climate-smart Agriculture (CSA) practices; and vi) existing knowledge management platforms and hubs will need to be used to present lessons learnt within the KRB for promoting future national upscaling and replication of the project's activities.

Complementing the catchment management strategy, the proposed project will directly build the resilience of selected communities by: i) implementing on-the-ground EbA; ii) supporting agro-ecological extension services to provide technical assistance on climate change adaptation practices to local community members; iii) promoting the development of business models that capitalise on EbA interventions; and iv) developing a Payment for Ecosystem Services (PES) approach to support the long-term financing of climate-resilient catchment management plans across Tajikistan.

## Geographical context

Tajikistan is a small, landlocked country bordered by China to the east, the Kyrgyz Republic to the north, Afghanistan to the south and Uzbekistan to the north-west. The total land area of the country is 142,600 km$^2$, making it the smallest of all the Central Asian countries[8,9]. Over 90% of the land is mountainous terrain, with approximately half the country being more than 3,000 metres above sea level (masl). The topography of the country is extremely steep, with elevations ranging from 300–7,495 masl (Figure 1). This elevation range has resulted in a significant inter-seasonally and regionally variable climate. Elevation also influences the mean annual temperature, which ranges from -20ºC–30ºC, depending on the region. Similarly, mean annual precipitation varies geographically, ranging from ~30–1,800 mm per annum, and occurring mostly during a unimodal rain season that lasts ~7 months.

The mountainous regions of Tajikistan are of global importance as a glacial area. Approximately, 60% of the total number of glaciers in Central Asia are located within the country. Together, these

[6] The administration delineations are explained in the following sub-section on the socio-economic context of Tajikistan.
[7] The terms 'catchment' or 'basin' refer to a portion of land drained by a river and its tributaries, and are used interchangeably throughout this document. Catchments/basins can be subdivided into 'watersheds' i.e. areas of land around a smaller river, stream or lake.
[8] Third National Communication 2014.
[9] The total land surface areas of the remaining four Central Asia countries, in order of increasing size, are: i) Kyrgyzstan at 199,900 km$^2$; ii) Uzbekistan at 448,978 km$^2$; iii) Turkmenistan at 491,210 km$^2$; and iv) Kazakhstan at 2,725,000 km$^2$.

glaciers make up ~6% of Tajikistan's land area (Figure 2) and are important water reserves, storing ~406 km$^3$ of water and contributing to between 40 and 60% of the national renewable freshwater resources[10]. Two principle mountain ranges in Tajikistan – namely, the Pamir and Alay – give rise to several glacial-fed streams and rivers that are used to irrigate large areas of farmlands. Increased intensity of glacier melting is likely to lead to significant changes in the hydrological system and a greater risk of water-related natural disasters, such as floods and mudflows[11]. Over the last decade, water-related natural disasters have cost the Government of Tajikistan (GoT) more than US$1 billion and have resulted in the loss of hundreds of lives[12].


**Figure 1.** Map showing the five administrative regions of Tajikistan, namely Sughd, Khatlon, Districts of Republican Subordination (DRS) (previously known as Karotegin Region), Badakhshan and Dushanbe[13,14].

Tajikistan's water resources are an integral contributor to the local economy, specifically for the agricultural and energy sector. Irrigation agriculture and livestock farming account for over 90% of annual water withdrawals, primarily from surface water sources. Despite this disproportionate water resource allocation to the agricultural sector, Tajikistan only develops 700–1,200 ha of land

[10] United Nations Economic Commission for Europe (UNECE). 2017. Environmental Performance Review: Tajikistan, Third Review.
[11] Pathways to Resilience in Semi-Arid Countries (PRISE). 8 September 2018. "COMMENT: Tajikistan's glaciers melting – far more than just a loss of ice". Available at: http://prise.odi.org/comment-tajikistans-glaciers-melting-far-more-than-just-a-loss-of-ice/ [accessed 03.07.2018].
[12] PRISE 2018 "Tajikistan's glaciers melting".
[13] The five administrative regions of Tajikistan are: i) Sugd *oblast*; ii) Khatlon *oblast*; iii) Gorno-Badakhshan *oblast*; iv) Regional Republic Subordination (RRS) – which consists of 13 autonomous districts; and v) Dushanbe.
[14] Maps of the world. 2016. Maps of Tajikistan. Available at: http://www.maps-of-the-world.net/maps-of-asia/maps-of-tajikistan/ [accessed 03.07.2018].

for irrigation annually. This amount is ~10 times less than what was planned in the Water Sector Development Strategy for 2010–2025[15]. Such slow progress in irrigating agricultural land is attributed to insufficient investment into the agricultural sector and has resulted in the country needing to import ~50% of most of its staple foods.

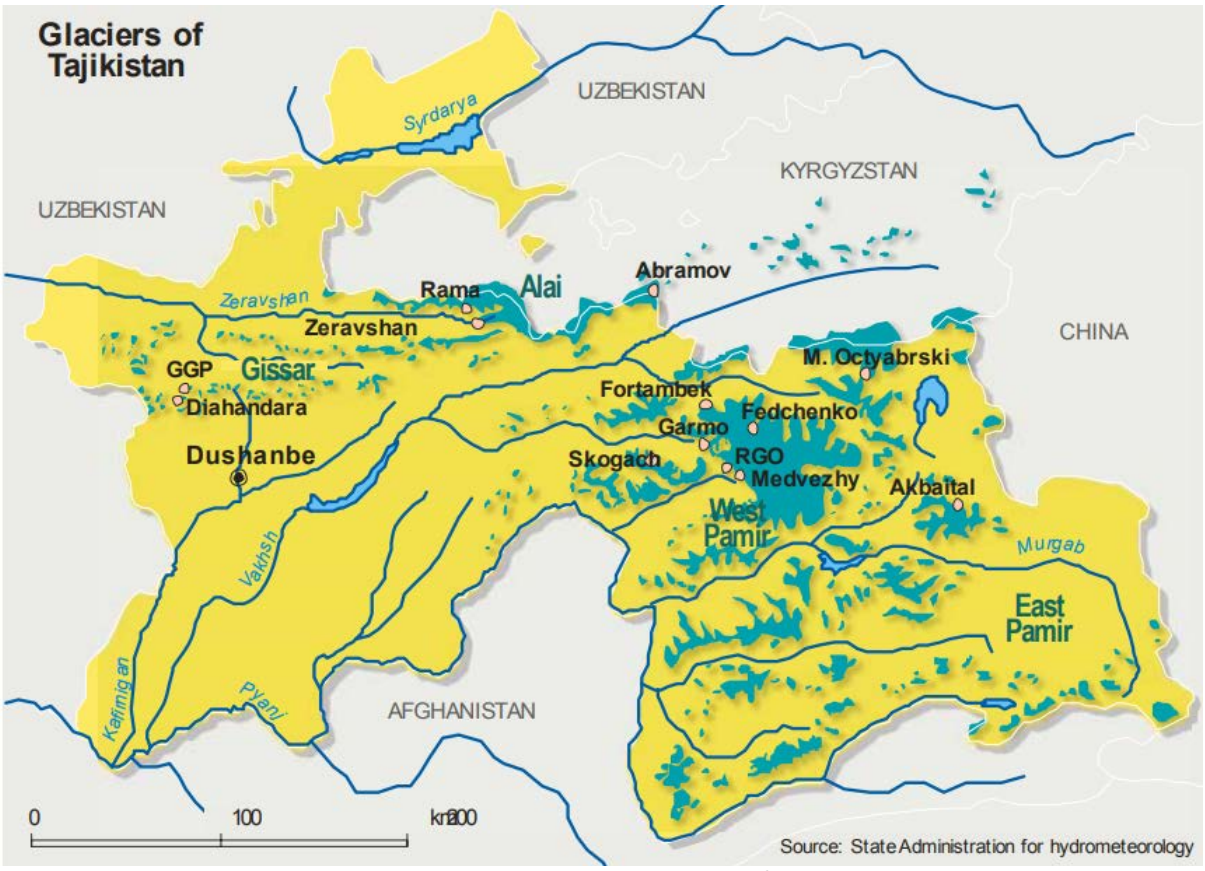



**Figure 2.** Map illustrating the extent of glacier coverage in Tajikistan[16].

## Socio-economic context

Tajikistan has a rapidly growing population, which at present numbers ~8.35 million[17]. Most people live in rural areas and are heavily dependent on agriculture for their livelihoods. Between 2005 and 2014, the population increased by ~22%[18]. Unlike many other countries globally, this rapid growth has not led to increased urbanisation. Indeed, the proportion of rural (~73%) to urban residents (~27%) has remained relatively constant since 2005[19].

[15] Water Sector Development Strategy for 2010–2025. 2009. Ministry of Land Reclamation and Water Resources (MLRWR) & Organisation for Security and Cooperation in Europe (OCSE), Dushanbe, Tajikistan.
[16] Kayumov A. 2016. Glaciers resources of Tajikistan in condition of the climate change. State Agency for Hydrometeorology of Committee for Environmental Protection under the Government of the Republic of Tajikistan. Designer: Minikulov N.
[17] UN DESA/Population Division. 2017. World Population Prospects 2017. Available at: https://esa.un.org/unpd/wpp/Graphs/DemographicProfiles/ [accessed 03.07.2018].
[18] UNECE 2017 Environmental Performance Review.
[19] Ibid.

The economy of Tajikistan is relatively weak compared with neighbouring countries – having the lowest per capita GDP (of ~US$970) in the United Nations Economic Commission for the Europe (UNECE) region. There has, however, been continuous growth in GDP over the last 20 years[20], with a total increase of 100% between 1998 and 2018. This growth has significantly improved the living standards of the population, resulting in a decrease in the number of people living below the poverty line from 53% to 36%[21].

Current socio-economic development trends in Tajikistan are closely connected to growth in the agricultural sector. This is because agriculture accounts for 75% of total employment and 23% of GDP, despite only 7% of the land surface being classified as arable. Cotton farming makes up the majority of the sector and is Tajikistan's main agricultural export product. Other agricultural focal areas include rice, grain, tobacco, corn, potato, vegetables, horticulture, vineyards and cattle breeding[22]. Like in other Central Asian countries, agricultural productivity showed a marked decline during the transition period from the Soviet Regime to independence[23], with productivity levels dropping ~50% by 1997[24]. By 2007, agricultural productivity in the country had, however, almost recovered to pre-transition levels, with the quantity of agricultural produce doubling again between 2005 and 2014[25].

Given the mountainous terrain of the country, transportation networks are integral to economic development[26] because they provide links to markets for multiple sectors, including agriculture. The main economic sectors in Tajikistan are, however, severely at risk from extreme climate events, particularly glacial lake outburst floods (GLOFs) and avalanches. GLOFs pose the most significant large-scale risk to transport networks – and consequently many other sectors – because of their unpredictability and the extent of affected area[27]. These events often cause extensive damage to trade networks, making them extremely detrimental to the economy[28]. In addition, both sudden and slow onset flooding events can cause landslides that have major negative impacts on the population[29].

### *Administrative delineations*

The administrative division of the country is established by its parliament and consists of three tiers of local government. These tiers are described below.

- First tier: sub-district- or *jamoat*-level. These are village and town governments in rural areas.
- Second tier: district- or *raion*-level. These are the administrations of large cities and *raions* which are subordinate to *oblasts.*

[20] Trading Economics. 2018. Tajikistan GDP per capita. Available at: https://tradingeconomics.com/tajikistan/gdp-per-capita [accessed 03.07.2018].
[21] UNECE 2017 Environmental Performance Review.
[22] National Action Plan of Tajikistan for Climate Change Mitigation (NAPCC). 2003. Main Administration on Hydrometeorology and Environmental Pollution Monitoring Ministry for Nature Protection of the Republic Tajikistan, Dushanbe.
[23] causes include the Tajik Civil War, removal of the centralised Soviet infrastructure and limited agricultural expertise
[24] Lerman Z. 2007. Tajikistan: An overview of land and farm structure reforms. The Hebrew University of Jerusalem. Discussion Paper 208.
[25] UNECE 2017 Environmental Performance Review.
[26] NAPCC 2003.
[27] Monhanty A, Mishra M, Mohanty B & BalaSuddareshwara A. 2011. Climate changes and natural hazards in mountain areas. Mountain Hazards 2011. Dushanbe, Tajikistan.
[28] The World Bank (WB). 13 September 2017. Strengthening infrastructure in Tajikistan for disaster and climate resilience. Available at: http://www.worldbank.org/en/news/feature/2017/09/04/strengthening-infrastructure-in-tajikistan-for-disaster-and-climate-resilience [accessed 03.07.2018].
[29] WB 2017 Strengthening infrastructure in Tajikistan.

- Third tier: *oblast*-level. These are the administrations of the capital city Dushanbe, as well as the *oblasts* of the Gorno-Badakhshan Autonomous Region (GBAR), Khatlon and Sougd, all of which are directly subordinate to the national government.

There are also District of Republican Subordination (DRS) which cover districts of Rasht and Gissar Valleys as well as those around the city of Dushanbe.

Tajikistan's capital city, Dushanbe, has 4 city districts, while the country's three *oblasts* have 58 rural districts between them. The GBAR is subdivided into 7 *raions* and 1 city; Sougd into 14 *raions* and 8 cities; and Khatlon into 24 *raions* and 4 cities[30]. Each *oblast, raion* and city has its own *khukumat*, or local council, with a chairperson who is appointed by the president and approved by respective council members. Local councils of second- and third-tier governments exercise the rights of self-government in their respective territories. Their decisions are legally binding for all institutions and organisations within their territories. Legislation does not address local self-government activity below the level of villages and towns. However, grassroots organisations of community self-government, such as *Mahala* committees are widespread and often exercise limited autonomy in solving local issues[31].

## Environmental context

Tajikistan is situated at the confluence of several diverse biogeographic regions. Influenced by variable weather patterns, these regions host a wide range of ecosystems, including glaciers, forests, woodlands, rangelands (steppe and grasslands), semi-deserts, deserts and wetlands[32,33]. The country is part of the Central Asia biodiversity hotspot[34], which supports a rich diversity of flora and fauna[35]. Ecosystems in Tajikistan are home to more than 23,000 plant species (of which ~8% are endemic) and more than 13,500 animal species (of which ~6% are endemic)[36]. Mountain ecosystems, situated between 600 and 7,000 masl, contain ~80% of the country's biodiversity and have high levels of endemism[37]. These mountain ecosystems also provide essential water resource services to their respective regions and to most of the country's summer pastures.

Tajikistan's 142,600 $km^2$ total land area is comprised of diverse ecosystems that support a range of land uses and resources, including:

- ~3% forests and shrublands;
- ~5% intensively-used arable land;
- ~32% agricultural lands, predominantly pastures; and
- ~60% natural (non-agricultural) areas, including glaciers, snowfields, well-vegetated mountain slopes, mountain deserts and rock/pebble fields[38].

[30] Ilolov M & Khudoiyev M. 2001. Local government in Tajikistan. In: Munteanu I (ed.) Developing New Rules in the Old Environment. Local Governments in Eastern Europe, in the Caucasus and in Central Asia. Budapest: Open Society Institute 603–648.
[31] Ilolov & Khudoiyev 2001 Local government in Tajikistan.
[32] Squires VR & Safarov N. 2013. Diversity of plants and animals in mountain ecosystem in Tajikistan. Journal of Rangeland Science 43–61.
[33] National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity (CBD Strategy). 2003. Government of Republic of Tajikistan, Dushanbe.
[34] Fauna and Flora International. 2018. "Tajikistan: Wild riches in a mountainous terrain". Available at: https://www.fauna-flora.org/countries/tajikistan [accessed 03.07.2018].
[35] World Wide Fund for Nature (WWF). 2018. Central Asia: Kyrgyzstan, Tajikistan, and Uzbekistan. Available at: https://www.worldwildlife.org/ecoregions/pa0808 [accessed 03.07.2018].
[36] CBD Strategy 2003.
[37] Squires & Safarov. 2013.
[38] NAPCC 2003.

Of Tajikistan's total land area[39], ~22% is currently conserved[40,41].

Conservation areas within Tajikistan are formally recognised in the form of reserves and environmental protection zones[42,43,44]. Five wetlands are listed in terms of the Ramsar Convention[45] and one conservation area has been declared a United Nations Educational, Scientific and Cultural Organisation (UNESCO) world heritage site[46]. Despite these conservation efforts, degradation continues to occur over large parts of the country[47]. Illegal poaching and uncontrolled harvesting of plant species are of particular concern within the reserves and protection zones[48]. Because there is such rich diversity in the country[49], the extinction risk to biodiversity is also high, with 226 plant species and 162 animal species currently classified as rare or threatened[50]. Expanding protected areas and eliminating threats to species extinction are focal areas for the GoT going forward[51,52].

Most territories of Tajikistan are prone to both natural and anthropogenic factors that contribute to land degradation (Figure 3). Tajik landscapes are affected by harsh climatic processes which degrade their health and function. Such harsh processes include freezing, thawing, physical destruction of soils from fluctuations in diurnal temperatures, dehydration, wind erosion and intense rainfall events[53]. Inappropriate land management such as the unsustainable use of forests and pastures, and the conversion of steep slopes for use in agriculture have contributed to the degradation of landscapes[54]. The effects of the harsh climatic processes coupled with the mismanagement of land are magnified by climate change factors[55]. These factors include increasing air temperatures, increasing intensity of extreme rainfall events and the shortening of rainfall seasons. Climate change events have also resulted in the intensification of desertification, landslides, gully erosion and sheet erosion – with the washout of fertile topsoil affecting more than 100,000 ha[56,57]. Available estimates indicate that ~82% of all land in Tajikistan is degraded by soil erosion to some degree. This translates into ~98% of agricultural land being currently affected by soil erosion, with almost ~89% being affected by medium to 'very high' levels of erosion[58].

[39] Third National Communication 2014.
[40] 3.1 million ha
[41] Third National Communication 2014.
[42] 4 reserves, 2 national parks and 13 wildlife reserves
[43] Third National Communication 2014.
[44] The Food and Agriculture Organisation of the United Nations (FAO). 2008. Country Report on the State of Plant Genetic Resources for Food and Agriculture. Republic of Tajikistan.
[45] Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987.
[46] Third National Communication 2014.
[47] FAO 2008 Country Report.
[48] Ibid.
[49] Fauna and Flora International 2018 "Tajikistan: Wild riches in a mountainous terrain".
[50] CBD Strategy 2003.
[51] e.g. Tajikistan's national programmes on biodiversity and biosafety
[52] FAO 2008 Country Report.
[53] NAPCC 2003.
[54] Third National Communication 2014.
[55] Ibid.
[56] NAPCC 2003.
[57] Third National Communication 2014.
[58] Poverty-Environment Initiative in Tajikistan. 2012. The Economics of Land Degradation for the Agricultural Sector in Tajikistan – A Scoping Study. Final Report, United Nations Development Programme (UNDP) and United Nations Environment Programme (UN Environment).

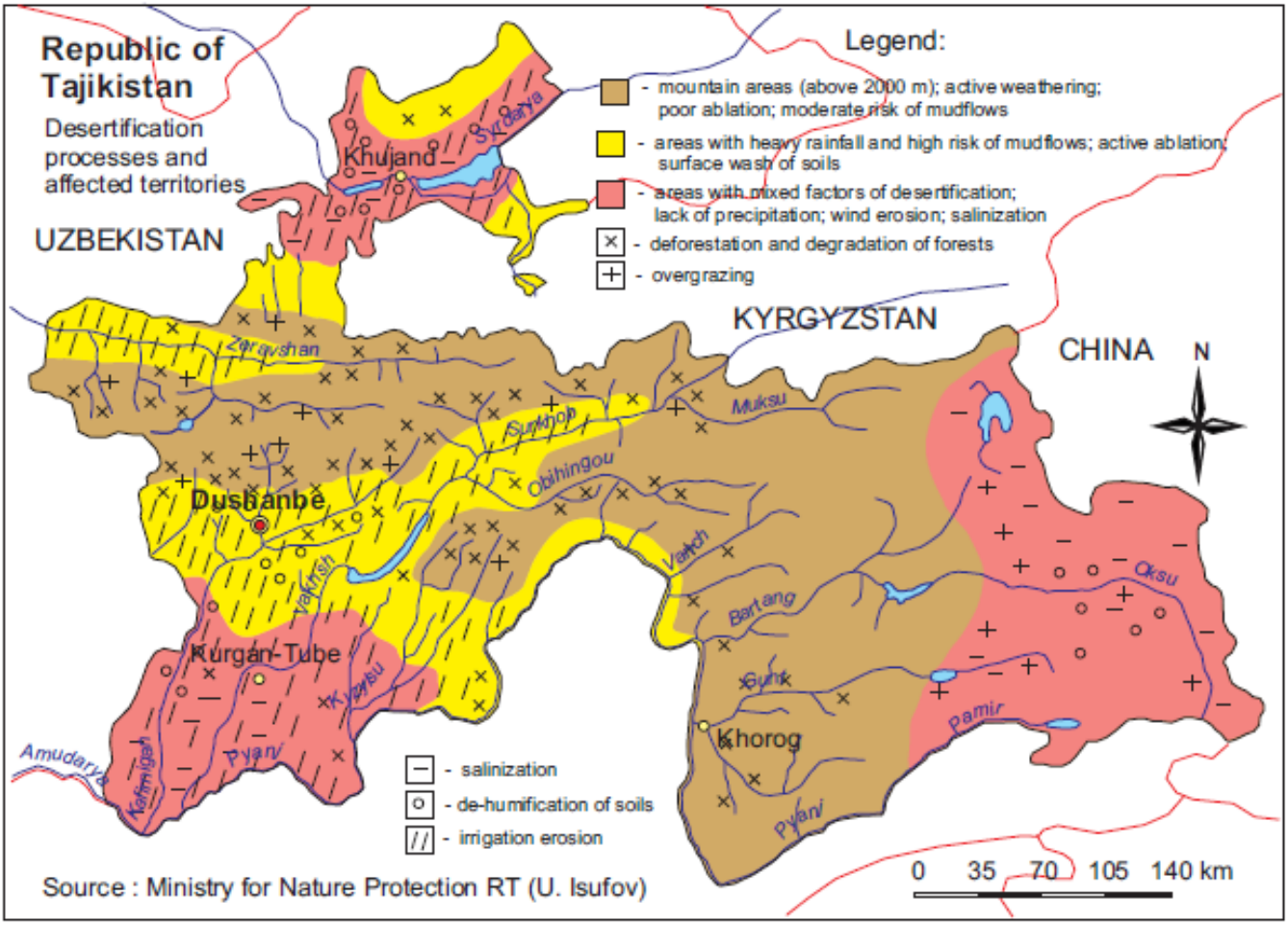



**Figure 3.** Desertification processes and territories in Tajikistan affected by *inter alia*: i) moderate risk of mudflows (brown); ii) high risk of mudflows, heavy rainfall and surface wash of soils (yellow); iii) desertification, lack of precipitation, wind erosion, salinization (pink); iv) deforestation (x); v) overgrazing (+); vi) salinisation (-); and vii) de-humification of soils (o).[59]

### *River systems*

The terrain of Tajikistan has been eroded to form a diverse range of mountains and steep valleys. The country's mountain ranges create several hydrographic areas, which in turn form the two main river systems. These two rivers feed into six primary rivers across the country. In order of decreasing size and length, these six rivers are: i) Bartang; ii) Vahksh; iii) Pyanj; iv) Kofirnighan; v) Zarafshan; and vi) Karatag. Figure 4 illustrates the river basins in Tajikistan.

[59] NAPCC 2003.

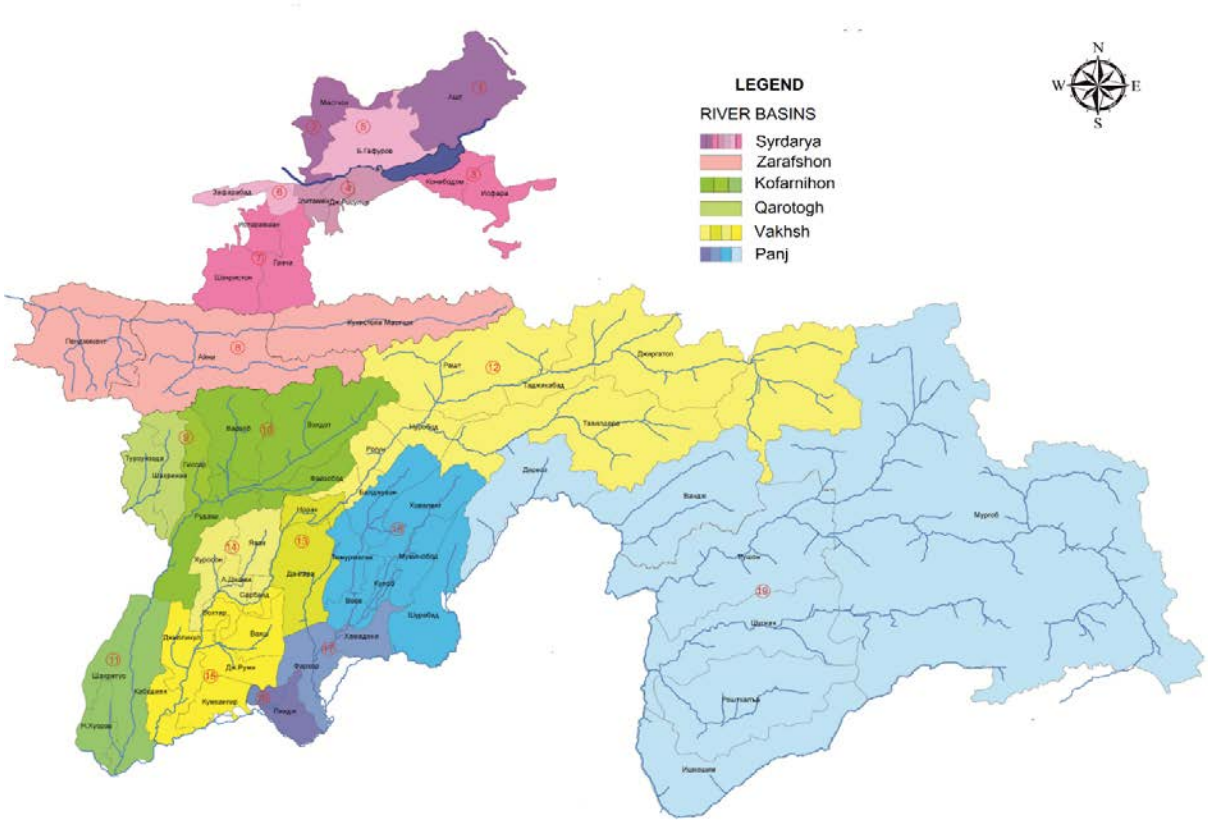



**Figure 4.** Map of river basins in Tajikistan, namely Bartang (labelled as Surdarya), Vahksh, Pyanj, Kofirnighan, Zarafshan and Karatag[60].

The Water Sector Reform Programme of Tajikistan for 2016–2025 (Water Reform Programme)[61] delineates four river basins according to hydrological boundaries. These four basins are the: i) section of the Syr Darya River that is located in Tajikistan; ii) section of the Pyanj River located in Tajikistan; iii) Vakhsh River Basin; and iv) the Kofirnighan River Basin.[62] By defining these river basins, the Water Reform Programme highlights the shift in the GoT towards improving management of these river systems away from using administrative boundaries. The programme also outlines the GoT's goal of promoting the implementation of integrated water resources management (IWRM) at a basin level.

Of the four river basins identified by Tajikistan's Water Reform Programme, the Kofirnighan River Basin (KRB) is one that currently does not have focused efforts being made towards IWRM[63]. Compared to the other three basins, KRB has received the fewest interventions from government and donors to date. The KRB is topographically and climatically very variable and is highly vulnerable to extreme climate events such as GLOFs, floods, mudflows and landslides[64,65]. It is also the smallest of Tajikistan's four basins and is fully encompassed within Tajikistan (i.e. is not

[60] Fergana Valley Water Resources Management (WRM). 2018. Kafirnigan River Basin Plan and Management Plan (KRBMP) Draft. Unpublished, Dushanbe, Tajikistan.
[61] Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme). 2015. Resolution of the Government of the Republic of Tajikistan. Unofficial translation.
[62] Water Reform Programme 2015.
[63] Fergana Valley WRM 2018 KRBMP Unpublished.
[64] State Agency for Hydrometeorology (Hydromet). 2018. Assessment of Kofirnighan River Basin (KRB), natural disasters and needs. Unofficial document.
[65] see sub-section on KRB below

transboundary). A Kofirnighan River Basin Management Plan (KRBMP) has been developed for the basin. Although this plan includes water management, it does not integrate land and natural resources into that management.

## Kofirnighan River Basin

The proposed project focuses its activities within the Kofirnighan River Basin (KRB) as, of the four basins within Tajikistan: i) the KRB has received limited international support for the implementation of integrated catchment management; ii) a large number of communities within the basin are highly vulnerable to a wide range of climate risks; iii) the basin's variable topographic and climatic conditions are highly representative of the conditions in Tajikistan; and iv) there are no transboundary disputes along the river[66]. A detailed justification for the selection of the KRB for project activity implementation has been included as Annex 3.

Situated in the south-western and western parts of the country, the KRB occupies a total area of ~11,600 km$^2$, with the mountain catchment making up 8,070 km$^2$ of this (equating to ~70% of the total basin area)[67]. The basin is divided into two regions, namely the north and the central/south regions[68]. The Gissar Valley encompasses the north region, which includes the city of Dushanbe, while the Kofirnighan and Beshkent valley depressions make up the south region. The Gissar Ridge forms the highland areas, extending for 250 km to elevations of ~4,500 masl and is home to 343 glaciers, covering a total area of 115 km$^2$.[69] The river of Kofirnighan, at ~387 km long, is one of the major contributing inflows of Tajikistan's largest river, the Amu Darya River[70]. It flows through different mountain ranges and zones within the basin including high mountains, intermediate foothills and low and flat zones. The basin's groundwater reserves are economically important and are used to irrigate crops (~98,000 ha) and pastures (~56,000 ha). Most of the irrigated land is in the arid southern sub-basin, while cultivated land in the northern sub-basin is largely rain-fed.

The mountain ranges and glaciers have a major influence on the air temperatures within the KRB. Temperature and precipitation gradients exist along the zones (mountainous, foothill, low), with temperatures increasing as one moves from the mountainous to the low-lying zones, and precipitation decreasing in this direction. In the mountainous areas of KRB, average temperatures range from 18°C in the summer months (hottest summer temperatures being ~35°C) to –8°C in the winter months (with cold air masses sometimes resulting in temperatures as low as –30°C). Intensely hot summer temperatures are typical for the south of KRB, which experiences mild winters compared with the north. Average temperatures in the southern areas of KRB range from ~31°C in the summer months (hottest summer temperatures being ~48°C) to ~2°C in winter (with temperatures dropping to as low as -28°C) [71].

In terms of political divisions, the KRB is made up of 10 administrative districts, 4 cities including Dushanbe, 10 villages and 77 *jamoats* (rural self-governance bodies). This division in the population is recorded in Table 1. As of January 2017, the total KRB population was 2.8 million people, with ~62% living in rural areas and ~38% in towns. Over the past 13 years, the KRB

[66] reducing the project partners and stakeholders to within the country
[67] Tahirov IG & Kupayi GD. 1994. Water resources of Tajikistan of the Republic of Tajikistan. Dushanbe 1:181.
[68] Fergana Valley WRM 2018 KRBMP Unpublished.
[69] Ibid.
[70] Tahirov & Kupayi 1994 Water resources of Tajikistan.
[71] Fergana Valley WRM 2018 KRBMP Unpublished.

population has increased by 712,000 people (representing a ~34% total increase and an annual growth rate of 2.5%).

**Table 1.** Kofirnighan River Basin population numbers according to cities and villages[72].

| No. | Districts and cities | Population[73] | | | Population density[74] | No. of cities | No. of urban-type settlements | No. of *jamoats* |
|---|---|---|---|---|---|---|---|---|
| | | Total | City (%) | Village (%) | | | | |
| 1 | Dushanbe | 816,200 | 100 | 0 | 8162 | 1 | 0 | 0 |
| 2 | Varzob | 76,900 | 3 | 97 | 45,2 | 0 | 1 | 6 |
| 3 | Vahdat | 324,000 | 17 | 83 | 87,6 | 1 | 1 | 10 |
| 4 | Gissar | 287,400 | 14 | 86 | 287,4 | 1 | 1 | 11 |
| 5 | Faizobod | 96,900 | 10 | 90 | 107,7 | 0 | 1 | 7 |
| 6 | Tursunzade | 280,000 | 19 | 81 | 233,3 | 1 | 0 | 9 |
| 7 | Rudaki | 476,500 | 11 | 89 | 264,7 | 0 | 3 | 13 |
| 8 | Nosiri Khusrav | 35,900 | 0 | 36 | 44,9 | 0 | 0 | 3 |
| 9 | Kabodiyon | 173,800 | 7 | 93 | 96,6 | 0 | 1 | 7 |
| 10 | Shaartuz | 120,500 | 14 | 87 | 80,3 | 0 | 1 | 5 |
| **Total** | | **2,802,500** | **38** | **62** | **180,8** | **4** | **10** | **77** |

The State Agency for Hydrometeorology (Hydromet) has conducted research on the river basins in Tajikistan, identifying KRB as a basin particularly vulnerable to extreme climate events[75,76]. Such extreme events have affected 163 communities within the basin. These KRB communities are illustrated in Figure 5, including the main river and tributaries.

A methodology which ranks rural areas in terms of their vulnerability to climate impacts has been used to identify the specific districts within the KRB that are the most vulnerable to climate change[77,78]. Ranking of areas used the following criteria[79]:

- exposure to extreme climate events caused by climate change including temperature, precipitation, floods and drought;
- sensitivity to climate change on sectors/elements including productivity, poverty, access to land resources, dependence on agricultural production and diseases; and
- adaptation potential which included access to health care, education, drinking and irrigated water, cattle density and internal and external migration.

Taking the above criteria into account, the following districts were deemed the most vulnerable districts within KRB: i) Vakhdat, Faizobod and Varzob in the north; and ii) Nosiri Khusrav, Kabodiyon and Shaartuz in the south.[80] These six districts are described in greater detail in the sub-sections below[81].

[72] Agency for Statistics. 2017. Regions of the Republic of Tajikistan. Under the President of the Republic of Tajikistan.
[73] Population census as at 1 January 2017.
[74] Population density is measured per km$^2$.
[75] Hydromet 2018 Assessment of KRB, Unofficial document.
[76] Further information concerning the KRB's vulnerability to extreme climate events is presented under 'Climate change context'.
[77] Asian Development Bank (ADB). May 2016. Tajikistan: Building Capacity for Climate Resilience – Mid-term Report (MTR). Technical Assistance Consultant's Report. Prepared by ABT Associates for the ADB and GoT. Project No: 45436–001; TA 8090.
[78] This methodology was developed under ADB project, titled 'Building capacity for climate resilience in Tajikistan', which contributed to the development of the National Climate Change Adaptation Strategy Tajikistan (NCCAS).
[79] ADB 2016 Tajikistan: Building Capacity for Climate Resilience – MTR.
[80] Fergana Valley WRM 2018 KRBMP Unpublished.
[81] Further information concerning districts' vulnerability to extreme climate events is presented under district descriptions.

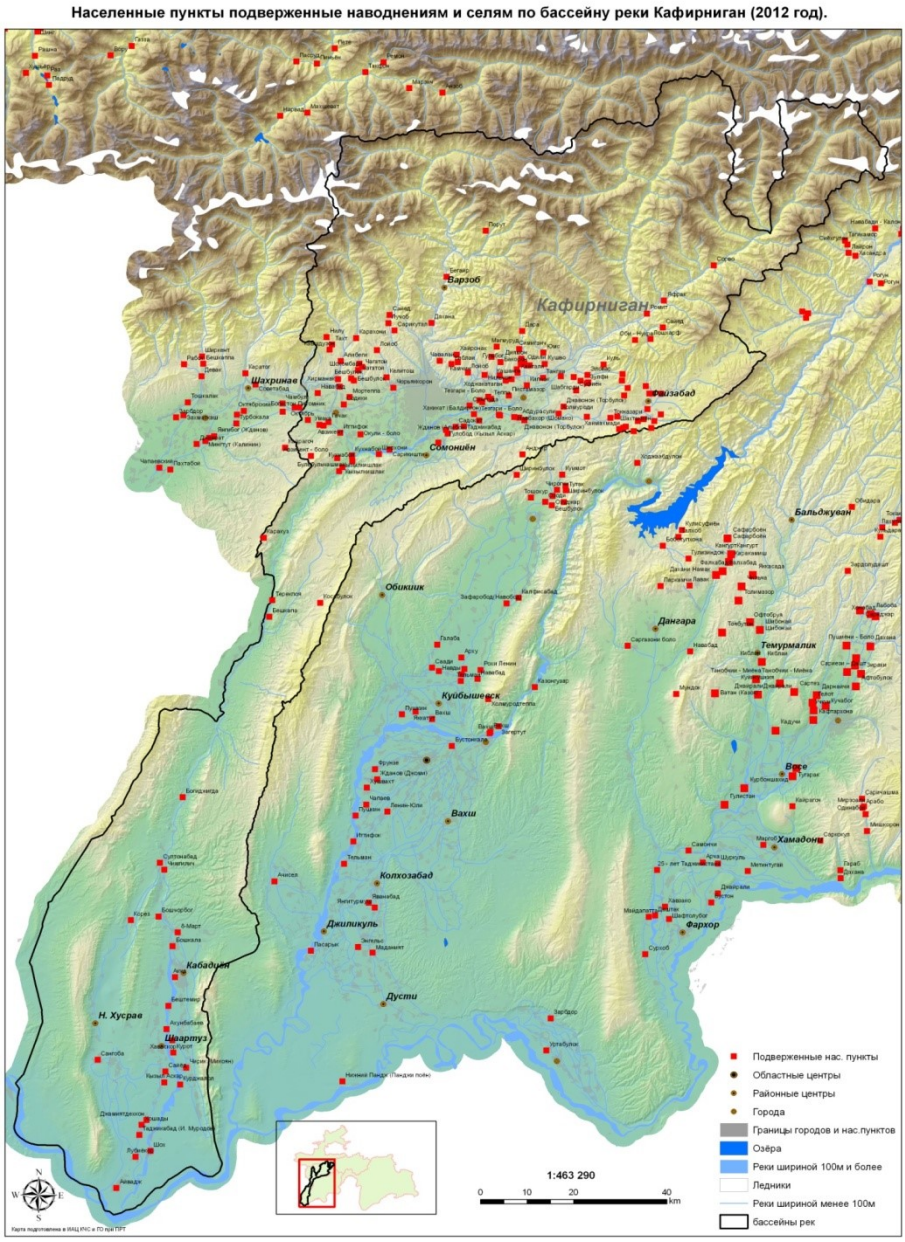



**Figure 5.** Map of Kofirnighan River Basin (outlined in black) indicating the most vulnerable communities to extreme climate events. Communities are indicated by a red dot.

## *Vahdat District*

The district of Vahdat (Figure 6) is situated ~10 km east of Dushanbe and, at 3,700 km$^2$, is one of the largest districts in Tajikistan. Altitude, which ranges from ~1,500 masl to more than 3,000 masl, is a major factor influencing the Vahdat climate. Warm summers and cool winters are experienced up to 1,500 masl, with average temperatures between 25–35°C in summer (July) and -5–0°C in winter (January). Between 1,500–2,500 masl, a moderate climate with a cool summer and a cold winter is experienced. At a height of more than 3,000 masl, cold winters are

the norm, coupled with an average annual precipitation of 700–900 mm. The district has five rivers with the largest being the Kofirnighan River, at a length of 70 km[82].

As of 2017, the total population of Vahdat was 324,000 people, with ~83% of the population living in rural areas[83]. Of the total area of the district, agricultural land comprises ~142,000 ha (~38%), of which ~87% is pasture, ~9% is arable land and ~3% is cultivated with perennial trees. Approximately 58% of Vahdat's agricultural production is derived from the production of crops, whilst the remaining ~42% is derived from livestock products. More than 10% of the population works as migrant labourers outside the district[84].

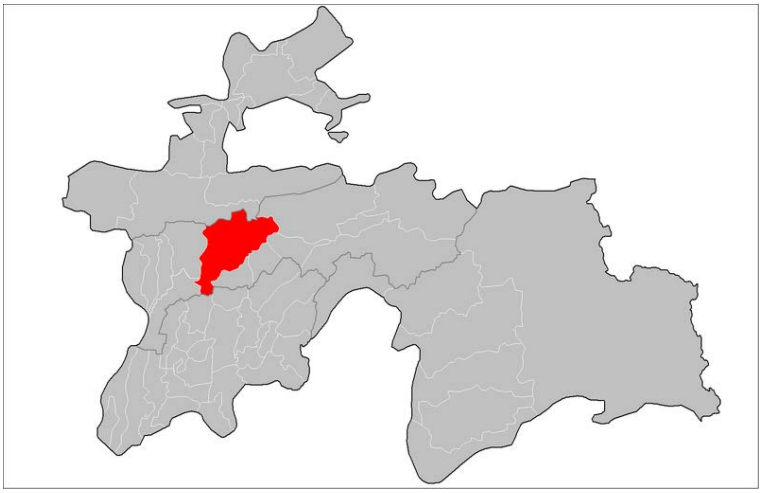


**Figure 6**. Location of Vahdat District within Tajikistan[85].

### *Varzob District*

Varzob District (Figure 7) is situated north of Dushanbe and covers an area of ~1,700 km$^2$. The northern extent of Varzob is comprised of the Gissar Mountain Range with the Varzob River running through the entire district from north to south. The Gissar range results in a variable climate, with cold winters. In winter months, the temperature drops to -31°C, with snow thickness reaching up to 1.5 m. Annual average annual precipitation for the district is 960–990 mm. Snow deposits and glaciers make up ~52 km$^2$ of the total land area in Varzob. These large snow- and glacier-covered areas within the district render most of the territory prone to natural disasters[86].

An array of natural disasters affect the district, including prolonged rainfall events, mudflows, landslides, rockfalls and avalanches. Approximately 31% of existing settlements within the district (22 out of 70) are prone to natural disasters, with ~4% of households located in hazardous areas[87].

[82] Fergana Valley WRM 2018 KRBMP Unpublished.
[83] Ibid.
[84] Ibid.
[85] Government of the United Kingdom (UK). 2018. Romanisation of Russian. BGN/PCGN 1947 System.
[86] Fergana Valley WRM 2018 KRBMP Unpublished.
[87] Ibid.

The total population of the district is ~769,000 people[88], with ~97% of the population living in rural areas. Most of the land in the district comprises mountains (96%), with agricultural lands making up only ~2% (163,133 ha), pastures ~0.8% (67,811 ha) and non-agricultural lands ~1.1% (91,794 ha)[89]. Of the total agricultural land, ~0.6% (260 ha) is irrigated. Cultivated crop species include perennial fruit-bearing trees (309 ha), vineyards (383 ha), mulberry trees (51 ha) and other perennial trees[90] (19 ha). Approximately 56% of Varzob's agricultural production is derived from livestock, with ~44% derived from crops. Of the district's total working population, more than 4% works as migrant labourers outside of the district[91].

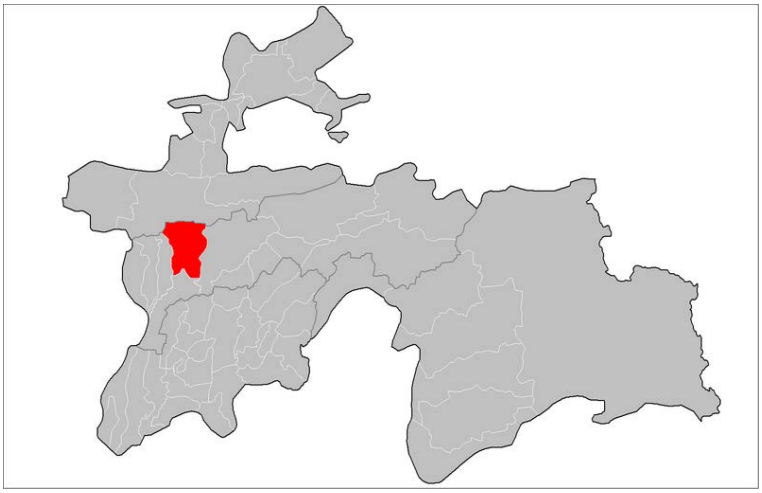


**Figure 7**. Location of Varzob District within Tajikistan[92].

### *Faizobod District*

The district of Faizobod (Figure 8) covers an area of ~900 km$^2$ and is situated at an average altitude of ~1,200 masl. Faizobod climate is medium continental, with average temperatures ranging from ~14-28°C in summer (July) and 3°C in winter (January). Average annual precipitation in the mountainous areas is 1,136 mm and is 767 mm in the valleys[93].

As of 2017, the total population of the district was 96,900 people. Approximately 90% of the district's population live in rural areas, with the remaining 10% living in urban settlements. Land use within the district is divided between pastures (~58%), arable land (~9%), forests and shrubs (~8%) and perennial trees (~5%). The Faizobod agricultural sector is comprised of livestock production (~57%) and crop production (~43%). More than 13% of the population works as labourers in other districts[94].

The main natural disasters occurring within Faizobod are floods, mudflows and landslides. All these disasters are primarily caused by the flooding of the Surkhdara and Elok Rivers. Negative impacts from these disasters threaten 26 villages, which make up ~7% of the district's population. This equates to ~6,559 people or 1,059 households[95].

[88] as of January 2017
[89] Fergana Valley WRM 2018 KRBMP Unpublished.
[90] e.g. walnut orchards
[91] Fergana Valley WRM 2018 KRBMP Unpublished.
[92] Government UK 2018 Romanisation of Russian.
[93] Fergana Valley WRM 2018 KRBMP Unpublished.
[94] Ibid.
[95] Ibid.

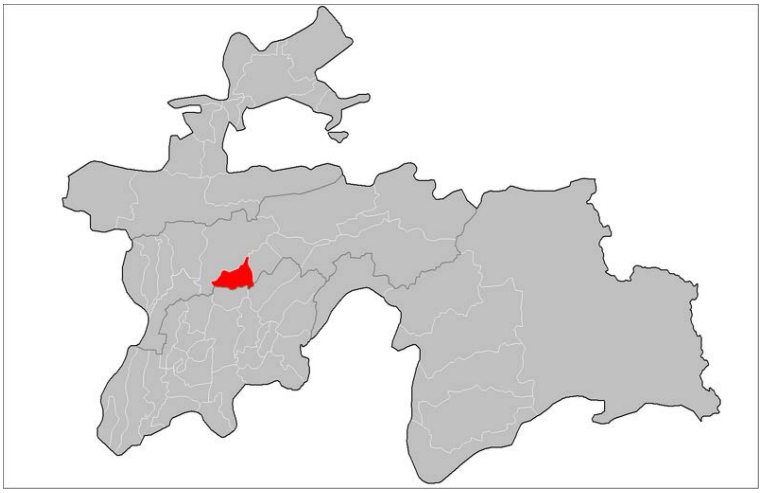
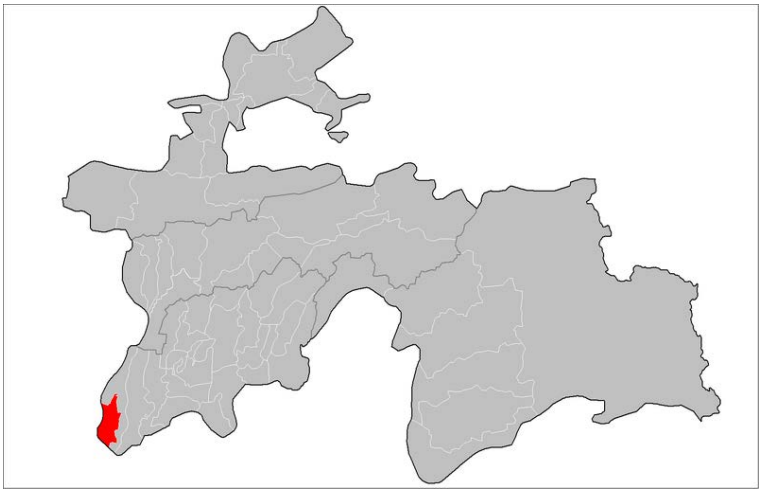


**Figure 8**. Location of Faizobod District within Tajikistan[96].

### *Nosiri Khusrav District*

The Nosiri Khusrav district (Figure 9) is ~800 km$^2$ and occurs at altitudes ranging from 380–400 masl. The climate in the district is dry and subtropical, with hot and dry summers and mild winters. The average temperature in summer (June–August) ranges from 40–55°C and is 10°C in winter (January). Total annual precipitation during winter months reaches 80 mm, with even less precipitation during spring and autumn months (up to 25–30 mm).

In 2017[97], the total population of Nosiri Khusrav was 35,900 people, with the entire population living in rural areas. As of 2014, ~84% (67,423 ha) of the district's total area was comprised of agricultural land, with ~16% (11,022 ha) of this land being irrigated. Of the total working population, more than 12% work outside of the district as labour migrants.



[96] Government UK 2018 Romanisation of Russian.
[97] as of January 2017

**Figure 9**. Location of Nosiri Khusrav District within Tajikistan[98].

### *Shaartuz District*

The district of Shaartuz (Figure 10) covers ~1,500 km$^2$, with a flat topography relative to other KRB districts. Only ~9% of the total district area is occupied by low mountain ranges. These ranges include: i) Bobotog (up to 2,100 masl); ii) Tuyuntog (up to 1,314 masl); and iii) Ariktog (just over 800 masl). The climate of the region is dry and subtropical, with warm-hot, dry summers and mild winters. The average annual temperature is ~32°C[99], with an average annual precipitation of 143 mm. In the low mountain areas, this annual precipitation average reaches 200 mm. The warm summer period lasts for ~190 days with humidity during these months reaching ~23%.

As of 2017, the total population of the district was 120,500 people. Approximately 87% of the population live in rural areas, with the remaining ~13% being situated in urban areas. The density of the population is 80 people per km$^2$. Of Shaartuz's total working population, more than 7% work as migrant labourers beyond district borders.

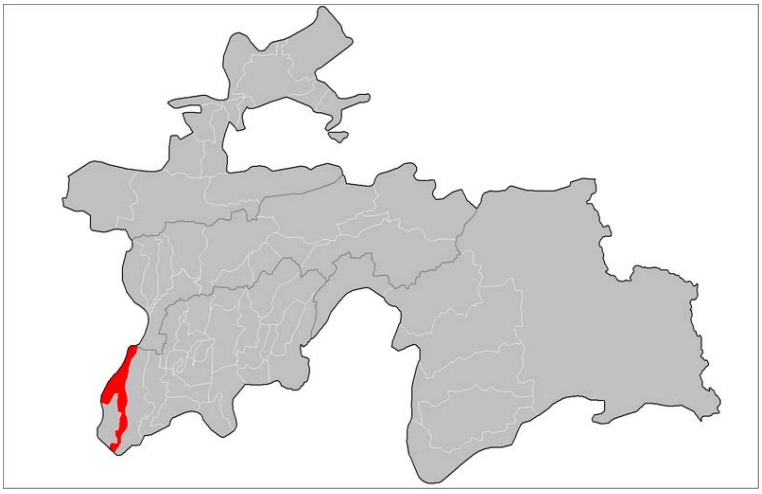


**Figure 10**. Location of Shaartuz District within Tajikistan[100].

### *Kabodiyon District*

The district of Kabodiyon (Figure 11) covers 1,900 km$^2$. It is located in the south of the Gissar and Alai Highlands, at an average altitude of ~788 masl. Kabodiyon is surrounded by the mountain ranges of Bobotog, Oktoi, Karotog and Chilontoy and consequently has a dry and continental climate. In winter (January), air temperatures range from -2–2°C, while summer (July) temperatures range from ~24–41°C.

The total population of the Kabodiyon District[101] is 173,800 people. Approximately 93% of the population lives in rural areas, with a density of ~97 people per km$^2$. More than 11% of Kabodiyon's working population works as migrant labourers outside of the district.

[98] Government UK 2018 Romanisation of Russian.
[99] in the sub-region of Ayvadzhe, and in some years reaches up to 46°C
[100] Government UK 2018 Romanisation of Russian.
[101] as of January 2017

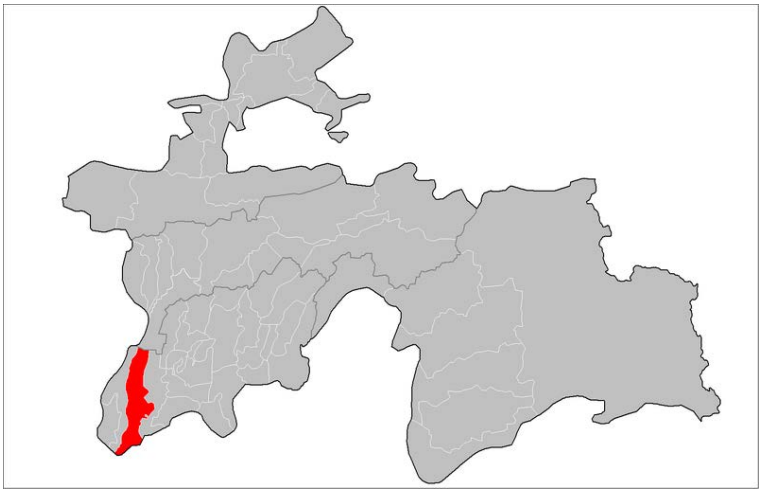


**Figure 11**. Location of Kabodiyon District within Tajikistan[102].

## Ecosystem goods and services

Tajikistan's natural systems provide numerous ecosystem goods and services. These critical ecosystem services can be broadly categorised into:

- provisioning services – products obtained directly from ecosystems;
- regulating services – benefits obtained through the regulation of ecosystems;
- cultural services – non-material benefits obtained through ecosystems; and
- supporting services – services necessary to produce all other ecosystem services.

Ecosystem services that are currently under threat from climate change and the effects thereof in Tajikistan are outlined in Table 2 according to the above four categories.

[102] Government UK 2018 Romanisation of Russian.

**Table 2.** A description of ecosystems goods and services in Tajikistan threatened by climate-induced and anthropogenic factors.

| Service | Description of threat to service |
|---|---|
| **Provisioning services** | |
| **Fresh water** | Catchments – particularly in the Pamir Mountains in western Tajikistan – provide fresh water not only to the country, but to the greater Central Asian region. The impacts of climate change on these areas significantly affect areas downstream. Predicted climate change impacts on river discharge are varied, with models under 'hot and dry' scenarios showing a reduction in river discharge and 'warm and humid' scenarios showing the converse. Additionally, climate-induced rising air temperatures are causing increased melting of glaciers, snow cover and permafrost soils[103]; all of which affect catchment hydrology through increased run-off and large-scale gully and sheet erosion[104]. |
| **Food** | Tajikistan's agricultural sector is an integral component of the country's economy, contributing more than 20% of the GDP[105,106]. Approximately 70% of Tajikistan's population live in rural areas and is dependent on agriculture. Crop and livestock productivity, especially in dry-land farming, are vulnerable to climate variability, particularly drought and extreme temperatures[107], as well as soil erosion, declining soil fertility and unsustainable use of pastures[108]. |
| **Raw materials** | Forests are a critical resource to communities[109], providing food and wood, as well as fodder and grazing to support livelihoods[110]. Permanent pastures currently cover ~3.6 million ha[111,112] of land in Tajikistan. Degradation is widespread in these areas and is primarily characterised by an increase in unpalatable grasses as well as a 15–20% decrease in productivity[113]. Sheep and goats are generally shepherded to high-altitude, summer pastures[114], returning to low-altitude, village pastures for the winter period[115,116]. Cattle are often grazed near villages resulting in severe degradation of rangelands through overgrazing[117]. Climate change impacts – predominantly droughts and extreme temperatures – have been greatest on dry-land farms and pasture lands, resulting in declining crop productivity and livestock carrying-capacity, respectively[118]. |
| **Energy** | Hydropower currently contributes 98% to Tajikistan's energy supply, with coal-, solar- and biomass-derived power providing the balance; however, this supply does not meet the country's annual requirements. Tajikistan has considerable hydropower potential[119,120] and development of more hydropower plants is a national priority[121]. Large-scale soil erosion and intense climate-induced hydrometeorological |

[103] Third National Communication 2014.
[104] NAPCC 2003.
[105] Third National Communication 2014.
[106] Curtain M. 2001. Environmental profile of Tajikistan. Asian Development Bank (ADB).
[107] Third National Communication 2014.
[108] Ibid.
[109] Fauna and Flora International 2018 "Tajikistan: Wild riches".
[110] A large part of the remaining forest area is given for long-term use as pasture.
[111] equivalent to almost 29% of its total land area
[112] The Food and Agriculture Organisation of the United Nations (FAO). 2008. Tajikistan: Reducing the Impact of Price Surge and Agriculture Rehabilitation Programme. Appraisal Document.
[113] Third National Communication 2014.
[114] ~500–1,000 masl
[115] FAO 2008 Tajikistan: Reducing the Impact.
[116] In some cases, where owners cannot afford the costs of shepherding, animals are kept on overgrazed village pastures all year round leading to pasture degradation and deterioration in carrying capacity.
[117] Third National Communication 2014.
[118] Ibid.
[119] approximately 3.6 mln kWh/1 km/year
[120] Third National Communication 2014.
[121] Ibid.

| Service | Description of threat to service |
|---|---|
| | events damage hydropower infrastructure, for example through siltation of dams and damage to turbines[122]. The ability to generate hydropower is negatively impacted by climate-induced fluctuations in river discharge[123]. |
| **Genetic plant resources** | Tajikistan is an important source of agro-biodiversity and is one of the main countries of origin for cultivated plants worldwide[124] for example the mountainous regions of the country host wild plantations of many different species of fruit trees[125,126]. Numerous anthropogenic[127] and natural factors pose a risk to this indigenous plant genetic material[128]. Some of the natural factors exacerbated by climate change include drought, hot and dry winds, extreme frosts, plant diseases, plant pests and soil salination. National plant breeding programmes are prioritising the development of varieties and cultivars adapted to biotic and abiotic stresses, especially increased resistance to drought, disease and pests[129]. |
| **Regulating services** | |
| **Water purification, water regulation and erosion control** | Excessive climate change-induced run-off of water from mountain slopes is causing large-scale soil erosion, including sheet and gulley erosion[130], across the country. This erosion poses considerable risk to Tajikistan's food, water and energy security[131]. Such large-scale soil erosion is affecting water infiltration, percolation and retention and is consequently hampering water purification and regulation services[132]. Inappropriate land-use – such as deforestation, over-grazing and cultivation of steep slopes – further reduces soil function[133]. |
| **Climate regulation; carbon sequestration** | Although pastures in Tajikistan contribute less plant biomass per unit area than forests, pastures cover ~32% of the total land area[134] and consequently fulfil an important function in climate regulation and absorption of atmospheric carbon. The natural vegetation of Tajikistan produces ~80 million tonnes of phytomass annually, ~39% of it occurring above-ground and 61% underground[135]. Pastures are particularly vulnerable to climate change-induced degradation that causes reduced vegetation cover, negatively affecting livestock productivity[136]. |
| **Disease regulation** | Climatic variability increases the vulnerability of Tajikistan's population to infections and diseases including malaria and typhoid[137,138]. The agricultural sector in the country is also increasingly at risk to plant pathogens and pests. Crop breeding programmes in the country are currently aiming to produce crop varieties with enhanced resistance[139] to mitigate these negative effects. |
| **Cultural services** | |

[122] Third National Communication 2014.
[123] Ibid.
[124] UNDP-GEF. 2009. Project title: Sustaining agricultural biodiversity in the face of climate change in Tajikistan: vulnerability and adaptation. GEF Project ID No. 3129 (Atlas Project ID 00070411); UNDP Project ID No. PIMS: 3647. Multi-focal area project with biodiversity and climate change adaptation. Terminal Evaluation Report available at: https://www.thegef.org/sites/default/files/project_documents/3647%2520PIMS_Tajikistan%2520EBD%2520TE%2520July2015.pdf [accessed 03.07.2018].
[125] In many cases, the distinction between cultivated and wild plants is unclear.
[126] FAO 2008 Country Report.
[127] including deforestation, overgrazing, overharvesting for fuelwood and medicinal purposes, and grubbing of old orchard
[128] FAO 2008 Country Report.
[129] Ibid.
[130] Third National Communication 2014.
[131] Ibid.
[132] NAPCC 2003.
[133] Third National Communication 2014.
[134] NAPCC 2003.
[135] FAO 2008 Country Report.
[136] Third National Communication 2014.
[137] The transmission of typhoid is increasing, which has been coupled with a reduction in the quality of drinking water especially during intense rainfall events.
[138] Third National Communication 2014.
[139] FAO 2008 Country Report.

| Service | Description of threat to service |
|---|---|
| **Scenic and cultural resources** | Tajikistan's rich culture derives from natural, heritage and spiritual resources. The country has two UNESCO world heritage sites: i) the Tajik National Park in the Pamir Mountains; and ii) the Proto-urban Site of Sarazm, an archaeological site.[140] The ancient Silk Road network of the Central Asian region passes through Tajikistan[141,142], and is a major tourist attraction along with the numerous towns, castles and ruins along the route[143]. The country's scenic and cultural services are threatened by climate change impacts (such as GLOFs, floods, mudflows, landslides and drought) that cause the damage or degradation of natural, heritage and spiritual resources. |
| **Recreation** | Tajikistan's mountainous areas[144,145] host a hiking industry, and a growing tourism sector has supported the establishment of health resorts around the country's natural springs. Tourism has recently become an important sub-sector in the country's economy[146]. In 2016, tourism contributed 8.2% to GDP (equating to US$0.6 billion). The contribution to employment of this sub-sector, including jobs indirectly supported by it, was ~21% of total employment (490,500 jobs)[147]. The dependence of nature-based tourism on natural resources renders recreational services particularly vulnerable to the impacts of climate change. |
| **Science and education** | Tajikistan's natural protected areas are increasingly being used by schools to promote science and ecological research. The GoT recognises that scientific institutions, in partnership with the institutes of higher education, are important for developing research capacities on climate change and environmental science[148]. Public environmental organisations are also playing an important role in environmental protection and education in Tajikistan. There are ~40 registered environmental NGOs in Tajikistan, primarily addressing biodiversity conservation in and around protected areas. Their principal activities include ecological awareness, education, information generation, information dissemination, and research related to biodiversity and protected area development[149]. Climate change impacts — resulting in the degradation of landscapes (within which research sites occur) and the physical damage to infrastructure (e.g. community education centres) and in-field research equipment — negatively impact the country's scientific and educational services. |
| **Spiritual and religious** | Approximately 90% of Tajikistan's population is Muslim[150,151], with the balance comprising several other religions[152]. Despite having been predominantly Muslim since the 10th century, in some communities, traditional, non-Muslim, cultural practices are still held, particularly among the elderly. Ancestors of Tajik people worshipped nature and natural phenomena, and many of these methods are still being practised. In some mountainous regions, animals such as eagles and hawks are considered animal totems, and the elements of earth, water and fire hold particular cultural significance in day-to-day life and ceremonies. For example, fire is used in wedding rituals (fires are burnt near to the groom's house to light the road; the bride jumps over a large fire before entering her husband's house) and rituals for pregnancy and childbirth (a fire is kept burning during pregnancy, childbirth and for the 40 days of the child's life)[153]. Since some aspects of the spiritual/religious services are underpinned by nature, although difficult to quantify, the climate change-induced degradation of natural resources would result in the gradual erosion of these services. |

[140] United Nations Educational, Scientific and Cultural Organisation (UNESCO). 2018. World Heritage Convention: Tajikistan. Available at: https://whc.unesco.org/en/statesparties/tj [accessed 03.07.2018].
[141] including the areas of Penjikent, Khujand, Istarafshan and Gissar
[142] The road splits west of the Pamirs, one branch passing to the north of the Pamirs and the other to the south. See further: UNESCO 2018 World Heritage Convention.
[143] Third National Communication 2014.
[144] near to Dushanbe city (Varzob, Qaratag, Shirkent and Romit gorges), Kuhistan (the Fann mountains, Marghuzor and Alauddin lakes, Iskanderkul) and the Pamir Mountains
[145] Third National Communication 2014.
[146] Ibid.
[147] World Travel and Tourism Council (WTTC). 2017. Travel and Tourism: Economic Impact 2017 Tajikistan.
[148] Third National Communication 2014.
[149] FAO. 2008. Tajikistan: NFP update.
[150] with Sunni Muslim comprising ~85% and Shia Muslim comprising ~5%
[151] Central Intelligence Agency (CIA). 2018. The World Factbook: Central Asia: Tajikistan. Available at: https://www.cia.gov/library/publications/the-world-factbook/geos/ti.html [accessed 03.07.2018].
[152] There are 85 non-Muslim groups registered with Tajikistan's Department of Religious Affairs at the Ministry of Culture.
[153] Advantour. 2018. "Tajikistan Rituals". Available at: https://www.advantour.com/tajikistan/traditions/wedding-rituals.htm [accessed 23.07.2018].

## *Climate change context*

### *Observed climate change*

Tajikistan has experienced a considerable warming of its climate since 1950[154] (Figure 12). The most recent warming trend from 1976 to 2010 averaged ~0.15ºC per decade in winter and spring, ~0.3ºC per decade in summer and ~0.2ºC per decade in autumn. From 2001 to 2010, the country experienced the warmest decade in its history (12)[155]. Average temperatures for the decade were: i) 1ºC above the long-term average in the foothills (0–1,000 m); ii) 0.8ºC above the long-term average in the mid-hills (1,000–2,500 m); and iii) 0.2ºC above the long-term average in the highlands (above 2,500 m).[156]

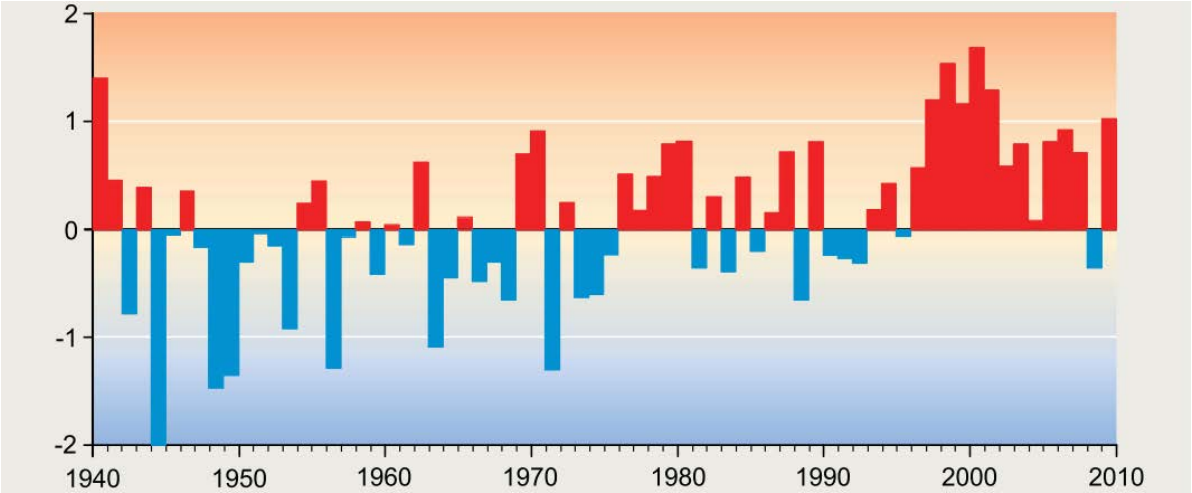



**Figure 12.** Illustration of the annual temperature (ºC) departure from the average long-term norm for the period 1961–1990 in Tajikistan[157].

The temperature changes across Tajikistan have been accompanied by increasingly erratic rainfall (Figure 13) which has resulted in both: i) an increase in rainfall intensity; and ii) longer dry spells.[158] In recent years, the amount of precipitation[159] received across the country has been above the long-term annual average. For example, from 1940–2010, average annual precipitation increased by ~7%. This trend has not been uniformly distributed across the country, with some regions experiencing increases in annual rainfall and others experiencing decreases. Decreases in annual precipitation have been experienced in the following regions:

- mid-hills and highlands of Central Tajikistan;
- valleys of southwestern and northern Tajikistan;
- foothills of Turkestan range;
- highland areas of Eastern Pamir; and
- foothills, mid-hills and highlands of the Khatlon region.

[154] Third National Communication 2014.
[155] State Agency for Hydrometeorology. 2018. Under the Committee for Environmental Protection under the Government of the Republic of Tajikistan Available at: http://www.ijozat.tj/index.php?option=com_content&view=section&id=30&lang=en [accessed 03.07.2018].
[156] Third National Communication 2014.
[157] State Agency for Hydrometeorology 2018.
[158] Ibid.
[159] 'Precipitation' refers to the combined amount of rainfall and snowmelt.

Over the same period, annual precipitation increased in the Rasht and Darvaz regions by 14–18%, the Western Pamir region by 12–17% and in the Fedchenko Glacier by 36%[160].

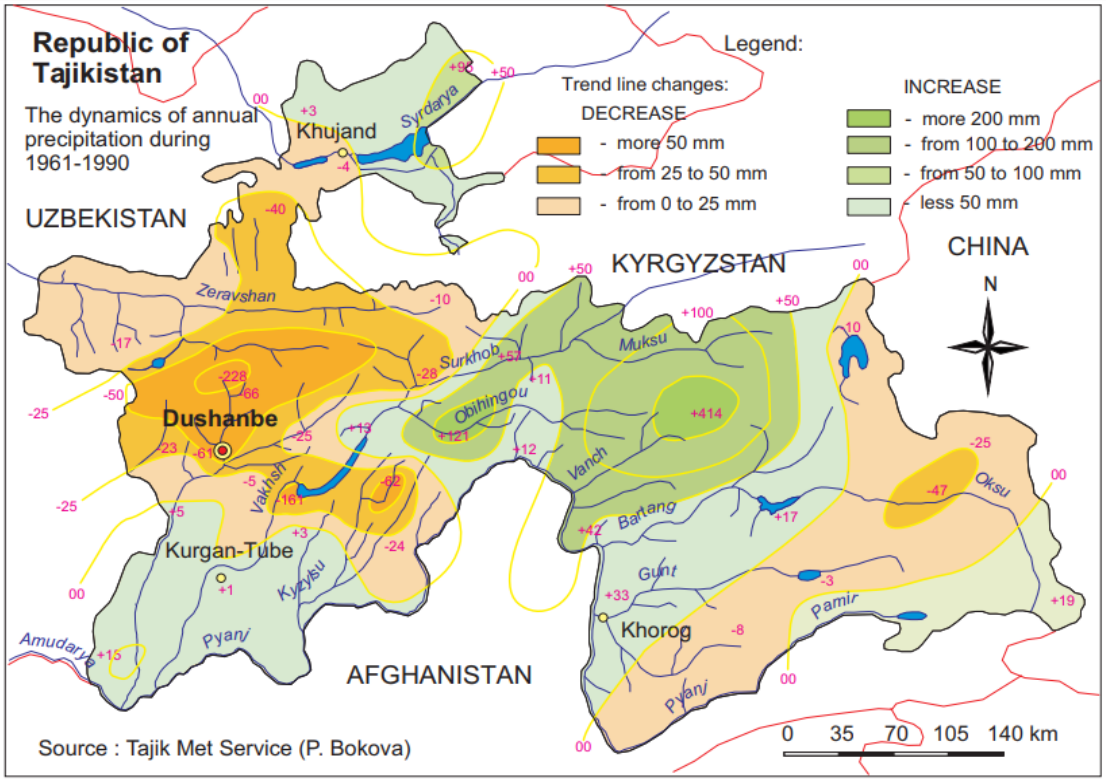



**Figure 13.** Changes of mean annual precipitation observed across Tajikistan during 1961–1990[161].

The number of days with precipitation (hereafter referred to as 'rain days') has decreased across the country since 1961[162]. By contrast, the number of days in which heavy precipitation events have occurred have increased[163]. The decrease in rain days coupled with the increase in heavy precipitation events equates to an increase in rainfall intensity in Tajikistan[164].

Fewer rain days and increased temperatures have resulted in a greater incidence of intense dry spells across Tajikistan[165]. In the major crop-growing regions, droughts that impact yields by at least 20% have been increasing in frequency over the past decade. Currently, these droughts occur once in every[166]:

- 3 years in south and south-east Tajikistan, Danghara, Kulyab, Bokhtar, Kabodiyon and Shaartuz regions;
- 4 years in the Eastern Tajikistan region; and
- 5 years in the North-Tajikistan region.

[160] NAPCC 2003.
[161] Third National Communication 2014.
[162] Ibid.
[163] Kayumov 2016 Glaciers resources of Tajikistan.
[164] Third National Communication 2014.
[165] World Food Programme (WFP). 2017. Climate Risks and Food Security in Tajikistan: A Review of Evidence and Priorities for Adaptation Strategies.
[166] The Food and Agriculture Organisation of the United Nations (FAO). 2017. Drought Characteristics and Management in Central Asia and Turkey. FAO Water Report 44: Policy Support and Governance.

Severe droughts – those that reduce average crop yields by at least 50% – have been observed once in every[167]:

- 4–5 years in the Bokhtar, Kabodiyon, Vakhsh and Shaartuz regions;
- 6–8 years in the Danghara, Kulyab, Temurmalik, Baljuvon, Vose and Balkhi regions;
- 9–11 years the in Devashtji, Spitamen and Istaravshan regions; and
- 12–15 years in the Kanibadam Asht and Isfara regions.

### *Climate risks, impacts and vulnerabilities*

As noted previously in this document, Tajikistan is the most vulnerable country to climate change in Central Asia[168]. This vulnerability is attributed to the country's: i) weak social structures; ii) low adaptive capacity; ii) underdeveloped infrastructure; iv) low-income insecurity; v) poor service provision; vi) strong dependence on agriculture; and vi) institutional constraints. Losses from natural hazards currently amount to ~20% of the country's GDP[169] and climate change impacts are predicted to increase the frequency and magnitude of such losses. In the future, loss amounts are expected to rise from ~US$50 million in 2014 to ~US$132 million by 2030[170] (Table 3).

**Table 3.** Total countrywide damages caused by climate change and extreme climate events[171].

| Risks and hazards | Total damage countrywide | | | |
|---|---|---|---|---|
| | **2014** (US$) | **2030** (US$) | **Increase** (US$/year) | **Increase** (%) |
| Rise in temperature | 22,230,000 | 42,210,000 | 19,980,000 | 90 |
| Drought | 22,230,000 | 42,210,000 | 19,980,000 | 90 |
| Pasture degradation | 4,131,000 | 41,310,000 | 37,179,000 | 900 |
| Mudflows | 432,000 | 2,331,000 | 1,899,000 | 440 |
| Intense precipitation | 342,000 | 531,000 | 189,000 | 55 |
| Water logging | 324,000 | 504,000 | 180,000 | 56 |
| High water and flooding | 144,000 | 2,313,000 | 2,169,000 | 1,506 |
| Gusty winds | 144,000 | 144,000 | 0 | 0 |
| Decrease in air temperature/freezing | 126,000 | 126,000 | 0 | 0 |
| Duration of snow cover | 90,000 | 90,000 | 0 | 0 |
| Landslides | 63,000 | 540,000 | 477,000 | 757 |
| Agricultural insects and pests | 63,000 | 630,000 | 567,000 | 900 |
| Dust storms | 45,000 | 45,000 | 0 | 0 |
| Avalanches | 27,000 | 270,000 | 243,000 | 900 |

Negative effects of climate change on the Tajik population include: i) glacial and permafrost melt; ii) increased rainfall intensity; and iii) longer and more frequent dry spells.[172] Together, these effects have increased the rate of topsoil erosion, threatening the food, water and energy security of the country[173]. Approximately 33% of all agricultural losses in the country are currently

[167] FAO 2017 Drought Characteristics and Management.
[168] WFP 2017 Climate Risks and Food Security.
[169] Ibid.
[170] National Climate Change Adaptation Strategy Tajikistan: Building Capacity for Climate Resilience (NCCAS). 2016. Asian Development Bank (ADB) and the Government of Tajikistan (GoT). Draft prepared by Abt Association with the GoT Committee of Environmental Protection (CEP).
[171] United Nations Development Programme (UNDP). 2014. Central Asian Multi-Country Programme on Climate Risk Management (CA-CRM). Regional Project Document. Atlas Award ID 59476.
[172] UNDP 2014 CA-CRM.
[173] Third National Communication 2014.

attributable to climate change and variability[174]. Furthermore, it has been projected that crop yields in Tajikistan will decrease by an additional 5–30% by 2050, with the potential for severe negative impacts on the country's economy[175].

Glacial melt poses a particularly large risk to the population of Tajikistan, currently averaging ~2 $km^3$ per year and leading to meltwater flows which often result in large-scale sheet and gully erosion[176]. Further negative impacts of meltwater flows include high frequency, low–medium impact hazards (such as extreme river flows and flooding, mudflows and landslides), and low frequency, high impact hazards (such as GLOFs) [177]. These low frequency, high impact hazards are particularly problematic because they are likely to trigger multiple other hazards, such as flash floods and landslides, as well as aggravate the scale and magnitude of such hazards. The impacts of flooding, mudflows, landslides and other hazards have resulted in considerable economic damages and losses of life across Tajikistan. Such damages and losses of life are particularly marked in the KRB (Table 4).

**Table 4.** Economic damages as a result of climate hazards occurring within the Kofirnighan River Basin, including number of events occurring from 1998–2014 and losses in life[178].

| **Climate hazard** | **Number of events** (occurring from 1998–2014) | **Economic damages** (US$) | **Loss of life** (no. of people) |
|---|---|---|---|
| Flooding | 31 | 5,577,682 | 0 |
| Mudflows | 98 | 191,898,148 | 38 |
| Avalanches | 8 | 326,808 | 8 |
| Landslides and rockfalls | 39 | 138,115 | 3 |
| Drought | 17 | 3,359,363 | 0 |
| Earthquakes | 83 | 1,37,017 | 0 |
| **Total** | **276** | **202,437,132** | **49** |

The negative impacts described above have been exacerbated by increasingly erratic rainfall. Floods and droughts caused by such erratic rainfall directly impact water quality and quantity across the country, and have also contributed to topsoil erosion[179]. The increasing rate of topsoil erosion is a threat to Tajikistan's food, water and energy security, which impacts the livelihoods, health and wellbeing of the population with regards to: i) food production, whereby decreasing soil fertility is reducing crop and livestock productivity; ii) water supplies, whereby the siltation of rivers is further contributing to declining water quality; and iii) energy security, whereby damage from silt to turbines in hydropower plants and reservoirs is reducing the efficiency of hydropower generation.

The KRB has been identified as a region within Tajikistan that is particularly vulnerable to the impacts of extreme climate events, with almost 200 communities living in the basin experiencing severe negative impacts[180,181]. All four of Tajikistan's agro-ecological zones are represented

[174] National Human Development Report (NHDR). 2012. Tajikistan: Poverty in the Context of Climate Change. United Nations Development Programme (UNDP), Dushanbe.
[175] Third National Communication 2014.
[176] Jacob P. 9 October 2016. "Global warming imperils Tajikistan's landscape". Aljazeera. Available at: https://www.aljazeera.com/news/2016/10/global-warming-imperils-tajikistan-landscape-161009175837236.html [accessed 03.07.2018].
[177] WFP 2017 Climate Risks and Food Security.
[178] Committee for Emergency Services (CoES). 2018. Statistical damages data for 1998–2014. Provided by the UNDP DRMP.
[179] Ibid.
[180] Hydromet 2018 Assessment of KRB, Unofficial document.
[181] Further information concerning the KRB's vulnerability to extreme climate events is presented under 'Climate change context'.

within the KRB as a result of the considerable altitudinal variation from south to north[182]. This altitudinal variation also results in the KRB being vulnerable to a wide range of climatic hazards, including both sudden-onset and slow-onset climate events, such as GLOFs and droughts, respectively. Communities in the KRB are frequently exposed to such extreme climate events. Flooding and landslides pose the greatest threats to these communities, with flooding seasons differing between upper, middle and lower reaches of the KRB. Upstream reaches experience floods from April to June, the middle reaches from March to May, and the downstream reaches from February to May. Because of the longer season in the downstream areas, the risk of flooding and landslides is much greater for these communities[183].

Six districts within the KRB have been identified as the most vulnerable to the impacts of climate change. These are the: i) Vakhdat, Faizobod and Varzob districts in the north; and ii) Nosiri Khusrav, Kabodiyon and Shaartuz districts in the south.[184] Many of the households in these districts are located in hazardous areas and experience a number of climate-related threats and disaster events including: i) floods; ii) mudflows; iii) landslides; iv) rockfalls; and v) avalanches[185]. In addition to increased exposure to climate-related threats, these are all rural communities with limited adaptive capacity because of their dependence on agriculture for livelihoods, and limited opportunities for alternative income. About one-third of the agricultural losses in Tajikistan are currently attributable to climate change and variability[186], meaning that communities in the KRB who rely on agriculture for income are extremely vulnerable to the current and future impacts of climate change.

The impacts of climate change are likely to be different in the northern sub-basin of the KRB to those in the southern sub-basin. Rural communities in the Vakhdat, Faizobod and Varzob districts are expected to become increasingly exposed to hydrometeorological hazards such as increased flooding, landslides and GLOFs. In particular, the steep terrain in these areas increase the likelihood of sudden onset multi-hazard risks, such as landslides occurring directly after a GLOF or similar flooding event. Concomitantly, watersheds in the northern sub-basin are frequently degraded as a result of unsustainable land-use practices that increase the likelihood and impact of the above-mentioned risks. Such unsustainable practices also increase the rate of erosion and soil loss, which compromises agricultural productivity in these regions and increases flood risk in downstream areas.

Communities in the Nosiri Khusrav, Kabodiyon and Shaartuz districts, conversely, are increasingly exposed to slow onset hazards such as drought and river bank erosion. In these areas, water availability is the greatest threat to livelihoods. Water availability is limited by poorly functioning irrigation supply infrastructure. This infrastructure is being damaged by: i) high levels of sedimentation from water-borne and wind-borne sediment; and ii) floods in the Kofirnighan River that damage irrigation dams and canals. Floods in the Kofirnighan River also cause riverbank erosion that results in the loss of arable land.

### *Future climate projections and scenarios*

[182] Tajikistan's agro-ecological zone are classified according to elevation, with the lower zones (1 and 2) primarily being used to grow irrigated crops such as cotton and sub-tropical fruit. Zones of higher elevation (3 and 4) are primarily rain-fed agriculture and used primarily for pasture land and for growing wheat, barley and lucerne.
[183] Hydromet 2018 Assessment of Kofirnighan River Basin.
[184] Fergana Valley WRM 2018 KRBMP Unpublished.
[185] Further information concerning district-specific vulnerability to extreme climate events is presented under district descriptions.
[186] NHDR 2012 Tajikistan: Poverty in the Context of Climate Change.

Climate models, developed during the preparation of the Third National Communication, project a number of negative impacts from climate change[187,188]. Specifically, rising temperatures and an increase in intensity of rainfall events have been predicted (Figure 14).

Average temperatures in Tajikistan are projected to increase by 2.9°C by 2050[189]. By the end of the 21st century, temperatures are projected to further increase in the: i) southern districts of the country (including the districts of Nosiri Khusrav, Kabodiyon and Shaartuz); ii) mountains of central Tajikistan (including those in the KRB); and iii) the mountains of the western Pamir.[190] In addition, diurnal temperature ranges and the occurrence of heat waves are predicted to increase, most notably in the country's southern lowlands. These temperature changes will exacerbate glacial and permafrost melt[191]. Glacial cover is projected to reduce by 15–20%, with most small glaciers predicted to disappear in 30–40 years. Ultimately, it is expected that reduced glacial cover will reduce the renewable water resources of Tajikistan.

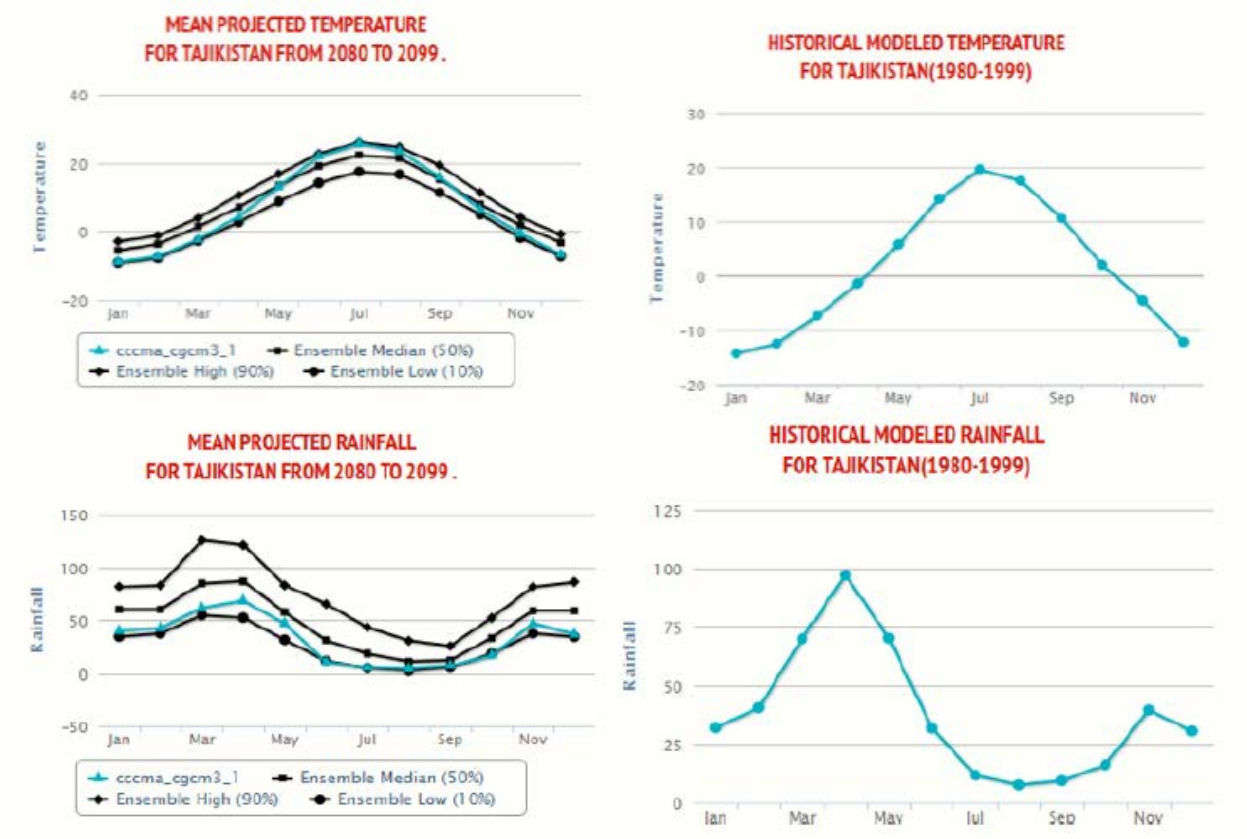



**Figure 14.** Projected mean temperature and rainfall for 2080–2099 against historically-modelled data for 1980–1999[192].

[187] The climatic models used were the CCSM3, ECHAM5 and CSIRO.
[188] WFP 2017 Climate Risks and Food Security.
[189] Third National Communication 2014.
[190] Ibid.
[191] Dusik J & Sheraliev B. 2016. Strategic framework for developing and prioritizing climate change adaptation initiatives in the agricultural sector in Tajikistan. Technical Report. Research Gate.
[192] WFP 2017 Climate Risks and Food Security.

No significant change in mean annual precipitation is predicted by 2050 in Tajikistan[193]. However, precipitation patterns will continue to change, resulting in[194]:

- an increased variation in maximum and minimum precipitation levels;
- wetter summers and drier winters, causing both flooding and prolonged periods of drought; and
- an increased rainfall intensity.

These climatic changes will have negative impacts on climate-sensitive sectors, including agriculture, water, energy and transport. For example, a decrease in dry-season water availability will adversely affect the agricultural sector, which in turn increases the risk of food insecurity in the country. Decreasing water availability is also likely to result in a climate change-induced migration of farmers to areas with improved water access. This shift in the population would result in an increase in the number of people living in areas exposed to extreme climate events such as floods and landslides[195]. It is predicted that by 2050, ~77% of the country population will be living in areas with considerable exposure to extreme impacts of climate change[196].

Climate change has had negative and lasting impacts on different sectors in Tajikistan. An overview of these impacts on the agricultural, water, energy and transport sectors is provided in the sub-sections below.

Agriculture

The predicted decrease in agricultural yields as a result of decreasing water availability and soil loss will directly impact ~2 million people in Tajikistan[197]. Agricultural yields are predicted to decline by as much as 30% by 2100[198], which is likely to result in rising food costs[199,200]. This will cause an increase in poverty levels and a decline in food security in the country[201].

Coupled with a decrease in water availability, increasing temperatures will result in greater crop evapotranspiration rates. Farmers will consequently need to alter their planting and harvesting practices to accommodate longer growing seasons while managing reduced water availability for agriculture use[202]. Reduced water supplies in the drier regions of the country are expected to result in major economic losses for farmers[203].

Water and energy

Tajikistan's energy production and transmission are predicted to be negatively impacted from changes to precipitation regimes[204]. Energy and water systems are interconnected and therefore

[193] Dusik & Sheraliev 2016 Strategic framework for developing and prioritizing climate change adaptation.
[194] WFP 2017 Climate Risks and Food Security.
[195] NCCAS 2016.
[196] World Bank (WB). 2013. Tajikistan – Overview of Climate Change Activities. World Bank. Washington, DC.
[197] WB 2013 Tajikistan – Overview.
[198] Schellnhuber HJ, Reyer C, Hare B, Waha K, Otto IM, Serdeczny O, Schaeffer M, Schleußner CF, Reckien D, Marcus R & Kit O. 2014. Turn down the heat: confronting the new climate normal. The World Bank. Washington, DC.
[199] Heltberg R, Reva A & Zaidi S. 2012. Tajikistan: Economic and Distributional Impact of Climate Change. World Bank Knowledge Brief #50. World Bank. Washington, DC.
[200] World Health Organisation (WHO) Europe. 2009. Protecting health from climate change in Tajikistan. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).
[201] NCCAS 2016.
[202] Ibid.
[203] Ibid.
[204] Ibid.

any changes in precipitation amounts[205] or an increased drought risk has the potential to adversely affect energy production and supply to the population. For example, changes in river flow and increasing erosion are likely to impact hydroelectric production capacity, while reduced availability of water is likely to increase energy costs for pumping water[206].

Transport

Farmers and pastoralists in Tajikistan will be further negatively affected by climate change impacts on the transport sector[207]. Roads and railways are predicted to be damaged and/or washed away as a result of more frequent and severe flooding events. Increases in the rate of erosion and landslide frequency are also expected to result in both transport blockages and increased maintenance costs for road infrastructure. The continued rise in temperatures is also predicted to damage the surface material of roads resulting in temporary or permanently blocked transport routes[208].

### *Adaptation gaps in Tajikistan*

Currently, there are a number of gaps that hinder the effective implementation of climate change adaptation in Tajikistan. Many of these gaps are related to limited institutional and technical capacity for the implementation of adaptation projects to develop the climate-resilience of Tajikistan communities.

Importantly, there is no targeted, national climate change adaptation policy in place in Tajikistan. The two primary national strategies that guide development in the country currently do not include climate change and adaptation. These strategies are the 'National Development Strategy for the Republic of Tajikistan for the period up to 2030' (NDS)[209] and 'Mid-term Development Programme 2016–2020' (MTDP)[210,211]. To address this gap, development of the National Climate Change Adaptation Strategy Tajikistan (NCCAS)[212] began in 2016 with a focus on building capacity within the country for climate resilience. The NCCAS is currently in draft form and has yet to come into effect, however the strategy preliminarily highlights the following as focal points[213]:

- existing laws, regulations, and codes on environmental protection, energy, drinking water supply, construction, and disaster risk management do not incorporate climate change; and
- policy, strategy, and legislative environments do not incentivise governments to reduce vulnerability and pursue adaptation measures.

In additional to the NCCAS, the Agricultural Reform Programme for 2012–2020[214] lists 'developing agricultural technologies for climate-change adaptation and resilience' as one of 22 specific objectives in Tajikistan[215]. However, there is little acknowledgement of climate change

[205] including from a reduction in snowpack as well as increased variation in snowmelt timing
[206] NCCAS 2016.
[207] Ibid.
[208] Ibid.
[209] National Development Strategy for the Republic of Tajikistan for the period up to 2030 (NDS). 2016. Republic of Tajikistan, Dushanbe.
[210] NDS 2016.
[211] Poverty Reduction Strategy for the Republic of Tajikistan for 2010–2012 (PRS). 2010. Republic of Tajikistan, Dushanbe.
[212] NCCAS 2016.
[213] Ibid.
[214] Agricultural Reform Programme for 2012–2020 of the Republic of Tajikistan. 2012. Ministry of Agriculture, Government of Tajikistan.
[215] World Health Organisation (WHO). 2012. Policy – Program on Agricultural Reform 2012–2020/Program of Reforming of Agriculture of the Republic of Tajikistan for 2012–2020. Global Database on the Implementation of Nutrition Action (GINA). Available at: https://extranet.who.int/nutrition/gina/en/node/14962 [accessed 11.07.2018].

challenges in other sectoral policies, including water and health. This limited mainstreaming is compounded by a lack of clear, institutional responsibilities and governance for land and water management at a catchment level. The absence of a cross-sectoral approach to climate change adaptation poses a significant barrier to integrated, landscape-level, adaptive planning.

In 2015, the GoT took steps to shift towards managing water resources according to hydrographic rather than administrative boundaries[216]. The Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme) aims to promote the implementation of Integrated Water Resources Management (IWRM) at the basin level. Through the programme, River Basin Organisations (RBOs) and River Basin Councils (RBCs) will be established in each of the six identified basins in the country, as well as in sub-basins, where required. RBOs will mainly be responsible for: i) planning the use and protection of water resources annually and in the long-term; and ii) monitoring the distribution of water as well as the state of rivers. Concurrently, RBCs will mainly be responsible for reviewing the plans developed by the RBOs and managing interactions with stakeholders such as water users and Water User Associations (WUAs). RBOs are expected to become operational in 2019, with the GoT being expected to allocate ~US$160,000 annually towards the operation of RBOs and RBCs. While the Water Reform Programme is likely to modernise water management in Tajikistan, it does not adequately consider the impacts of climate change on the water sector. While climate change impacts are acknowledged to impact water resources, the extent of these impacts is not well understood – particularly at the river basin level. Furthermore, the focus of the Water Reform Programme is restricted largely to water resources management and does not adequately consider the impacts of multiple hazards at the river basin and watershed level. While flood management will be the responsibility of RBOs, other climate-linked hazards such as erosion and landslides are not addressed through the programme[217].

The latest version of the PRS, the 'Living Standards Improvement Strategy of Tajikistan for 2013–2015' (LSIS)[218], is one of the first non-ecological strategy documents to acknowledge climate change as a threat to development in the country. This acknowledgement has been in response to the reliance on agricultural productivity and disaster risk information from previous hydrometeorological events, including glacial melt. The most recent NDS, for the period 2016–2030[219], reflects the significance of climate change as a barrier to achieving the desired development goals for the country by 2030.

Climate change expertise currently only exists within a limited number of institutions in Tajikistan, most notably the State Agency for Hydrometeorology (Hydromet) of the Committee for Environmental Protection (CEP). Within these institutions, specialists have either specific skills (e.g. meteorologists, hydrologists) or broader knowledge (e.g. environment, water management) related to climate change and its impacts. As a result, the staff employed by these institutions do not have the technical capacity to recognise the need for climate change adaptation and implementing necessary measures for it.

During the Soviet era, these research institutions were staffed by qualified and trained international and regional scientists. However, since the early 1990s, climate and agricultural

[216] Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme). 2015. Resolution of the Government of the Republic of Tajikistan. Unofficial translation.
[217] Water Reform Programme 2015.
[218] Living Standards Improvement Strategy for the Republic of Tajikistan for 2013–2015 (LSIS). 2013. Republic of Tajikistan, Dushanbe.
[219] NDS 2016.

research in Tajikistan has been critically underfunded which has resulted in limited scientific capacity. Salaries in research are poorly remunerated and financial research resources are limited[220]. The former capacity building and reward systems that functioned under the Soviet Regime are no longer in place, while the existing culture of centralised decision-making limits initiative and innovation.

An additional problem facing research in the country is that limited incentives and strong hierarchical barriers have reduced the recruitment of young research scientists. As a result, most research staff are nearing retirement age. Furthermore, limited contact with the international scientific community, and limited English language skills, have resulted in a technology lag which, in turn, has prevented scientists from keeping abreast of scientific advances. Indeed, only recently have initiatives such as the University of Central Asia (UCA) and the Central Asia and the Caucasus Association of Agricultural Research Institutions (CACAARI) have been established in Tajikistan. A brief description of each of these initiatives is outlined below.

- The **UCA** is an internationally chartered not-for-profit secular institution. It was formed as a partnership between the governments of Kazakhstan, the Kyrgyz Republic and Tajikistan under the sponsorship of the Aga Khan Development Network (AKDN). Founded in 2,000, its first campus opened in 2016 in Naryn, Kyrgyzstan and offers five-year undergraduate programmes in Computer Science (BSc) and Communications and Media (BA). In 2017 the Khorog Campus in Tajikistan was opened, offering five-year undergraduate programmes in Earth and Environmental Sciences (BSc) and Economics (BA).
- The **CACAARI** was established in 2,000 when leaders of the eight National Agricultural Research Systems (NARS) came together under the aegis of the Consultative Group on International Agricultural Research (CGIAR) Central Asia and the Caucasus (CAC) Program facilitated by the International Centre for Agricultural Research in Dry Areas (ICARDA). The purpose of the organization is to facilitate regional cooperation in agricultural research for development by providing a neutral platform where ideas and experiences can be shared. Moreover, the association acts as a two-way communicative mechanism, supporting information flow between global organizations and local partners. The membership is open to research institutions, universities, NGOs and farmer associations located in Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan[221].

## Non-climatic problems

There are a number of non-climatic environmental challenges in Tajikistan that are exacerbating vulnerability to climate change. Such challenges include land degradation, which is compromising and poor water supply[222]. Following the collapse of the Soviet Union in 1991, previously collectivised farms were divided. The disruptions following this division put pressure on Tajik farmers who had become accustomed to collective structures and living within *avlods*[223]*.* There are now few associations or institutions which support individual farmers, as most present-day state and collective farms work with groups of *dehkan*[224] farmers. A country-wide organisation

[220] Central Asian Countries Initiative for Land Management Multi-Country Support Project (CACILM). 2009. Research Prospectus: A Vision for Sustainable Land Management Research in Central Asia. Sustainable Agriculture in Central Asia and the Caucasus. Regional Office of ICARDA for Central Asia and the Caucasus.
[221] CACAARI. 10 February 2017. Meeting of the GFARC Steering Committee. Available at: http://www.cacaari.org [accessed 23.07.2018].
[222] World Bank Group (WBG). 2008. Tajikistan: Country Environmental Analysis. Washington, DC.
[223] an extended patriarchal family that serves as an informal mutual support structure
[224] A *dehkan* farm is a term for an individual or family farm in Central Asia.

exists to provide support to the *dehkan* farmers, but small-scale farmers do not benefit significantly from this.

Unsustainable land management practices in Tajikistan – including overgrazing and overploughing on steep slopes – have resulted land degradation, which has been characterised by the reduced productivity of agricultural lands and pastures[225]. These unsustainable land management practices have also compromised the supply of water to the population of Tajikistan, specifically by increasing erosion. Accelerated erosion has resulted in an increase in suspended solid material in the Kofirnighan River. This negatively impacts water supply, as suspended solids damage pumps and other water supply infrastructure. These damages increase the treatment costs for producing potable, industrial and irrigation water.

In addition to damaging water supply infrastructure, suspended solids also increase the downstream flood risk. When suspended solids settle out of suspension, they reduce the capacity of the river channel and increase the likelihood and extent of flooding. Other negative water quality impacts are currently being experienced as a result of agricultural practices in the KRB. Fertiliser and other agricultural inputs are washed from agricultural land and into streams and rivers. These inputs are commonly nutrients, which cause downstream eutrophication of water bodies. Nutrients may also reduce the suitability of water for human consumption – in particular, nitrates in fertiliser may be converted into toxic nitrites. Climate change is expected to exacerbate the negative impacts of agriculture on surface water quality in Tajikistan. This is because the use of agricultural inputs is likely to increase as increased rates of erosion negatively impact soil fertility.

Further to the above-described unsustainable land management practices, the quality and quantity of water in Tajikistan has been affected by deforestation. Firstly, and as with overgrazing and overploughing, deforestation has caused increased erosion in several river basins in the country, including in the KRB. Trees are important for sustaining ecosystem functions in the following ways: i) the high infiltration rate in forests reduces the incidence of surface runoff and reduces erosion transport; and ii) the binding effect of tree roots enhances slope stability, which reduces erosion. Hence, with deforestation, these ecosystem functions are being compromised. Secondly, deforestation has also impacted river flows in Tajikistan and within the KRB. Because trees regulate river flows (specifically through promoting transpiration and infiltration), deforestation in Tajikistan has led to water deficits (droughts) during the dry season and water excesses (floods) during the wet season. With the combined effects of erosion and compromised river flows, deforestation is severely impacting the hydrological functioning in the KRB as well as in river basins throughout Tajikistan.

## Problem statement

The problem to be addressed by the proposed project is that the livelihoods of small-scale rural farmers and pastoralists in the Kofirnighan River Basin (KRB) of Tajikistan are being negatively affected by climate change. Rising temperatures and extreme climate events, including floods and droughts, are resulting in: i) damages to crops; ii) increased rates of soil erosion and concomitant declines in agricultural productivity; and iii) damages to properties and infrastructure. These effects are greatly exacerbated by a baseline situation of unsustainable management of land and water resources in the KRB. Future prospects for rural communities in this river basin are limited, with their livelihoods expected to be further threatened as climate change impacts intensify, making sustainable management of their natural resources increasingly challenging.

[225] WBG 2008 Tajikistan: Country Environmental Analysis.

## Alternative solution and barriers

### *Preferred solution*

The preferred solution would be for the small-scale farmers and pastoralists within the KRB of Tajikistan to become resilient to climate change impacts. This would be achieved by developing and then implementing a climate-resilient catchment management strategy for the KRB, which will enhance the provision of ecosystem services in the river basin. Such a strategy would promote a wide range of new approaches, including: i) long-term planning at the river basin scale, informed by integrated catchment management principles; ii) explicit consideration of the trends, risks and impacts of extreme climate events and their interactions in catchments of various scales iii) consideration of all landscapes (i.e. urban, pastoral, agricultural as well as conservation areas) within the KRB; iv) the use of ecosystem goods and services under climate change conditions to support climate-resilient livelihoods; v) ecosystem-based adaptation (EbA) interventions, including watershed rehabilitation and sustainable management of all natural resources; and vi) the development of appropriate adaptation responses by communities and relevant public services for both sudden- and slow-onset climatic events.

### *Barriers*

Barriers to implementation of the above solution within the KRB include: i) a lack of coherent climate risk information coupled with limited knowledge sharing within the country; ii) weak institutional structures for developing integrated catchment management strategies; iii) limited technical capacity of public services to promote climate change adaptation among communities; and iv) limited knowledge among communities of the benefits of EbA. The activities within the project are designed to overcome these barriers and are detailed in Part II[226].

**Barrier 1. Lack of systematic production, collection and sharing of climate risk information.** A wide range of projects and programmes have been conducted in river basins across Tajikistan, which have assessed the impact of various environmental and socio-economical factors on the population. However, most of these initiatives have not accounted for climate change and its associated risks, resulting in these risks not being included in basin-level planning and management.

Furthermore, the current sectoral approach in governance has resulted in insufficient information on climate risks (particularly advisories) being shared between sectors. This has resulted in development initiatives being unable to contribute to the building of Tajikistan's climate resilience. For example, a management plan is in development for the KRB[227], but does not take an integrated approach to landscape planning and will not include climate risk projections.

The relevant climate information authority in Tajikistan, Hydromet, also lacks the necessary capacity to measure and collect climate risk information. In the KRB, three of the major hydrological stations[228] have been identified as having poor performance, with equipment that is outdated and poorly maintained. This limitation has resulted in communities in the KRB not receiving advanced climate risk information on events such as flooding or landslides.

[226] Part II: A, where details on the project components, outcomes, outputs and activities are provided.
[227] The KRBMP is being developed by Fergana Valley Water Resources Management and is to be completed in 2019. Further details are presented in the environmental context sub-section.
[228] These three stations are the Tartki and Chinar on the Kofirnighan River and Romit on the Sardai-Miyona River.

An additional limitation is that all information and data being generated on climate and climate change in the country are not currently being housed in a secure and accessible information centre. Although centres for storing such information do exist in Tajikistan in the form of hubs or platforms, the population and relevant institutions are not being appropriately informed of the services provided by such centres. Relevant centres include the Open Centre being hosted by the Department of Geology and an information centre being established by the Ministry of Water and Energy. These centres are still in a nascent stage, with a limited capacity for cross-sectoral information sharing. As a result, information on climate risks is not available on a central, readily accessible platform.

With the limited sharing of existing knowledge within the country on climate change risks, there is a significant gap in available knowledge on appropriate adaptation interventions. Specifically, rural Tajik communities have limited or no access to information on climate risks and appropriate adaptation practices.

**Barrier 2. Limited institutional capacity to include climate change adaptation into river basin management plans and policies, and to apply catchment management approaches to climate risk reduction.**

Integrated land and water resource management is particularly relevant under climate change conditions and the associated increase in climate risks. This is because upstream land uses, such as agriculture, affect downstream risks, such as flooding. These interactions between land use and climate risks are complex and not well understood in Tajikistan. This is particularly true for a topographically diverse basin such as the KRB, where both steep mountainous regions and arid lowlands occur. The basin is affected by multiple climate risks but lacks an integrated catchment management approach for the management of such risks.

While a river basin management plan is currently being developed for the KRB under the Water Reform Programme, this management plan will focus on water resources management. Cross-sectoral management of land and water resources as well as multi-hazard climate risk management will not be covered by the proposed basin management plan. Consequently, the RBOs and RBCs that will be established in the northern and southern KRB sub-basins will not be capacitated to plan for the implementation of integrated climate-resilient practices at the basin, sub-basin and watershed scales.

**Barrier 3. Limited technical capacity of local government to implement adaptation activities that promote climate resilience within local communities.**

Local government authorities in the KRB currently lack the knowledge and expertise to monitor extreme climate events, transmit early warning information and take adequate and appropriate response measures to manage climate risks. This limitation results in local KRB communities receiving minimal training and information on climate change adaptation. In particular, public services from local government that provide climate advisories, agricultural extension services and livestock health services do not take climate risks into account. The end result is that local communities: i) are not being regularly updated on local, regional nor international best practices for reducing the impacts of climate change; and ii) are not being made aware of climate risks in time to take adequate action.

**Barrier 4. Limited knowledge among communities of livelihood benefits from implementing climate risk reduction and EbA measures.**

Farmers and pastoralists in Tajikistan have had limited exposure to EbA and its benefits for reducing the impacts of climate change as well as improving livelihoods. This is particularly true for communities in the KRB, where there have been limited climate change projects and initiatives.

Consequently, KRB rural community members do not have the technical capacity to implement EbA interventions and are also not incentivised to do so. Because of this limitation in climate change projects and initiatives within the KRB, communities have not been exposed to demonstration plots that showcase the benefits of EbA activities for improving climate resilience. It is also unlikely that rural community members in KRB will autonomously implement EbA interventions because farming practices in the country have shown limited innovation since the end of the Soviet era.

*Project Objective:*

The objective of the proposed project is to enhance the livelihoods of the small-scale farmers and pastoralists living in the Kofirnighan River Basin under future climate change conditions. Such conditions are expected to include increased frequencies and intensities of extreme climate events such as intense rainfall, flooding and droughts. Three interrelated outcomes within the project (detailed in Part II[229]) will contribute to achieving this objective, namely: i) catchment management strategy to manage climate risks operationalised at *raion* and *jamoat* levels in the KRB; ii) an integrated approach to building the climate resilience of agro-ecological landscapes operationalised at a village level; and iii) existing knowledge management platforms supported for integrated catchment management and EbA.

The overarching approach of the project is to employ integrated catchment management within the KRB. To this end, a climate-resilient catchment management strategy will be designed for the basin which will enable national rural development planners, local government and local communities to manage a wide range of climate risks. As noted in the introduction of this document, this strategy will be underpinned by the following concepts and principles:

- climate change can cause or exacerbate multiple hazards (e.g. GLOFs, floods, mudflows, landslides, soil erosion and drought), all of which need to be taken into account when designing adaptation measures;
- management of climate risks needs to be tailored for a particular spatial scale (e.g. catchment or watershed);
- there are complex upstream-downstream interactions (involving flooding and erosion processes) that need modelling before effective adaptation interventions can be designed;
- long-term development planning for the KRB will require careful consideration of the multiple hazards associated with climate change;
- a cross-sectoral approach, which takes linkages between sectors (e.g. agriculture, conservation, energy and water) into account, is required for effective adaptation;
- a landscape approach that considers urban environments, rural villages, agricultural fields and all ecosystems (forests, pastures) is critical for managing climate risks in the long-term; and
- adaptation in the KRB will require considerable investment in EbA interventions that increase the supply of critical ecosystem goods and services under conditions of climate change.

With regards to the project's implementation of EbA within the KRB, communities will be trained on EbA interventions for managing pastoral, forest and agricultural landscapes at a watershed scale under climate change conditions. These interventions will follow the principles of sustainable land management (SLM) and climate-smart agriculture (CSA) wherever applicable. The training will be targeted, in particular, at the *raion* (district) and *jamoat* (sub-district) levels. In so doing, the project will enhance support services to villages and enable participatory, local-level planning.

[229] See Part II: A, which gives a project overview and details the components, outcomes, outputs and indicative activities of the project design.

The lessons learned from the project will enable a policy and investment framework to be developed for replicating and scaling up EbA interventions across the country. Existing knowledge management platforms and hubs will be used for promoting this replication and upscaling.

Each of the proposed project's activities have been designed to address the climate change problem described in Part II[230], and to contribute to overcoming the barriers described above.

*Project Components and Financing*

The duration of the project is proposed to be five years (60 months) beginning in 2020 and ending in 2024.

Table 5 presents the proposed components, expected outcomes, concrete outputs and indicative activities of the project, which are further detailed in Part II[231]. During the development of the Full Proposal, the activities were outlined to ensure their alignment with national target areas. A detailed breakdown of costings per activity is provided in Part III[232].

**Table 5.** Project components, expected outcomes and an outline of concrete outputs, with component-level grant amounts.

| **Project Components** | **Expected Outcomes** | **Expected concrete Outputs** | **Amount** (US$) |
|---|---|---|---|
| 1. Integrated catchment management to build climate resilience. | 1. Catchment management strategy to manage climate risks operationalised at *raion* (district) and *jamoat* (sub-district) levels in Kofirnighan River Basin (KRB). | 1.1. Multi-hazard climate risk models developed for target watersheds in the KRB. | 1,012,000 |
| | | 1.2. Support provided for establishing automated weather stations in Kofirnighan River Basin watersheds. | |
| | | 1.3. Integrated catchment management strategy developed for the KRB. | |
| | | 1.4. Strengthened coordination and training mechanisms for integrated climate-resilient catchment management. | |
| | | 1.5. Payment for Ecosystem Services models developed for the KRB. | |
| 2. Ecosystem-based Adaptation, including Climate smart Agriculture and Sustainable Land Management, in agro-ecological landscapes. | 2. An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level. | 2.1. Agro-ecological extension services supported at the *jamoat* level to provide technical support for EbA implementation. | 7,282,810 |
| | | 2.2. Watershed Action Plans developed that promote climate resilience and enhance economic productivity for target watersheds. | |
| | | 2.3. EbA interventions implemented in target watersheds by local communities. | |
| 3. Knowledge management on building | 3. Existing knowledge management | 3.1. Existing knowledge management platforms supported for collating information on the planning, implementation and financing of EbA interventions. | 142,500 |

[230] See Part II: A, which gives a project overview and details the components, outcomes, outputs and indicative activities of the project design.
[231] Ibid.
[232] See Part III: G, which illustrates the budget and detailed budget notes.

| | | | |
|---|---|---|---|
| climate resilience through integrated catchment management and EbA in the KRB. | platforms supported for integrated catchment management and EbA. | 3.2 An impact evaluation framework established to enable effective adaptive management of EbA activities. | |
| **4. Component sub-total** | | | **8,437,310** |
| 5. Project Execution cost (9.20%) | | | 776,000 |
| 6. Implementing Entity Fee (8.5%) | | | 783,131 |
| **7. Total Project Cost** | | | **9,996,441** |

*Projected Calendar:*

The projected timeline for the proposed project is a five-year implementation from 2020–2024. Estimated milestones are outlined in Table 6.

**Table 6.** Projected milestones and expected timeline for the proposed project.

| Milestones | Expected dates |
|---|---|
| Start of Project Implementation | January, 2020 |
| Mid-term Review | June, 2022 |
| Project Closing | March, 2024 |
| Terminal Evaluation | June, 2024 |

## PART II: PROJECT JUSTIFICATION

### *A. Project components*

To achieve its objective of enhancing the climate resilience of small-scale farmers and pastoralists in Tajikistan, the proposed project focuses on strengthening the integrated management of the KRB and implementing concrete on-the-ground EbA interventions. The three components of the project are: i) integrated catchment management to build climate resilience; ii) Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes; and ii) knowledge management on building climate resilience through integrated catchment management and EbA in the Kofirnighan River Basin. The first component will strengthen the institutional and technical capacity of government and local communities to manage climate risks. The second component will support local communities to implement interventions that reduce climate risks by enhancing the ecosystem functionality of degraded watersheds. The last component will compile and disseminate lessons learned for future national and regional upscaling and replication.

The outcomes, concrete outputs and indicative activities under each component are described below.

### Component 1. Integrated catchment management to build climate resilience.

The GoT has initiated a water sector reform[233] that will result in water resources being managed according to hydrographic boundaries rather than administrative ones. For the KRB, this will result in the establishment of River Basin Organisations (RBOs) and River Basin Councils (RBCs) in the northern and southern sub-basins by the end of 2019. While this will strengthen the management of water resources throughout the KRB, the KRB Management Plan (KRBMP) that is being developed will not address: i) the linkages between land and water management and the consequent impacts on climate risks; and ii) the importance of an EbA approach to risk reduction at the watershed level. Consequently, Component 1 has been designed to build on the KRBMP that is currently being developed and facilitate climate-resilient integrated catchment management in the KRB.

*Outcome 1. Catchment management strategy to manage climate risks operationalised at raion (district) and jamoat (sub-district) levels in Kofirnighan River Basin.*

Under this outcome, integrated land and water resources management principles will be introduced to Tajik authorities at the *raion* and *jamoat* levels to effectively address the climate change impacts described in Part I[234]. An integrated, climate-resilient catchment management strategy for the KRB will be developed using a multi-hazard climate risk approach. This strategy will detail the climate risks in each KRB watershed and will provide the *raion* and *jamoat* government levels with guidelines for managing these risks. This will enable climate-resilient land-use management in the KRB.

Outcome 1 will be achieved through five linked outputs. These outputs will: i) contribute towards improved transparency on multi-hazard climate risks throughout the KRB through risk modelling and improved climate data production; ii) develop a cross-sectoral strategy for managing these risks throughout the KRB by using an integrated catchment management approach; iii) strengthen the capacity of government bodies and local communities for managing climate risks by implementing EbA; and iv) incentivise ecosystem management as a risk management approach by developing a framework for a Payment for Ecosystem Services (PES) approach.

Output 1.1. Multi-hazard climate risk models developed for vulnerable watersheds in the Kofirnighan River Basin.

A gap analysis will be conducted based on all available information that covers the KRB, including baseline projects and the ongoing assessment being conducted as part of the KRBMP[235]. It is expected that the outputs of the KRBMP will include watershed delineation for the KRB, as well as information on water scarcity at the watershed level. However, it is not expected to include information on risks related to water access and climate change impacts on basin hydrology. The gap analysis will inform the identification of watershed-level risks to be prioritised for the north and south sub-basins of the KRB.

Under this output, priority risks, which will include flooding and landslides, will be modelled at the watershed level for the north and south KRB sub-basins. For climate-specific risks – which also include floods, landslides and droughts – downscaled climate predictions will be included in the risk models. These models will inform the development of cohesive Multi-Hazard Climate Risk Models (MHCRMs) for the KRB.

[233] Water Reform Programme 2015.
[234] See Part I: Project Background, on the climate change context in Tajikistan.
[235] scheduled to be completed in 2019

The MHCRMs will be used to inform the development of detailed Watershed Action Plans (WAPs) under Outcome 2. In addition, the models and their results will be archived and disseminated through knowledge centres that will be supported under Outcome 3.

Indicative activities to be implemented under Output 1.1 are detailed below.

**Activity 1.1.1.** Conduct a gap analysis on existing risk information in the Kofirnighan River Basin.

A detailed gap analysis will be conducted on the KRBMP. The analysis will be informed by existing information on *inter alia*: i) the vulnerability of the KRB; ii) baseline projects in the KRB and surrounding regions; iii) the ongoing assessment for the development of the KRBMP[236]; and iv) water availability in the KRB. The collation of data on water availability will support the assessment of identified climate risks[237] as well as producing the climate change projections that will inform the MHCRMs [Activity 1.1.3[238]].

The gap analysis will take into account all recommendations and watershed delineations made through the KRBMP assessment. If the assessment does include watershed delineations, the design of the integrated catchment management strategy for the KRB will refer to those delineations.

Once the gap analysis has been completed, missing primary data will be collected for the KRB. Satellite imagery will be used to obtain land use, vegetation cover and slope data. Where existing data on soils is limited, ground-truthing studies will be conducted. For watersheds that are expected to be particularly vulnerable, satellite imagery will be supplemented with topographic models derived from high-resolution drone imagery.

To accurately consider the impacts of climate change on the risk profile of the KRB, regional climate change predictions will be downscaled. These downscaled predictions will be used in Activity 1.1.2 to inform the climate risk models.

**Activity 1.1.2.** Develop Multi-Hazard Climate Risk Models for the Kofirnighan River Basin.

Multi-Hazard Climate Risk Models (MHCRMs) will be developed at the watershed scale for the KRB. These models will be calibrated with historical data, but will also be run using downscaled climate change predictions developed under Activity 1.1.1. Notably, multi-hazard models will consider the relationships between different types of hazards. In many cases, the onset of one hazard alters the likelihood or impact of another hazard. For example, a GLOF may result in river bank destabilisation that could trigger a landslide event. Similarly, landslides and other forms of mass movement may alter river morphology and increase the risk of flooding. These interactions may be closely linked temporally and spatially (e.g. a GLOF triggering a landslide). Conversely, some hazards may interact across larger temporal and spatial scales; for example, rapid erosion upstream in a catchment may result in downstream sediment accumulation, which slowly increases downstream flood risk.

In this activity, priority hazards such as GLOFs, floods, mudflows and landslides will be modelled for the KRB. While different priority risks have been identified in both the north and south sub-basin of the KRB, the vertical linkage between the two regions will markedly impact the risk

[236] scheduled to be completed in 2019
[237] Validation of the identified climate change risks for the KRB is being conducted under Activity 1.1.2.
[238] Use of square brackets is specifically to highlight linkages between outcomes, outputs and activities.

profile. In particular, land uses in the northern sub-basin (upstream area), will have impacts on the southern sub-basin (downstream area) risk profile. For example, inappropriate land uses in the upstream areas could result in increased sedimentation, erosion and landslides, as well as reduced dry season water availability, in the downstream areas. Conversely, upstream land uses that maintain the ecosystem functionality of watersheds will result in downstream benefits of drainage control, flood reduction, improved water quality and increased dry season water flow.

Output 1.2. Support provided for establishing automated weather stations in Kofirnighan River Basin watersheds.

Currently, there are 11 weather stations across the KRB, which equates to an approximate density of one station per 1,000 $km^2$. This is regarded as an appropriate density[239,240] according to WMO guidelines[241]. Notwithstanding this, existing weather stations throughout Tajikistan face technical challenges, limited automation and problems regarding data quality. In addition, weather stations are being degraded because of insufficient resources and technical capacity to rehabilitate them following extreme climate events.

Under this output, the State Agency for Hydrometeorology (referred to hereafter as 'Hydromet') will be supported by providing capacity building to repair existing weather stations in the KRB. Support to Hydromet will also be provided in the form of equipment for the rehabilitation and upgrading of selected weather stations. This support will improve the quality and quantity of hydrometeorological data that is collected from the weather stations. Collected data will contribute to building an in-depth understanding of the climate change risks on different soil types and land units. The data will also be used to deliver climate risk information and adaptation advisories to agro-ecological extension service providers [supported under Output 2.1]. In addition, the data will be used to refine the MHCRMs [Activity 1.1.3 and 1.1.4].

Indicative activities to be implemented under Output 1.2 are detailed below.

**Activity 1.2.1.** Provide technical support for the modernisation of automated weather stations in the most vulnerable districts of the Kofirnighan River Basin.

In order to provide relevant and up-to-date climate risk information and associated advisories for rural farmers and pastoralists in KRB, weather stations need to be regularly updated. In addition, following extreme climate events, weather stations should be inspected for potential repair needs. Existing weather stations within the KRB, although regarded as operational, are in need of rehabilitation. This is in response to limited resources for regular inspections following extreme climate events that have resulted in the stations undergoing significant wear and tear[242].

Of the 11 total weather stations in KRB, 3 have been identified for rehabilitation and modernisation, namely 'Tartki' and 'Chinar' situated on the Kofirnighan River, and 'Romit' on the Sardai-Miyona River. The rehabilitation will ensure that the three stations are capable of procuring a greater density of data required for the climate projections for their respective areas.

[239] Third National Communication 2014.
[240] World Meteorological Organization (WMO). 2008. Guide to Meteorological Instruments and Methods of Observation. Seventh Edition, WMO-No. 8.
[241] World Meteorological Organization (WMO). 2018. Country Profile Database: Tajikistan Regional Association II (Asia). Available at: https://www.wmo.int/cpdb/tajikistan [accessed 19.07.2018].
[242] Currently, KRB weather stations frequently collect unreliable or insufficient data. Therefore, high-quality climate information cannot be disseminated to the respective end-users. Automated data collection protocols will be implemented at all weather stations in the KRB and suitable data management software will be acquired. This software will ensure that data collected by weather stations is accurate and that all data is safely stored.

Hydromet will be supported through this activity by providing training to relevant technical personnel on the ongoing maintenance of weather stations, as well as repairs following extreme climate events. In addition, required equipment will be provided to Hydromet under this activity to rehabilitate the existing three identified weather stations. Support will also be provided to install stream gauging equipment. This equipment will include sensors to automatically measure stream velocity, depth, width and water turbidity, as well as supporting infrastructure. Supporting infrastructure will include cabling, observer cabins and electric drum winches (details of hydrometric equipment are presented in Annex 6).

**Activity 1.2.2.** Collect and collate data from improved automated weather stations.

All data and information from both existing and supported automated weather stations [under Activity 2.1.1] will be collected. This data will be collated for dissemination through the existing knowledge centres in the country [Outcome 3] for analysis and further dissemination in usable formats. In addition, historic records dating back 100 years will be digitised.

To date, data collected from weather stations have been digitally archived through the process of scanning written records. However, this data is not usable for the necessary analysis that should take place in order to inform climate risk projections because it is in image format. In light of this shortfall, this activity will involve using Intelligent Character Recognition (ICR)[243] software to automatically convert scanned images into machine-readable data. This will significantly improve the historical weather records for the KRB and will be considered an innovative advance in climate data management capability in the country.

**Activity 1.2.3.** Use collected data to inform climate risk information and adaptation advisories for agro-ecological extension service providers.

The collected and collated data from available automated weather stations in the KRB [under Activity 2.1.2] will be fed into the existing knowledge management centres supported under Outcome 3. This data will then be used to develop climate risk and advisories for farmers and pastoralists. Adaptation advisories will be tailored to the local needs based on the collected data as well as existing climate forecasting for the country. Mobile service providers will be engaged with to identify partners for the long-term and to ensure sustainability of advisory delivery. Advisories will be disseminated to all agro-ecological extension service providers in KRB so that they are able to make informed decisions on adaptation recommendations.

By developing and disseminating advisories, the adoption of climate-resilient and high market-value crop and seed varieties will be promoted. These seed varieties include – but are not limited to – lucerne (*Medicago sativa* L.) and sainfoin/'especet' (*Onobrychis viciifolia* Scop.)[244]. Not only will advisories inform the selection of crops that take climate risks into account, they will inform alternative agricultural options for communities. Such options could include introducing fodder production into agricultural practices and establishing agroforestry and intercropping practices. The introduction of alternative land-use options will result in increasing soil fertility and conservation of natural resources for valuable ecosystem services for future seasons[245].

[243] ICR is an advanced optical character or handwriting recognition software system that enables different fonts to be learned by a computer. This system has been used to improve accuracy and recognition levels within data collection and analysis.
[244] FAO. 2008. State of Plant Genetic Resources for Food and Agriculture (PGRFA) in the Republic of Tajikistan: Country Report. By Prof. Dr Hafiz Muminjanov, Dushanbe.
[245] FAO 2008 PGRFA: Country Report.

Included in the advisories will be guidance on planting time and season specific to the target areas. The guidance will include suggested crop types, timing of planting and reason for selection.

*Output 1.3. Integrated catchment management strategy developed for the Kofirnighan River Basin.*

Under Output 1.3, an integrated catchment management strategy will be developed for the KRB. This strategy will outline how to implement integrated land and water resources management in watersheds throughout the KRB in order to manage climate risks. The strategy will address the linkages between upstream and downstream impacts at the river basin scale and outline approaches for identifying and managing such impacts at the watershed scale.

The integrated catchment management strategy will further inform the KRBMP that is currently being developed. RBOs and RBCs in the KRB will be closely involved in the development of the strategy. Staff from RBOs and RBCs, along with relevant staff from CEP, Agency for Land Reclamation and Irrigation (ALRI) and local government at *raion* and *jamoat* levels will be trained on the implementation of the strategy. Strategic approaches and objectives of the strategy will be operationalised at *raion* level through District Development Plans (DDPs).

Indicative activities to be implemented under Output 1.3 are detailed below.

**Activity 1.3.1.** An integrated catchment management strategy developed for the Kofirnighan River Basin to inform and facilitate cross-sectoral landscape planning.

This activity will build on the training provided under Activity 1.3.2 to develop an integrated catchment management strategy for the KRB. Relevant government authorities will be included in the design of the strategy to ensure that it is coherently linked with existing sectoral and local level policies. The strategy will detail how the identified climate risks [under Activity 1.1.2] will be managed using a cross-sectoral approach to integrated catchment management. The strategy design will consider all relevant individual sector mandates and align their objectives within the context of integrated management for the KRB.

Based on the MHCRMs [developed under Output 1.1], the strategy will provide guidance on risk management at various catchment scales within the KRB. This means that factors such as soil erosion and flood risk will be incorporated into cross-sectoral land-use planning to facilitate efficient management across all relevant government sectors. These sectors include *inter alia* water, environment, agriculture, and education.

The strategy will provide overall guidance for the integrated management of watersheds by local communities. This guidance will ensure that WAPs developed under Outcome 2 take downstream impacts into consideration and that interactions between different watersheds are accounted for in a strategic manner.

**Activity 1.3.2**. Training programme delivered on mainstreaming climate risks for integrated catchment management planning.

Relevant government and academic staff will be trained on mainstreaming climate risks into integrated catchment management planning. Identified agencies include CEP, Hydromet, MEWR, ALRI, the Department of Geology (DoG), RBOs of the KRB and UCA. Additional agencies and entities to be trained will be identified during the project inception phase. These partners will be trained on international best practices for integrating climate risks into integrated catchment

management. In addition, this training will include identifying relevant risk management measures for existing and emerging climate risks. The overall objective of the training programme will be for relevant institutions, government levels and departments to effectively implement an integrated catchment management strategy for managing the impacts of climate change.

Trainings will be tailored to the specific needs of the department/institution to ensure that all partners acquire equal knowledge on the most appropriate mechanism for integrated management. All relevant sectors will be included to ensure that – although mandates will continue to differ slightly – the goals of each align with the strategy for the KRB.

Sub-activities for the trainings under Activity 1.3.2 are outlined below.

- 1.3.2.1. Training conducted to relevant CEP representatives to integrate catchment management into implementation and monitoring activities for all projects going forward, both those with a focus on climate change and without.
- 1.3.2.2. Training provided to the personnel of the supported knowledge management centres – including the DoG Open Centre and to UCA – on assessing available climate risk information and ensuring it is all made available through the relevant portals/hubs.
- 1.3.2.3. Training provided to *raion*-and *jamoat*-level government departments on integrated catchment management and identifying climate risks that require such a management approach.

**Activity 1.3.3.** Provide training for selected communities on identification of EbA activities and implementation.

Rural communities across the six identified most vulnerable districts of the KRB will be selected for training on identifying and implementing appropriate EbA interventions. These identified six districts include Vahdat, Varzob and Faizobod Districts in the north of the KRB and Nosiri Khusrav, Shaartuz and Kabodiyon Districts in the south of KRB[246]. From these districts, it is expected that communities in ~100 villages across 14 *jamoats* will benefit from training on EbA interventions.

The selected communities will be trained by representatives from those institutions trained under Activity 1.3.2, including district and *jamoat* representatives of CEP. This training-of-trainers (ToT) approach will build the capacity of selected communities to identify climate risks, and to design and implement appropriate EbA interventions. All trainings will be delivered in local Tajik dialects specific to each target district. This will ensure that trainings are accessible to all participants.

<u>Output 1.4. Strengthened coordination and training mechanisms for integrated climate-resilient catchment management.</u>

Relevant co-ordination and training mechanisms will be strengthened for the implementation of integrated climate-resilient catchment management. Co-ordination structures to be strengthened include the RBOs and RBCs in the KRB. These entities are currently being established and, by project inception, will have been capacitated on water management at the catchment level. The proposed project will build their capacity on climate-resilient catchment management that includes land use as well as the management of water resources under climate change conditions. Training on cross-sectoral management will be provided to RBOs and RBCs in the KRB, as well as *raion* and *jamoat* level staff. This training will strengthen the existing coordination structures in the KRB to include integrated and climate-resilient management of land and water resources.

[246] Details on these six districts are provided in Part I, where the environmental context of Tajikistan is described.

Opportunities for establishing/supporting existing local training mechanisms will be identified. Currently, no institutionalised or systematic training mechanisms exist for farmers and pastoralists.

Indicative activities to be implemented under Output 1.4 are detailed below.

**Activity 1.4.1.** Strengthen existing training mechanisms at the *raion* and *jamoat* levels.

Under this activity, existing training programmes will be strengthened at the *raion* and *jamoat* government and administration levels. The programmes will be adopted from existing mechanisms within the *raion* and *jamoat* government for targeted catchment and/or watershed management. Improved training programmes will include coordination mechanisms for integrating holistic landscape management practices through the integrated catchment management strategy [Output 1.3]. Trainings will be coordinated between the RBOs and RBCs to ensure that the process of continued training is adopted into regular management within the government.

**Activity 1.4.2.** Training provided on integrating EbA into catchment management.

Following on from Activity 1.4.1, the strengthened training programmes will be carried out for *raion* and *jamoat* level government officials in the targeted districts[247]. The training will focus on providing support for agro-ecological extension services and will include EbA measures as part of an integrated approach to management. Main recipients of this training will include RDPP, CEP and *jamoat* government-level officials to ensure that the administrative and organisational processes are strengthened for EbA implementation.

This training will be linked with activities under Output 2.1 where community demonstration plots of EbA interventions will be established [under Activity 2.1.2] and farmer field schools will be conducted [under Activity 2.1.3]. All trainings will be delivered in local Tajik dialects specific to each target district. This will ensure accessibility to all willing and necessary participants.

Output 1.5. Payment for Ecosystem Services models to support the long-term financing of integrated catchment management strategy implementation.

Payment for Ecosystem Services (PES) has been identified as a viable approach for conserving the supply of ecosystem goods and services of Tajikistan under climate change conditions. Currently, no viable models for PES have been identified in the KRB. However, there are a number of ecosystem services within the KRB that could be eligible for a PES approach. These include water provision, flood reduction, sediment retention and biodiversity conservation. The activities of this project will support the delivery of the above ecosystem services and, consequently, the possibility of implementing PES in the KRB will be investigated under this output.

The indicative activity to be implemented under Output 1.5 is detailed below.

**Activity 1.5.1.** Suitable Payment for Ecosystem Services models developed for the KRB.

Under this activity, appropriate PES models will be developed for the KRB. Relevant ecosystem services will be identified, such as water provision from restored and ecologically-sound watersheds. Willing buyers and willing sellers for each ecosystem service will be identified and

[247] Vahdat, Varzob, Faizobod, Nosiri Khusrav, Shaartuz and Kabodiyon Districts.

engaged with to determine: i) the feasibility of PES for a particular ecosystems service; and ii) pricing structures for PES-compatible ecosystem services. Where willing buyers and willing sellers of a particular ecosystem service have been identified, potential intermediaries will be engaged with. Intermediaries may include government entities, NGOs and financial institutions. Negotiation platforms will be established between buyers, sellers and intermediaries to determine prices and payment methods for the delivery of ecosystems services.

## Component 2. Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes.

Adaptation measures such as EbA are increasingly being recognised as a cost-effective approach for building the climate resilience of vulnerable communities. In the context of watersheds, EbA interventions are most effective when implemented in degraded landscapes. In the KRB, many watersheds are degraded because of unsustainable land management practices – such as overgrazing and deforestation – and the impacts of climate change. These watersheds are prone to increased risks of flooding, mudflows and landslides and are characterised by low agricultural productivity. Implementing EbA interventions such as erosion control measures, agroforestry and sustainable pasture management in these watersheds will restore ecosystem services of flood reduction, soil stabilisation and increased water availability. Concomitantly, these interventions will provide long-term benefits to local communities by: i) providing climate-resilient and ecologically-sound livelihood opportunities; and ii) reducing both the likelihood and impact of climate risks.

EbA interventions for watershed management function optimally as part of an integrated upstream-downstream approach that considers risk avoidance and risk protection. For example, if a watershed is prone to flooding, EbA interventions in the upstream areas can promote ecological processes of flood attenuation and runoff infiltration that reduce downstream flood impacts. Downstream communities can then be further protected by combined grey-green infrastructure such as reinforced river banks that are stabilised with riparian vegetation. Under Component 2, vulnerable watersheds in the KRB will be climate-proofed through the implementation of integrated watershed management with a focus on an EbA approach that provides long-term benefits to local communities.

### *Outcome 2. An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level.*

The integrated catchment management strategy developed under Outcome 1 will inform development across all economic sectors at a catchment scale in the KRB. It will not, however, be sufficiently detailed to inform land-use management practices at a watershed scale. Outcome 2 will consequently include the development and operationalising of Watershed Action Plan (WAPs). These plans will have an overarching focus on addressing climate risks, thereby ensuring full alignment with the catchment management strategy [developed under Output 1.3]. A total of six districts[248] have been identified for EbA implementation, namely Vahdat, Varzob, Faizobod, Nosiri Khusrav, Shaartuz and Kabodiyon. This implementation will serve to demonstrate the cost-effectiveness and adaptation benefits of such EbA interventions.

Under this outcome, an integrated approach for building community resilience to climate change will be established, demonstrated and subsequently implemented. This approach will be informed

[248] Refer to the Part I sub-section on the environmental context in Tajikistan for details on these districts.

by detailed WAPs and community enterprise plans that will focus on building the climate resilience of the communities.

There are four outputs to achieve the above-described outcome. These outputs are interlinked through the respective activities by providing support to communities and implementing EbA activities in target regions. The four outputs and their indicative activities are detailed below, including linkages between the three project outcomes.

Output 2.1. Agro-ecological extension services supported at the *jamoat* level to provide technical support for EbA implementation.

Agro-ecological extension services are currently provided by private enterprises – largely agronomists – at the *jamoat* level on an ad-hoc basis in response to farmer requests. Through a ToT approach, these service providers will be supported to ensure that communities have access to the necessary guidance for effectively implementing EbA.

Indicative activities to be implemented under Output 2.1 are outlined below.

**Activity 2.1.1.** Agro-ecological extension services supported by training existing service providers on EbA, climate-resilient agriculture and multi-hazard climate risk management.

Currently, agro-ecological extension services are being provided to farmers and pastoralists by private enterprises at the *jamoat* level. Under this activity, these existing service providers will be supported to ensure that communities have access to the necessary guidance for effectively implementing EbA. This support will be through a ToT approach that ensures all knowledge sharing is ongoing among *jamoats* and communities. Training will include a focus on EbA, climate-smart agriculture (CSA) and sustainable land management (SLM) to ensure that an integrated approach to management is adopted following the provision of extension services. By providing additional training on multi-hazard climate risk management, existing extension service providers will be informed of the relevant and up-to-date technologies for climate information.

The ToT programme provided to the existing agro-ecological extension service providers will include training on specific processes that are essential to implementing an effective integrated catchment management strategy. These specific processes include measures on EbA, CSA and SLM that all contribute to improved river and water management. The processes are outlined below.

- **Developing land-use plans (LUPs) that take into account all natural resources within and surrounding a particular area**. Efficient land-use planning will prevent social conflicts over land and ensures the sustainable use of available resources. LUP could involve the implementation of rotational grazing and/or cropping as well as intercropping or alternate harvesting. In this way, LUP contributes to increased soil fertility and improved productivity. The ToT programme will train extension service providers on developing land-use plans for specific areas within the target districts. Importantly, this training will differ between regions and within districts because of considerable variability in landscapes.
- **Developing implementation protocols for EbA that are specific to particular soil types, ecosystems and landscape units**. Together with LUP, such implementation protocols will assist with ensuring maximum sustainability of all available resources. Such protocols make use of previous seasons' experiences and outputs to adapt for future seasons. Training to extension services providers will be focused on the process of identifying potential EbA measures to be implemented in a specific region. The training will also include how to

determine the appropriate intervention according to the landscape and needs of the community.

- **Training extension service providers on the technical implementation of EbA, including theoretical and practical aspects**. This is because the providers are private enterprises, meaning that farmers may often request guidance rather than hands-on assistance. Extension services consequently need to be able to describe in detail the identified EbA measure as well implement it on the ground.
- **Connecting agricultural producers to markets**. Improving market connectivity among agricultural producers will be a focus in the training of extension service providers. Currently, farmers are not adequately making use of the existing extension services. This could be because of many reasons, however the reason that has been highlighted is that farmers are not aware that such services specific to EbA are available.
- **Introducing agro-processing to extension service providers.** Through agro-processing, there will be added value to primary agricultural products. Training will focus on what the different options are for processing/transformation of raw and intermediate products and how it could benefit the communities.
- **Training extension service providers on post-harvest storage handling.** This will promote the use of post-harvest storage facilities among Tajik farmers to reduce crop losses to pests and to improve prices received at markets. Training will include the appropriate steps immediately following harvest such as cooling, cleaning, sorting and efficient packing.
- **Training farmers on improving livestock productivity.** With climate change, farmers are likely to become more reliant on their livestock for their livelihoods. By focusing on supporting the health and nutrition of livestock, the resilience of local communities will be improved. Such examples of guidance would be to establish small fodder production units for livestock and to shift from an entirely plant-based diet to a semi-animal-based protein.
- **Developing advisories from climate risk information received from Hydromet**. These advisories will be delivered to farmers to inform their decision-making for the season ahead.

**Activity 2.1.2.** Establish EbA demonstration plots in each of the target villages.

Under this activity, community demonstration plots will be established in the target villages. These plots will consist of the main EbA interventions to be implemented. The training provided under Activity 1.4.2 will serve as the base for the implementations of these plots. These demonstration plots will be the main platform for: i) demonstrating enhanced crop and livestock productivity; ii) training farmers and pastoralists on the technical details of how to implement EbA interventions; and iii) demonstrating how the interventions reduce climate change-induced soil erosion.

The EbA measures included in the demonstration plots will be selected from the shortlist of EbA interventions to be developed under Activity 2.2.2. Examples of the measures that have been identified as successful and/or potentially successful in the KRB are described in Table 7.

**Table 7.** EbA measures that have been identified as successful/potentially successful in the KRB. In the 'Applicable area' column, 'N' denotes the northern sub-basin while 'S' denotes the southern sub-basin.

| No. | Description | Applicable area |
|---|---|---|
| 1 | Construction of 'protection' gabions along rivers to provide buffers during flash floods. | N,S |
| 2 | The introduction of water-saving irrigation techniques such as drip irrigation, dry farming, composting/mulching and making use of cover crops. | N, S |
| 3 | Rehabilitation/restoration of degraded forest ecosystems making use of *saxaul* species, as well as others. | N, S |
| 4 | Sustainable harvesting for livelihoods from existing 'healthy' forest ecosystems. | N |

| No. | Description | Applicable area |
|---|---|---|
| 5 | Establishing livestock exclusion zones for the growing of fodder crops such as 53ucerne and sainfoin. | N, S |
| 6 | Establishing shelterbelts and integrating bio-drainage measures to reduce wind erosion and improve water infiltration. | N, S |
| 7 | Introducing indigenous and palatable grass seeds into degraded rangelands. | N, S |
| 8 | Introducing rotational grazing of livestock between pastures to assist with increasing field water absorption and decreasing water runoff. | N, S |
| 9 | Pasture management such as land-use planning and introducing improved management measures such as exclusion zones and rotational grazing of livestock. | N, S |
| 10 | Establishing joint forest management involving communities and local government. | N, S |
| 11 | Introducing intercropping and agroforestry, and in specific areas may include apiculture, i.e. beekeeping. | N, S |
| 12 | Introducing sustainable long-term community services such as renewable energy and energy-efficient stoves. | N, S |
| 13 | Setting up shelterbelts in areas frequently exposed to erosion. | S |
| 14 | Establishing commercial plantations making use of an array of indigenous fruit species in 53ucerne53d and degraded lands. | S |
| 15 | Introducing organic mulching for farmers to use on croplands which promotes soil fertility as well as water-saving. | S |
| 16 | Diversifying crop use, including drought-tolerant and climate-resilient crops. | S |
| 17 | Establishing greenhouses for horticulture including local lemon, tomato and cucumber. | S |
| 18 | Establishing community woodlots in 53ucerne53d and abandoned areas for fuelwood. | S |
| 19 | Providing additional and improving existing extension services provision which will include developing advisories for farmers. | S |
| 20 | Establishing on-farm water resource management. | S |
| 21 | Rehabilitating existing irrigation, drainage and pumping systems. | S |

The proposed techniques outlined above will include EbA practices as well as CSA and SLM measures. EbA is currently not being undertaken by local communities because of limited technical capacity to plan, implement and sustainably finance the interventions. Under this activity, this capacity will be enhanced at the village level. In addition, Outcome 1 will contribute to building the capacity by strengthening local extension services and village governance structures.

**Activity 2.1.3**. Farmer field schools conducted in target villages making use of demonstration plots.

The strengthened training programmes under Activity 1.4.2 will inform the development of a curriculum for farmer field schools (FFSs). These FFSs will be conducted in the target villages of Vahdat, Varzob, Faizobod, Nosiri Khusrav, Shaartuz and Kabodiyon Districts and will include training on EbA, CSA and SLM. Specifically, trainings will demonstrate the importance of improved livestock husbandry and community-based rangeland practices. FFSs will be advertised through the activities under Outcome 3. Through the provision of FFSs, local community capacities will be built with specific wide-spread knowledge of EbA, CSA and SLM.

Training of *jamoat*-level extension service providers will be focused on within the FFSs. By including these local experts in the FFSs, the project will promote farmer interaction whereby both government and communities learn from previous experiences. This will allow upstream versus downstream experiences to be shared as well as the development of possible measures that will benefit each other in the future. Through the establishment of demonstration plots [under Activity 2.1.2], training by community members to fellow community members will take place. This will facilitate a training-of-trainers (ToT) approach which further promotes sustainability of project

interventions. Community leaders will be selected to take part in the training and sharing of experiences.

Curricula of the FFSs will include training on avoiding soil erosion threats at the community level. This training will be tailored to: i) increase infiltration of rainwater into topsoils; ii) increase the water-retention capacity of soils; and iii) restore soil horizons in landscapes with sheet/gulley erosion. Such management of soils will be underpinned by increasing the vegetative cover of the landscape and the organic matter content of the soil. To this end, a wide range of land management techniques will be presented for implementation to improve SLM in target villages. Such management interventions and techniques are separated according to the northern and southern sub-basin of the KRB. The specific EbA measures proposed for the northern and southern sub-basins are outlined in Table 7 above.

The proposed techniques outlined above will include EbA practices, which are usually a form of CSA and/or SLM. EbA is currently not being undertaken by local communities because of limited technical capacity to plan, implement and sustainably finance the interventions. Under this activity, this technical capacity will be enhanced at the village level. In addition, Outcome 1 will contribute to building the capacity by strengthening local extension services and village governance structures.

*Output 2.2. Watershed Action Plans developed that promote climate resilience and enhance economic productivity for target communities.*

Under this output, climate risk information will inform the development of fine-scale Watershed Action Plans (WAPs). These WAPs will assist local government and communities in ensuring that all identified EbA measures are carried out in an efficient and effective manner. The WAPs will include detailed budgets that will assist in determining the extent to which EbA measures can be implemented.

WAPs will be developed through a participatory process with communities from target villages in Vahdat, Varzob, Faizobod, Nosiri Khusrav, Shaartuz and Kabodiyon Districts. Such participatory processes will be conducted by holding regular consultation meetings in the villages with local government, PUUs and other relevant organisations. Through this output, the appropriate EbA measures in each watershed will also be shortlisted for future implementation.

Indicative activities to be implemented under Output 2.2 are detailed below.

**Activity 2.2.1.** Participatory mapping conducted at the watershed level.

All mapping will be conducted in a thorough participatory manner with local communities and community-based organisations (CBOs). These CBOs are likely to include forestry organisations and Pasture User Unions (PUUs). Experts undertaking the mapping will be required to consult with local communities, learning from their on-the-ground experiences in the region. Communities will also be part of the final decision-making process for the shortlisting of EbA interventions [under Activity 2.2.2]. The meetings will be to consult with communities on their knowledge of watershed mapping, as well as to inform, update and make decisions for the future planning.

PUUs are currently in place in certain regions of the country. These PUUs have been established through previous and ongoing projects. Further development of these associations will be supported under this activity by conducting participatory mapping of each target watershed in the KRB. The mapping will make use of ecological, hydrological and agricultural data as well as

regional and local experts to determine the most appropriate EbA measures to be implemented at the watershed level to improve community resilience.

These ecological, hydrological and agricultural experts will also assist with determining the most appropriate land-use management changes necessary to address the climate change threats in the villages' surrounding landscapes. The recommendations will take into account the integrated catchment approach of the project, based on the strategy developed under Output 1.3.

**Activity 2.2.2.** Watershed Action Plans developed for vulnerable watersheds in the Kofirnighan River Basin.

Results of the participatory mapping conducted at the watershed level [Activity 2.2.1] will inform the selection of a wide range of EbA measures for each targeted watershed. These interventions will be assessed to form a shortlist that will be used for implementation recommendations going forward.

The land-use plans informed by these recommendations will be treated as working documents, primarily because of the: i) participatory nature of the mapping; ii) selection of shortlisted EbA interventions; and iii) monitoring to be conducted of implementation interventions. These working documents are flexible in nature in that they can be changed in an iterative manner as more relevant and up-to-date information becomes available. Importantly, these WAPs will be carefully aligned with the integrated catchment management strategy developed under Outcome 1 [under Output 1.3]. WAP development will be facilitated by district representatives from CEP and *jamoat*-level government in a participatory process with local communities living in the watersheds.

These WAPs will outline what types of EbA interventions will be implemented in which areas, propose sustainable rates of extraction for local ecosystems, and identify the types of protection measures that need to be undertaken. This will ensure that the plans will be responsive to local needs, while also building local community ownership of WAPs. Through the participatory development of WAPs, local community members will gain an increased understanding of climate risks, DRR and the importance of sustainably managing watersheds.

Output 2.3. EbA interventions implemented in target watersheds by local communities.

Under Output 2.3, local communities will be supported in implementing EbA interventions identified in Output 2.2. These interventions will reduce climate risks in two ways. Firstly, interventions such as reforestation, agroforestry and sustainable pasture management in degraded watersheds will strengthen the provision of ecosystem services. These ecosystem services include increased groundwater recharge and soil stabilisation, which will reduce the downstream impacts of flooding, landslides, soil erosion and limited water availability. Secondly, project activities will include protection interventions downstream. These interventions will include river bank stabilisation and flood protection.

The sustainability of watershed rehabilitation activities will be ensured by promoting local community livelihoods that are decoupled from unsustainable natural resource extraction. This will be done by using economically valuable species such as fruit and nut trees for watershed reforestation wherever possible. In addition, the environmental sustainability of local community livelihoods will be increased through the implementation of sustainable livelihood alternatives. Such alternatives will include low energy cookstoves, as well as harvesting fuelwood and timber species from local community woodlots.

**Activity 2.3.1.** Support local communities to implement priority EbA interventions.

Under this activity, local community members in ~100 villages across 14 *jamoats* will be supported in implementing the priority EbA interventions demonstrated in Output 2.2. Communities will be provided with technical assistance and inputs for implementing risk-reduction activities such as watershed reforestation, erosion control measures and flood reduction measures. Additionally, inputs will be provided for measures that increase energy efficiency and consequently reduce unsustainable practices (such as low-energy cook stoves).

Nurseries will be established in each of the 14 *jamoats* to provide local community members with suitable climate-resilient species for watershed reforestation, agroforestry and intercropping. Economically useful species such as fruit trees or high-value timber trees for woodlots will be prioritised and species selection will be informed by local conditions as well as community needs.

Selection of the EbA interventions will be informed by an assessment of their social, environmental and economic impacts within a community. Local communities will be consulted to agree on which EbA interventions should be implemented in the different land categories. The proposed EbA interventions that will be assessed for selection on the shortlist have been listed under Output 2.1 [specifically under Activity 2.1.3].

**Activity 2.3.2.** Support local community members in developing Enterprise Plans (EPs) based on EbA interventions.

Under this activity, local communities will be supported in developing EPs. Local community members will receive training on enterprise development and be educated on the economic viability of ecologically-sound natural resource-based businesses. By demonstrating the economic viability of EbA interventions for watershed restoration to local communities, this activity will contribute towards the sustainability and scalability of project interventions.

Local community members will be trained on how to start and maintain enterprises based on EbA interventions. Training will include cash flow prediction, product processing and accessing suitable markets. Possible enterprise plans identified during the project development stage include beekeeping, fodder crop production, agricultural production from fruit and nut trees and supporting services. These are outlined below.

*Beekeeping*
Beekeeping is readily integrated into EbA activities that promote the planting of flowering plants, such as fruit trees or fodder crops. Honey is a highly marketable product in local markets and can be sold at up to TJS40[249] (~US$4) per kilogram. It is generally sold locally and also exported to surrounding Central Asian countries.

*Fodder production*
Fodder crops such as 56ucerne (*Medicago sativa* L.) or sainfoin (*Onobrychis viciifolia* Scop.) can markedly improve the productivity of livestock agriculture. Pastures generally produce ~1.6 dry tonnes of feed per hectare per annum. Comparatively, fields planted with fodder crops can produce up to 10 dry tonnes of feed per hectare per annum. Fodder crops can be used as ground cover for intercropping with orchards or in agroforestry. Leguminous fodder crops, such as 56ucerne and sainfoin, also increase soil fertility by fixing nitrogen. While fodder crop production

[249] 'TJS' refers to Tajikistan Somoni.

can be profitable, with lucerne being sold at up to TJS15 (~US$1.50) per pressed kilogram on local markets, prices are highly variable according to season and climatic conditions.

*Agricultural production from fruit and nut trees*
Fruits and nuts are readily sold on local markets. Amongst others, peaches (*Prunus persica* L.), apricots (*Prunus armeniaca* L.), figs (*Ficus carica* L.), sour cherries (*Prunus cerasus* L.), pears (*Pyrus sp.* L.), plums (*Prunus divaricata* Led.) and apples (*Malus pumila* Mill.) are commonly grown fruit trees, while pistachios (*Pistacia vera* L.), walnuts (*Juglans regia* L.) and almonds (*Prunus dulcis* Mill.) are commonly grown nut trees. Pistachios and wild sour cherries, in particular, are frequently planted to stabilise slopes. Community members will be assisted in selecting the appropriate tree species to plant based on local soil conditions, climatic factors and markets.

*Supporting services*
A number of the interventions that will be undertaken in the proposed project will require supporting services. For instance, the introduction of low-energy cookstoves will require local community members that have the prerequisite skills to manufacture such stoves. During project implementation, supporting services for the long-term implementation of project activities will be identified and local community members trained on how to provide such services. In addition, to ensure productivity of fruit trees, pruning and grafting methods will be taught to local communities [for inclusion in Activity 2.3.1 and the establishment of nurseries].

**Activity 2.3.3.** Monitor the impacts of EbA interventions.

Continuous monitoring will be done at the community-level to provide an evidence-base on the effectiveness of EbA interventions and to enable adaptive management to take place. Community monitoring plans will be developed to enable continuous monitoring of WAPs [developed in Activity 2.2.2]. Local community members will monitor the impacts of EbA interventions and other actions implemented under WAPs. Authority figures in the local communities will be trained on interpreting monitoring information and taking adaptive management decisions based on the available information. In addition, monitoring information will be shared with *jamoat*-level government officials and extension service providers, who will use this information to inform their decision-making at *jamoat* level.

Monitoring is likely to include the extent of damages from climate-related disasters, such as floods and landslides. In addition, the reliance of local community members on unsustainable practices will also be monitored. Indicators will be identified in community monitoring plans but are likely to include the amount of fuelwood harvested from natural forests.

## Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the Kofirnighan River Basin.

The activities of the proposed project have significant upscaling potential throughout Tajikistan and in Central Asia. Other countries in the region face similar climate change risks and are likely to benefit from adopting an integrated catchment management approach using EbA. Consequently, lessons learned from this project will provide an evidence-base to both inform and promote project activities beyond the project's geographical scope. To ensure that lessons learned are adequately collected, collated and disseminated, this component will focus on strengthening knowledge management around integrated catchment management and EbA in Tajikistan.

*Outcome 3. Existing knowledge management platforms supported for integrated catchment management and EbA.*

A number of projects to address climate change impacts have been implemented at a village level across Tajikistan in the past decade. Many of these projects have had considerable success in terms of reducing soil erosion, raising finance for EbA interventions and increasing crop and livestock productivity. Consequently, numerous lessons have been learned for climate change adaptation activities in the country. These lessons include:

- establishing governance structures, from a national to village scale, to support EbA interventions;
- methods for engaging local communities;
- mechanisms for sharing lessons and best practices between villages;
- methods to undertake applied research in a participatory community approach;
- use of technology, such as smartphone applications, for training on and monitoring of interventions; and
- incentives[250] required to ensure long-term implementation and maintenance of EbA interventions by local communities.

The lessons listed above have, to date, not been collated, analysed and shared. They remain dissipated across projects and are consequently often viewed as unreliable because their underlying data is not available for public viewing. Under this outcome, activities will support existing knowledge management platforms and hubs to facilitate the exchange of lessons learned across Tajikistan. By providing much-needed support to these platforms, information will be readily accessible and available for dissemination to different organisation levels, including national government ministries to the villages. This method will ensure that local knowledge sharing continues beyond the project lifespan and also raises awareness of the benefits of EbA for integrated catchment management in the country. The evidence base assembled under this outcome will ultimately be used by policy-makers for informing the revision of legislation, policies and strategies relevant to upscaling EbA across Tajikistan.

There are three outputs to achieve the above-described outcome. These outputs are interlinked through the respective activities to ensure the necessary support is provided to knowledge sharing platforms to facilitate information transfer. The three outputs and their indicative activities are detailed below, highlighting the linkages between the three project outcomes.

*Output 3.1. Existing knowledge management platforms supported for collating information on the planning, implementation and financing of EbA interventions.*

Currently, several knowledge management platforms and hubs exist within Tajikistan as a result of previous and ongoing development projects. Because of this, a network already exists for the housing, viewing and transfer of new information. Such institutions include the University of Central Asia (UCA) and the Open Centre under the Department of Geology (DoG). These institutions are mandated with the responsibility of collating, analysing and disseminating information on climate risks and suitable adaptation options. By providing support through training and information transfer, this output will promote the sustainability of these platforms.

Indicative activities to be implemented under Output 3.1 are outlined below.

[250] e.g. financial, environment, cultural and aesthetic

**Activity 3.1.1.** Existing knowledge management platforms responsible for collating, analysing and disseminating information on climate risks and suitable adaptation options will be supported.

The existing knowledge management platform that has been identified for facilitation and support through Output 3.1 is the Open Centre under the DoG. As a reputable academic institution, the UCA will also be supported considering its goal and mandate to expand to rural regions of Tajikistan and other Central Asian countries. Through supporting these two institutions, awareness raising activities will be promoted on climate risks and the benefits of integrating EbA into landscape management.

In order to effectively provide support to the platforms, all new information to be provided will be screened to ensure it is scientifically sound. An emphasis will be placed on information underpinned by credible scientific analysis methods. Anecdotal information will be also be made available with, however, the caveat that further research is needed to determine its accuracy.

Training will be provided to the relevant platform representatives under Outcome 1.

**Activity 3.1.2.** Data and information will be collected from automated weather stations, agro-ecological extension centres and international publications.

All data and information collected under Outcome 1 from *inter alia* automated weather stations, local extension centres and from international publications will be collated for inclusion in the supported information centres. While the Open Centre will provide a repository of information, to be disseminated to local communities, national decision-makers and academics, UCA will facilitate active sharing and training of the information.

*Output 3.2. An impact evaluation framework established to enable effective adaptive management of EbA activities.*

To increase the quality of information available on the platform(s), Output 3.2 will include the development of an impact evaluation framework. This framework will be used for assessing EbA interventions implemented through the project, the sites selected for EP implementation, and also those villages that have had or are adjacent to areas where prior EbA interventions have been successful. Given that EbA benefits materialise fully over decades, the framework will need to be used by stakeholders during as well as after the completion of the project. A long-term research approach will consequently underpin the design of the framework.

Indicative activities to be implemented under Output 3.2 are detailed below.

**Activity 3.2.1.** An impact evaluation framework will be established to enable the effective quantification of project benefits and to provide information for future planning and implementation of EbA interventions.

An impact evaluation framework will be developed to monitor the impacts of project interventions. This framework will include the use of semi-randomised trials in areas with and without project interventions. In so doing, the framework will enable the effective attribution and quantification of project benefits and provide information for the future planning and implementation of EbA interventions across the country.

**Activity 3.2.2.** Data and information obtained through applying the framework will be disseminated via the knowledge platform(s).

The data and information obtained through applying the framework will be disseminated via the communication channels of the supported knowledge platform(s).

## B. Economic, social and environmental benefits

Climate variability is already reducing agricultural productivity which is directly impacting food security in Tajikistan. This situation is likely to be exacerbated by predicted climate change-induced increases in extreme climate events. These events include floods, landslides and drought. The design of the proposed project is intended to provide adaptation alternatives for vulnerable Tajik communities to improve their resilience to climate change.

Activities and outputs of the project will have several economic, social and environmental benefits which will contribute to furthering sustainable development within Tajikistan. Activities have been designed to address the barriers identified as hindering climate change adaptation (CCA) in the country, namely: i) limited capacity of institutions to include CCA into national plans; ii) limited technical capacity of public services to implement activities among communities for CCA; and iii) limited knowledge sharing on CCA in Tajikistan.

The primary, overarching benefit of the project will be a reduction in climate risks. In doing so, environmental, social and economic damages as a result of climate change will be minimised among rural Tajik communities. This benefit will be realised by: i) reducing the exposure of vulnerable communities in the KRB to climate hazards; and ii) increasing the resilience of KRB communities and ecosystems to the impacts of climate hazards. To optimise sustainable development co-benefits, project interventions aimed at building climate resilience will use an EbA approach.

Implementing EbA in agricultural systems[251,252] has been proven to improve the ability of crops and livestock to adapt to climate change and variability. These practices can be implemented at various scales to improve land-use management. For example, on-farm management of genetic biodiversity can ensure a broader source of crop resistance-capacity to uncertain occurrences and effects of extreme climate events. Genetic biodiversity is promoted through the diversification of crop varieties or inclusion of wild relatives. Other farm-level practices include the use of: i) integrated pest management strategies; ii) new cropping systems to reduce the impacts of pests and diseases; iii) the planting of windbreaks; and iv) the planting of agroforestry systems or cover crops to help reduce the evapotranspiration effect. At the landscape level, EbA helps regulate water and nutrient cycling by ensuring tree cover or natural vegetation in areas of hydrological importance. EbA also reduces the incidence or severity of crop pest and disease outbreaks related to extreme climate events. This is because enhancing the structural complexity of the agricultural landscapes through diverse cropping systems or inclusion of natural vegetation and on-farm tree cover promotes pest regulation.

EbA practices benefit smallholders in multiple ways beyond helping them adapt to climate change. For example, they help ensure the continued provision of ecosystem services on which farming

[251] Ecosystem-based Adaptation (EbA) is defined as in agricultural systems as the implementation of agricultural management practices that use or take advantage of biodiversity, ecosystem services or ecological processes (either at the plot, farm or landscape level) to help increase the ability of crops or livestock to adapt to climate variability. In contrast, practices that substitute the role of biodiversity in providing ecosystem functions and services for agricultural production such as excessive use of inorganic fertilizers or pesticides is not ecosystem-based.

[252] Vignola R, Harvey CA, Bautista-Solis P, Avelino J, Rapidel B, Donatti C & Martinez R. 2015. Ecosystem-based adaptation for smallholder farmers: Definitions, opportunities and constraints. Agriculture, Ecosystems and Environment 211:126–132.

depends such as water provision, food provision, nutrient regulation, pest control and pollination. This contrasts with other non-EbA adaptation measures, such as excessive use of agro-chemicals. Such adaptation measures can yield adaptation benefits but may negatively impact the provision of ecosystem services, whilst having additional negative environmental off-site effects including the loss of biodiversity or contamination of streams. In addition, the use of EbA practices can help diversify production systems and sources of income generation, providing more stability to smallholder farmers. For example, the use of intercropping and agroforestry in production systems can diversify farmer revenue. This revenue is generated by providing timber, fruits, fuelwood and building materials that farmers can use for additional income, especially in years when income from the main cash crop is reduced. These additional products reduce farmer vulnerability to market changes as well as their dependence on outside products which improves farmer food security both directly and indirectly. The use of agroforestry practices can also make significant contributions to biodiversity conservation efforts. In addition, many EbA practices can help mitigate climate change by either reducing the amount of GHGs emitted from agricultural systems[253], or by increasing the overall farm biomass[254].

Table 8 illustrates the social, economic and environmental benefits associated with the EbA interventions to be implemented through the proposed project.

[253] e.g. by reducing the use of inorganic fertilisers, agrochemicals, machinery and associated emissions
[254] e.g. by increasing soil carbon stocks or above-ground biomass

**Table 8.** Specific expected social, economic and environmental benefits per outcome of the proposed project.

| Outcome | Environmental benefits | Social benefits | Economic benefits |
|---|---|---|---|
| 1. Catchment management strategy to manage climate risks operationalised at Raion (district) and jamoat (sub-district) levels in Kofirnighan River Basin (KRB). | • Enhanced catchment integrity through better protection | • Increased awareness and technical capacity of policymakers and government institutions regarding climate-resilient adaptation technologies<br>• Increased capacity of professionals to present climate change adaptation information<br>• Increased gender equality at a local and national level – 30% of participants involved will be women | • Increased profit margins will be realised in the long-term as a result of training provided on climate change adaptation technologies and integrated catchment management |
| 2. An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level. | **Construction of gabions**<br>• Reduced slope instability and risk of minor mudslides and landslides<br>• Slowed water runoff, increased water infiltration and soil moisture<br>• Reduced soil loss (particularly through reduced gully erosion)<br>• Increased soil organic matter<br>• Increased above-ground biomass<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | • Increased production area<br>• Increased land productivity and crop yield | • Increased farm income<br>• Reduced loss of crops and land caused by slope instability |
| | **Stone lines and contour bunds**<br>• Slowed water runoff, increased water infiltration and soil moisture<br>• Reduced soil loss (particularly through reduced sheet erosion)<br>• Increased soil organic matter<br>• Increased above-ground biomass<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | • Increased production area<br>• Increased land productivity and crop yield | • Reduced agricultural inputs and thus production costs<br>• Increased farm income |
| | **Water-saving irrigation techniques**<br>• Reduced evaporation of soil moisture<br>• Increased water infiltration and soil moisture | • Reduced water consumption<br>• Increased crop yield | • Reduced agricultural inputs and thus production costs<br>• Increased farm income |

| Outcome | Environmental benefits | Social benefits | Economic benefits |
|---|---|---|---|
| | • Delivered constant moisture to root zone (reduced drought-stress)<br>• Reduced soil loss (particularly through reduced rain-splash erosion caused by overhead irrigation)<br>• Increased above-ground biomass of crops, reduces above-ground biomass of weeds<br>• Reduced plant pathogens e.g. fungus | | • Reduced loss of crops to drought or dry spells |
| | **Diversification of crops and use of drought-resilient crops**<br>• Increased biodiversity conservation (of genetic resources)<br><br>**Horticulture in greenhouses**<br>• Increases intensity of cultivation through consolidation of production area | • Increased diversity of production within farms<br>• Increased nutrition for local community<br>• Increased crop yield<br>• Reduced crop susceptibility to pests | • Increased farm income<br>• Reduced risk of economic failure due to diversification of production |
| | **Intercropping, agroforestry and woodlots**<br>• Protected crops and livestock from extreme climatic conditions<br>• Increased biodiversity conservation<br>• Reduced slope instability and risk of minor mudslides and landslides<br>• Slowed water runoff<br>• Increased soil moisture<br>• Reduced soil loss (through reduced sheet and gully erosion)<br>• Increased soil organic matter<br>• Increased above-ground biomass<br>• Increased climate regulation and carbon sequestration<br>Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | • Increased diversity of production on and off-farm<br>• Increased provision of food and fodder.<br>• Increased nutrition for local community<br>• Increased provision of fuelwood and timber (reduces pressure on natural forests) | • Increased farm income<br>• Reduced risk of economic failure in response to diversification of production |
| | **Rehabilitation/restoration of degraded forest ecosystems**<br>• Increased biodiversity conservation<br>• Increased water infiltration<br>• Increased above-ground biomass (increased plant survival)<br>• Protected crops and livestock from extreme climatic conditions<br>• Reduced slope instability and risk of minor mudslides and landslides<br>• Slowed water runoff | • Increased nonmaterial benefits (e.g. scenic resources, recreation, science and education, spiritual and religious) derived from increased conservation value of landscape | • Reduced inputs and thus production costs<br>• Increased farm income<br>• Reduced loss of trees to drought or dry spells<br>• Increased ecosystem services such as tourism (e.g. hiking) and recreation |

| Outcome | Environmental benefits | Social benefits | Economic benefits |
|---|---|---|---|
| | • Increased soil moisture<br>• Reduced soil loss (through reduced sheet and gully erosion)<br>• Increased soil organic matter<br>• Increased climate regulation and carbon sequestration<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | | |
| | **Sustainable harvesting from 'healthy' forest ecosystems**<br>• Protected crops and livestock from extreme climatic conditions<br>• Increased biodiversity conservation<br>• Reduced slope instability and risk of minor mudslides and landslides<br>• Slowed water runoff<br>• Increased soil moisture<br>• Reduced soil loss (through reduced sheet and gully erosion)<br>• Increased soil organic matter<br>• Increased above-ground biomass<br>• Increased climate regulation and carbon sequestration<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | • Increased provision of food and fodder<br>• Increased nutrition for local community | • Increased farm income |
| | **Livestock exclusion zones**<br>• Increased above-ground biomass<br>• Increased biodiversity conservation<br>• Slowed water runoff<br>• Increased soil moisture<br>• Reduced soil loss (particularly through reduced sheet erosion)<br>• Increased soil organic matter<br>• Increased climate regulation and carbon sequestration<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o reduced groundwater river pollution | • Increased nonmaterial benefits (e.g. scenic resources, recreation, science and education, spiritual and religious) derived from increased conservation value of landscape | • Increased ecosystem services such as tourism (e.g. trekking) and recreation |
| | **Sowing of palatable and indigenous grass seeds in degraded rangelands and introducing rotational grazing** | • Increased pasture productivity and carry capacity | • Increased farm income through increased carrying capacity |

| Outcome | Environmental benefits | Social benefits | Economic benefits |
|---|---|---|---|
| | • Increased above-ground biomass<br>• Increased biodiversity conservation<br>• Slowed water runoff<br>• Increased soil moisture<br>• Reduced soil loss (particularly through reduced sheet erosion)<br>• Increased soil organic matter<br>• Increased climate regulation and carbon sequestration<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o reduced groundwater river pollution | | |
| 3. Existing knowledge management platforms supported for integrated catchment management and EbA. | • Involving communities in developing the approaches allows more flexible adaptation efforts, i.e. catering specifically for reduced soil nutrients through soil erosion etc. | • Improved livelihoods through adoption of climate-resilient adaptation technologies and innovative climate information technologies within and surrounding vulnerable communities<br>• Increased knowledge through training provided to relevant local-level government and NGO officials<br>• Increased community-uplift in response to developing their own project proposals for on-the-ground implementation within their communities | • Facilitation of microfinance to successful community-led small-scale projects focusing on community-based adaptation |

## C. Cost-effectiveness

Alternatives to the baseline context in Tajikistan include the null alternative, the traditional alternative and the proposed alternative. These three scenarios are presented below.

**Scenario 1. 'Do nothing' approach**
The first scenario assumes that no interventions will be implemented. This means that the baseline scenario will remain, and the negative impacts of climate change will continue to cause significant losses to the economy. Climate change impacts such as rising temperatures and increases in intense rainfall events will be exacerbated by business-as-usual practices. Rural Tajik communities will continue to lack the required technical capacity to climate-proof their livelihoods and will continue to be impacted disproportionately by the negative impacts of climate change. Predicted declines in the agricultural yield under climate change conditions will further reduce the food security in the country, while an increasing number of climate change migrants will be exposed to hydrometeorological risks.

**Scenario 2. Use of a non-EbA approach**
Traditional approaches to managing the impacts of climate change may include engineered structures that protect infrastructure, agricultural fields and communities from floods and landslides. Such approaches may also result in an increase of agricultural inputs to offset a loss in soil productivity. These types of approaches are likely to yield adaptation benefits to local communities but have a number of undesirable shortfalls. Firstly, traditional approaches generally do not generate significant co-benefits. These approaches are inflexible in that each intervention generally only serves one purpose. Secondly, traditional approaches are frequently technology-oriented and require technical capacity to implement. This capacity is often lacking among local communities in Tajikistan. Lastly, traditional approaches are frequently costly, with significant associated capital and operational costs. Neither the GoT or local communities currently have the financial capacity to construct and maintain technological solutions – particularly as maintenance costs are likely to increase with the increasing impacts of climate change.

**Scenario 3. Integrated catchment management, including EbA solutions**
Under this scenario, the target communities in Tajikistan will be introduced to EbA practices that include CSA and SLM interventions. Community members will be trained on how to adopt these EbA solutions to manage the landscape through an integrated cross-cutting strategy rather than by each sector. This integrated catchment management strategy will be focused on increasing the resilience of small-scale farmers and pastoralists in Tajikistan to the impacts of climate change. Such EbA interventions are inherently multi-use, providing several social, economic and environmental co-benefits. EbA interventions are also frequently cheaper and easier to maintain than their traditional counterparts. As a result, community members are more likely to continue maintaining EbA interventions in the long term.

**Preferred solution**
The preferred solution for the proposed project is Scenario 3, which encompasses an integrated approach to catchment management for vulnerable Tajik communities. Although Scenario 2 is a technically viable alternative, the preferred solution has been chosen because: i) EbA is likely to be cost-effective; and ii) EbA interventions are likely to be more sustainable than a traditional approach. The overall objective of the proposed project is cost-effective in that a proactive approach to climate-risk management will be promoted throughout Tajikistan. Climate impacts are predicted to cost the country more than US$132 million annually by 2050. Preventative

measures, such as climate-informed planning and development, will avoid some of these costs. Such a preventative approach to climate risks is more cost-effective than reactionary measures.

Project outputs will focus on improving catchment management, including landscape management and planning processes, in rural areas of Tajikistan. In so doing, the project will create an enabling environment for climate change adaptation to occur in vulnerable catchments. These processes are inherently replicable across the country, thereby strengthening the sustainability, reach and impact of the project objectives. The strengthened knowledge management provided through Outcome 3 will further promote adaptive management of EbA and climate risk management in Tajikistan. This will ensure that future activities in the country benefit from a strengthened local knowledge base for EbA and catchment management.

At a local level, the project will promote the use of EbA interventions, which have been demonstrated to have favourable cost-benefit ratios while providing significant sustainable development co-benefits[255,256]. For example, soil conservation measures have been shown to increase crop productivity by between 15–25%[257]. Project activities will support EbA interventions in target districts and sites[258], providing improved livelihoods and value addition for agricultural and pastoral products. This has been shown to be more cost-effective for increasing income and reducing poverty than support for other sectors[259]. Introducing agrobiodiversity and ecosystem service improvement practices to smallholder farmers ensures that farm-based livelihoods will be resilient to climate change and variability[260].

The cost-effectiveness of the project's on-the-ground adaptation interventions [under Outcome 2] will be greatly enhanced by the EbA approach. A growing scientific literature library highlights that EbA measures result in a greater ratio of cost-benefit compared to the implementation of hard infrastructure. For example, an economic analysis of the restoration and rehabilitation of degraded woodlands[261] estimates internal rates of return of 20–60% and cost-benefit ratios of up to 35:1 for grasslands[262]. An example of the cost-effectiveness of EbA approaches also recently emerged from an economic analysis undertaken in Lami, Fiji[263]. This analysis included assessments of the costs and benefits of three approaches to watershed management, namely: i) EbA measures only; ii) hard infrastructure interventions only; and iii) a hybrid approach applying both EbA measures and hard infrastructure interventions. Results of the analysis demonstrated that EbA options for watershed management are at least twice as cost-effective as hard infrastructure engineering options – i.e. a cost-benefit ratio of US$19.50:1 for EbA compared to US$9:1 for hard infrastructure. The cost-effectiveness of EbA approaches is expected to benefit the project through the implementation of EbA activities in target project sites.

[255] Jones HP, Hole DG & Zavaleta ES. 2012. Harnessing nature to help people adapt to climate change. Nature Climate Change 2:504–509.
[256] UNEP/STREP. 2012. A comparative analysis of ecosystem-based adaptation and engineering options for Lami Town, Fiji: Synthesis Report.
[257] Tesfaye A, Brouwer R, van der Zaag P & Negatu W. 2016. Assessing the costs and benefits of improved land management practices in three watershed areas in Ethiopia. International Soil and Water Conservation Research 4:20–29.
[258] Target sites will be identified during project inception.
[259] Ligon E & Sadoulet E. 2007. Estimating the effects of aggregate agricultural growth on the distribution of expenditures. Background Paper for the World Development Report.
[260] van Noordwijk M, Tata HL, Xu J, Dewi S & Minang PA. 2011. Segregate or integrate for multifunctionality and sustained change through rubber-based agroforestry in Indonesia and China. In Nair PKR & Garrity DP (eds) "Agroforestry: The Future of Global Land Use", Springer, The Netherlands pp 69–104.
[261] from several studies occurring across different sites
[262] De Groot RS, Blignaut J, van der Ploeg S, Aronson J, Elmqvist T & Farley J. 2013. Benefits of investing in ecosystem restoration. *Conservation Biology* 27:1286–1293.
[263] Rao NS, Carruthers TJB, Anderson P, Sivo L, Saxby TA, Durbin T, Jungblut V, Hills T & Chape S. 2013. An economic analysis of ecosystem-based adaptation and engineering options for climate change adaptation in Lami Town, Republic of the Fiji Islands. A technical report by the Secretariat of the Pacific Regional Environment Programme. Apia, Samoa.

## D. Consistency with national priorities

As a country, Tajikistan only recently started modifying their national policies and institutional frameworks to integrate the need for adaptation. Although the country has a relatively strong legislative framework regarding environmental protection, very few strategies or policies developed prior to 2010 acknowledge climate change as a cross-sector threat.

While climate change has not previously been acknowledged as a discrete threat, the importance of agriculture and water resources to the economy and to the country as a whole has been recognised. There are, therefore, numerous older policies, strategies and programmes that are synergistic with the outcomes of the project. The most significant of these is the 2003 National Action Plan for Climate Change Mitigation (NAPCC)[264,265]. This is the only strategic framework specifically addressing the implications of climate change and is also strongly aligned to all three project outcomes. Other significant plans that align to project outcomes include the National Environmental Action Plan (NEAP)[266,267] and the National Programme of Actions to Combat Desertification (NPACD)[268].

More recently, policies and strategies have moved to incorporating specific climate change terminology. These include the latest poverty reduction strategy, 'Living Standards Improvement Strategy of Tajikistan for 2013–2015' (LSIS)[269], which links water resource management and agricultural reform to a wider reduction in poverty. The 2011 'Strategic Program for Climate Resilience'[270] is another synergistic programme that includes agriculture and SLM as one of its six focal components. The most recent National Development Strategy (NDS)[271] reiterates the vulnerability of Tajikistan to climate change and advocates for the reduction and mitigation of the negative effects of climate change across multiple sectors. This strategy also identifies the centrality of agricultural productivity, water resources and capacity building to realise the targeted socio-economic growth by 2030.

Several of the more recent national strategies and policies in Tajikistan have already expired without renewal, for example NEAP 2011–2015. Other national strategies have been planned and approved but never implemented because of financial constraints, for example the State Programme on the Protection of River Banks[272].

The GoT has made significant progress within its water sector by developing the Water Sector Reforms Programme for 2016–2025 (Water Reform Programme)[273]. While the programme is likely to modernise water management in Tajikistan, it does not adequately consider the impacts of climate change on the water sector. Furthermore, the focus of the Water Reform Programme is restricted largely to water resources management and does not adequately consider the impacts of multiple hazards at the river basin and watershed level. While flood management will

[264] also referred to as 'The National Action Plan on Climate Resilience'
[265] NAPCC 2003.
[266] also referred to as 'The National Action Plan for Environmental Protection'
[267] National Environmental Action Plan (NEAP). 2006. Government of Tajikistan.
[268] National Program of Actions to Combat Desertification (NPACD). 2001. Government of Tajikistan.
[269] LSIS 2013.
[270] Strategic Program for Climate Resilience (SPCR). 2011. Government of Tajikistan.
[271] NDS 2016.
[272] The State Programme on the Protection of River Banks is detailed in the Intended Nationally Determined Contribution (INDC) towards the achievement of the global goal of the UN Framework Convention on Climate Change (UNFCCC) by the Republic of Tajikistan.
[273] Water Reform Programme 2015.

be the responsibility of the RBOs established under the programme, other climate-linked hazards such as erosion and landslides are not addressed through its implementation[274].

Table 9 outlines the relevant national and sub-national strategies, plans and programmes that relate to project activities. For each, alignment to project outcome level is indicated.

[274] Water Reform Programme 2015.

**Table 9.** Consistency of project outcomes with national policies, plans, strategies and development goals.

| Strategy | Year enforced | Alignment |
|---|---|---|
| **National strategies** | | |
| National Development Strategy 2016–2030 (NDS)[275] | 2016 | The primary focus of the NDS is on the long-term development of Tajikistan to improve living standards for the population. NDS objectives to achieving this include: i) poverty eradication; ii) sustainable economic growth; iii) promotion of sustainable consumption and production patterns; and iv) sustainable use of natural resources.<br><br>The vulnerability of the Tajik population to climate change is acknowledged throughout the NDS, with the importance of agriculture and water management to alleviating this highlighted.<br><br>Outcome 1 and 2 of the project therefore align with achieving the ultimate goal of the NDS in the country. |
| National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity (CBD Strategy)[276] | 2003 | Several interconnected components contribute to the primary objective of the CBD Strategy.<br><br>A priority element of the 'geo-system-level approach' outlined in the CBD Strategy is the restoration and reforestation of degraded landscapes to reduce soil erosion, particularly in landslide and already eroded areas.<br><br>Outcome 2 is aligned with this strategic component through implementing EbA activities that contribute to restoration and reforestation in degraded landscapes. |
| National Strategy on Disaster Risk Management for 2010–2015 (NDRMS)[277] | 2010 | The NDRMS identifies the significance of climate change-related disasters in the country such as droughts and high-water events. It is also acknowledged in the strategy that mitigation for these types of events needs to be incorporated into the design phase of new development projects.<br><br>The project is therefore aligned with the NDRMS under Outcome 1, relating to integrated catchment management which includes the improvement of water monitoring systems. |
| The National Climate Change Adaptation Strategy (NCCAS)[278] | 2016 | Within the NCCAS there are guidelines provided for priority adaptation actions to be undertaken in Tajikistan. The proposed project is well-aligned with the NCCAS because they both recognise that climate change effects on the agricultural sector result in significant negative impacts for the population. The NCCAS also recognises the potential of EbA as an effective adaptation approach.<br><br>The NCCAS is currently in draft format and has not yet been accepted by the government. Notwithstanding this information, the proposed project is aligned with the NCCAS through both Outcome 1 and 2. |
| Living Standards Improvement Strategy for the Republic of Tajikistan for | 2013 | LSIS recognises the cross-cutting nature of climate change adaptation in relation to environmental sustainability, economic growth and reducing poverty. The importance of water, soil quality and improving the capacity to collate and disseminate climate change information are also identified as important fields for poverty reduction.<br><br>In this regard, all three outcomes of the project align with LSIS objectives. |

[275] NDS 2016.
[276] CBD Strategy 2003.
[277] National Strategy on Disaster Risk Management for 2010–2015 (NDRMS). 2010. Republic of Tajikistan, Dushanbe.
[278] NCCAS 2016.

| Strategy | Year enforced | Alignment |
|---|---|---|
| 2013–2015 (LSIS)[279] | | |
| **National programmes and plans** | | |
| National Program of Actions to Combat Desertification (NPACD)[280] | 2001 | Outcome 2 of the project aligns with the NPACD focus on 'rational land tenure' and 'measure on rational nature using'. These focal points refer to the sustainable use of natural resources, with clear guidelines on reforestation and mitigating the effects of water erosion.<br><br>Outcome 3 aligns with two further objectives of the NPACD, namely: i) the development of better platforms to disseminate climate change information; and ii) increasing the role of the local population in collecting and collating data. |
| Strategic Program for Climate Resilience (SPCR)[281] | 2011 | The SPCR was developed in response to the specific vulnerability of Tajikistan to climate change and the associated economic, environmental and social impacts. It is the strategic overview of the Pilot Programme for Climate Resilience (PPCR), which consists of six core components. One of these core components is 'Agriculture and sustainable land management', which focusses on incorporating climate resilience into all sectors of land management.<br><br>Outcome 2 of the proposed project has a strong alignment with this component. |
| National Action Plan for Climate Change Mitigation (NAPCC)[282,283] | 2003 | The NAPCC is the only strategic framework in the country that specifically addresses the implications of climate change. All outcomes of the project are strongly aligned with the NAPCC. |
| National Environmental Action Plan (NEAP)[284,285] | 2006 | The NEAP focusses on a broad spectrum of current environmental concerns, many of which are likely to be exacerbated by climate change. Amongst the most prevalent concerns included in the NEAP include: i) soil erosion; ii) deforestation and land degradation; iii) high water events; and iv) water scarcity.<br><br>Outcome 1 and 2 of the project align with these concerns. The NEAP also recognises the need to improve environmental knowledge in Tajikistan at both institutional and local levels, which is complemented in Outcome 3 of the project. |
| Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme)[286] | 2015 | Under the Water Reform Programme, the GoT is initiating a shift towards managing water resources according to hydrographic rather than administrative boundaries. Further to this, the programme aims to promote the implementation of Integrated Water Resources Management (IWRM) at the basin level. IWRM was specifically defined for Tajikistan as being:<br><br>*"based on the interaction of various sub-sectors with the objective good accessibility to high quality water and sanitation services for the population, ensuring water availability for irrigation, hydropower, environment and other users in river basins defined by hydrographic boundaries. IWRM promotes the protection of water resources from over-exploitation and pollution; provides protection of vulnerable mountain environments including river banks and floodplains from flooding and erosion, and facilitates public participation in decision-* |

[279] LSIS 2013.
[280] NPACD 2001.
[281] SPCR 2011.
[282] NAPCC 2003.
[283] also referred to as 'The National Action Plan on Climate Resilience'
[284] NEAP 2006.
[285] also referred to as 'The National Action Plan for Environmental Protection'
[286] Water Reform Programme 2015.

| Strategy | Year enforced | Alignment |
|---|---|---|
| | | *making, planning, financing and development of water resources in the interests of economic growth, sustainable development of the society and preservation of the environment."* [287]<br><br>River Basin Organisations (RBOs) and River Basin Councils (RBCs) will be established in each of the six identified basins, as well as in sub-basins as required. RBOs will mainly be responsible for: i) planning the use and protection of water resources annually and in the long-term; and ii) monitoring the distribution of water as well as the state of rivers. RBCs will mainly be responsible for reviewing the plans developed by the RBOs and managing interactions with stakeholders such as water users and Water User Associations (WUAs).<br><br>RBOs are expected to become operational in 2019, with the GoT being expected to allocate ~US$160,000 annually towards the operation of RBOs and RBCs.<br><br>Outcome 1 aligns with the Water Reform Programme in involving RBOs and RBCs in developing an integrated catchment management strategy for the KRB. |
| Agricultural Reform Programme of the Republic of Tajikistan for 2012–2020[288] | 2012 | The Agricultural Reform Programme includes a direct focus on mitigating the negative impacts of climate change for agricultural production. This includes the primary activity of 'systematic reduction of soil erosion, land degradation and deforestation by improving natural resources management'. The programme includes a focus on EbA strategies with emphasis on soil erosion activities.<br><br>Both Outcome 1 and 2 of the project align with these focal points of the Agricultural Reform Programme.<br><br>Another important component of the programme is the 'development and establishment of information management systems that would enable communities, local and national authorities to effectively collect, record and analyse reliable information on the impact of natural disasters and climate change'. Outcome 3 of the project is strongly aligned with this component. |
| **Strategies with a focus on climate change** | | |
| Greenhouse Gas Abatement Strategy (GHG Strategy) included in the NAPCC[289] | 2003 | In order to meet the UNFCCC commitments for Tajikistan, the GHG Strategy was developed with the focus to address the problem of source-based anthropogenic emissions.<br><br>Outcome 2 of the proposed project aligns with the objective of promoting sustainable forms of agriculture in light of climate change considerations.<br><br>Additionally, Outcome 2 aligns the priority of enhancing natural sinks of carbon including forests and soils. |
| Strategy of Adaptation to Climate Change, Prevention and Minimization of its Adverse Effects | 2003 | In order to meet the UNFCCC commitments for Tajikistan, the Adaptation Strategy was included within the NAPCC to ensure that climate change adaptation remained a focal point for development in the country.<br><br>Outcome 2 and 3 of the project align with the following components of the strategy:<br>• improvement of systematic observation and monitoring network for ensuring timely adjustment of adaptation measures; and |

[287] Water Reform Programme 2015.
[288] Agricultural Reform Programme for 2012–2020 of the Republic of Tajikistan. 2012. Ministry of Agriculture, Government of Tajikistan.
[289] NAPCC 2003, Section 8: Greenhouse Gas Abatement Strategy.

| Strategy | Year enforced | Alignment |
|---|---|---|
| (Adaptation Strategy) included in the NAPCC[290] | | • improvement of the data collection system and analysis, interpretation and dissemination of the results among the end users.<br><br>Outcome 1 of the project is aligned with two of the priorities relating to water resources:<br>• development of measures in the field of water resources protection, water and energy saving in the conditions of climate change; and<br>• development of new, and improvement of existing technical and economical tools on water use at national and regional levels.<br><br>In addition, Outcome 2 of the project aligns with four of the five 'measures of adaptation and minimisation of adverse impacts of climate change' relating to land use. These are listed below.<br>• Zoning of territory depending on the extent and type of influence of climatic factors on the condition of lands taking into account its vulnerability to the different forms of erosion.<br>• Setting a selection of soil protection measures for specific landscapes according to the influence of climatic and anthropogenic factors.<br>• Conducting land-reclamation measures, which include crop rotation, soil protection and limiting the ploughing of steep lands that will help to conserve the humus in the soils under the expected conditions of climate change.<br>• Forest rehabilitation measures in the regions prone to drought and wind erosion. |
| **Laws** | | |
| Land Code of The Republic of Tajikistan (Land Code)[291] | 1996 | The Land Code regulates all land relations and is directed at the rational use and protection of land. This focus is targeted to improve the fertility of soil, and to maintain and improve the natural environment. In this way, opportunities for equal development of all forms of economic activity will be promoted in Tajikistan. |
| Water Code of The Republic of Tajikistan (Water Code)[292] | 2000 | The Water Code is aimed at regulating water relations to ensure rational use. This is so that there is adequate supply for the needs of the population and the natural environment. |
| Law of the Republic of Tajikistan on Land Reform (Land Reform Law)[293] | 1994 | The Land Reform Law includes tasks listed by the GoT specifically for further developing land management. These tasks are all designed with the purpose to increase the agricultural production of the country and include the: i) creation of optimal conditions for equal rights; ii) development of various forms of land management; iii) formation of a multi-structural economy; iv) rational use; and v) the protection of land. |
| Law of the Republic of Tajikistan on Land Management (Land | 2001 | The objective of the Land Management Law in Tajikistan is to create conditions for equal development for all sector in the country. |

[290] NAPCC 2003, Section 9: Strategy of Adaptation to Climate Change, Prevention and Minimization of its Adverse Effects.
[291] Land Code of the Republic of Tajikistan (Land Code). No. 498 of 1997. Republic of Tajikistan.
[292] Water Code: Law of the Republic of Tajikistan (Water Code). 2001. Government of Tajikistan, Dushanbe.
[293] Republic of Tajikistan Law on Land Reform (Land Reform Law). 1994. Republic of Tajikistan.

| Strategy | Year enforced | Alignment |
|---|---|---|
| Management Law)[294] | | |
| Law About Environmental Protection | 2011 | This law provides the legal base for developing the state policy on environmental protection. Further to this, it aims to conserve the natural resources of the country and ensure the environmental sustainability for socio-economic development. Therefore, the law ensures that the human right to a healthy environment is guaranteed. |
| Law on Ecological Expertise | 2012 | The law defines principles and norms for environmental experts to adhere to and provides for the prevention of negative impacts on planned economic interventions on environment. |
| Law on the Republic of Tajikistan on *Dehkan* Farms (*Dehkan* Law)[295] | 2016 | This law defines the legal base for establishing and maintain the efficient functioning of *dehkan* enterprises. In addition, the law aims to create an enabling environment for the development of farming in the country. |

[294] Law of the Republic of Tajikistan "on Land Management" (Land Management Law). 2001. Republic of Tajikistan.
[295] Republic of Tajikistan Law "on *Dehkan* Farms" (*Dehkan* Law). 2002. Republic of Tajikistan.

## E. Consistency with national technical standards

The proposed project is aligned with the requirements of the March 2016 Revision of the Environmental and Social Policy (ESP) of the Adaptation Fund (see Part II: K)[296]. Prior to project approval, the Full Proposal will be screened according to the UNDP Social and Environmental Safeguards Procedure[297]. This is to ensure that the necessary safeguards have been addressed and incorporated into the project design.

In addition to complementing the efforts of the CEP and the GoT to improve catchment management in the KRB, project activities will increase rural Tajik resilience to climate change in throughout the country. The Adaptation Fund-accredited Implementing Agency, UNDP, together with CEP and relevant national partners, will ensure that the project follows procedures outlined in the ESP. This includes the requirement that project activities funded by the Adaptation Fund reflect local circumstances and needs and draw upon national actors and capabilities.

The project will also adhere to all relevant national technical standards. At the Full Proposal development stage, the following legislation has been identified with relevance to the proposed activities:

- the 1996 Land Code of The Republic of Tajikistan[298];
- the 2000 Water Code of The Republic of Tajikistan[299];
- the 2001 Law of the Republic of Tajikistan on Land Management[300];
- the 2001 Law About Environmental Protection; and
- the 2012 Law on Ecological Expertise.

Given the small scale of the project's EbA interventions in the target sites and communities, as well as their focus on environmental protection, Environmental Impact Assessments (EIAs) are not expected to be necessary for any of the planned interventions. In addition, the proposed projects activities are in line with national social norms, including gender equality and equal access.

## F. Duplication in project design

There are a number of adaptation projects being implemented in Tajikistan with varying but similar objectives, including livelihood improvement, disaster risk reduction (DRR) and building climate resilience. The proposed project will complement these existing projects. In particular, there are three ongoing initiatives in the country that project activities will complement. These ongoing projects include: i) 'Livelihood Improvement in Tajik-Afghan Cross-border Areas' (LITACA); ii) 'Strengthening Disaster Risk Reduction and Response Capacities'; and iii) 'Facilitating Climate Resilience in Tajikistan'. Brief outlines of these projects are provided below. In addition to an overview of each project, justification is provided for why the project will not be a duplication of the respective projects' efforts.

During implementation of project activities, a team will work closely with the project representatives – as well as other relevant initiatives – to identify the best possible opportunities

[296] Refer to Part II: K on the environmental social impacts and risks of the project.
[297] UNDP Social and Environmental Safeguards Procedure.
[298] Land Code 1997.
[299] Water Code 2001.
[300] Land Management Law 2001.

for enhancing complementarity. Table 10 outlines the alignment between ongoing projects and proposed project activities in Tajikistan.

**Table 10.** Alignment of current and ongoing initiatives in Tajikistan with the proposed project.

| Project title | Fund, grant amount(s) and timeline | Objective | Alignment with proposed project |
|---|---|---|---|
| Livelihood improvement in Tajik-Afghan cross-border areas (LITACA) | **Fund:** Government of Japan (GoJ)<br><br>**Fund grant:** US$10,559,227<br><br>**Timeline:** 2018–2020 | The LITACA project is the logical continuation of the successes and lessons of the LITACA Phase I Project which took place between 2014 and 2017. Phase II aims to build on the results of Phase I by further strengthening the living standards of selected rural communities in the bordering areas of Tajikistan and Afghanistan. | • Best practices and lessons learned on capacity-building of people in rural settings, particularly women, can contribute to knowledge sharing. |
| Strengthening disaster risk reduction and response capacities | **Fund:** Government of Japan (GoJ)<br><br>**Grant:** US$10,600,000<br><br>**Timeline:** 2016–2020 | Through four interlinked outcomes, this project will support the Government of Tajikistan (GoT) to enhance the population's resilience to natural and man-made disasters. It will achieve this by improving policy and operational frameworks for environmental protection and sustainable management of natural resources. | • Best practices and lessons learned on climate risk-reduction interventions can contribute to knowledge sharing. |
| Facilitating climate resilience in Tajikistan | **Fund:** Government of Russian Federation (GoRF)<br><br>**Grant:** US$950,130<br><br>**Timeline:** 2018–2020 | Through the effective use of climate and disaster risk information, this project aims to facilitate access to climate finance for communities in disaster-prone mountainous regions of Tajikistan. The climate-resilience of these communities will therefore be enhanced. | • Information from community consultations will contribute to existing understanding of community preferences for risk management options.<br>• Best practices and lessons learned on climate risk-reduction interventions can contribute to knowledge sharing. |
| Kofirnighan River Basin Plan and Management (KRBMP)[301] | Unpublished March 2018 draft authorised by the Fergana Valley Water Resources Management<br><br>**Timeline:** 2018–2019 | The KRBMP will support the GoT in implementing the Water Sector Reform Programme for 2016–2025 by developing institutional mechanisms to improve water resources management at the basin- and local-level in the KRB. It also aims to develop a long-term basin plan for the use, protection and development of water resources, as well as annual or seasonal plans for the distribution and management of KRB water resources. | • Focused information on sustainable water resources management in the KRB can contribute to the development of basin-specific catchment management strategies. |
| Building climate resilience of vulnerable and food insecure communities through capacity strengthening and livelihood | **Fund:** Green Climate Fund (GCF)<br><br>**Fund grant:** US$9,300,000<br><br>**Partner:** World Food Programme (WFP)<br><br>**Partner grant:** US$346,000 | This initiative will introduce adaption measures to address climate change effects leading to declines in agricultural yields, increases in food prices and reduced agricultural wages. It will focus on the most vulnerable and food insecure communities in the Rasht valley, Khatlon and Gorno-Badakhshan Autonomous Region (GBAO) regions. | • Possibility for using data, methodologies and practices related to SLM. |

[301] Fergana Valley WRM 2018 KRBMP Unpublished.

| Project title | Fund, grant amount(s) and timeline | Objective | Alignment with proposed project |
|---|---|---|---|
| diversification in mountainous regions of Tajikistan[302] | **Timeline:** 2018–2022 | | |
| Tajikistan: building climate resilience in the Pyanji River Basin[303] | **Fund:** Strategic Climate Fund<br><br>**Grant:** US$21,550,000<br><br>**Timeline:** 2013–2020 | The project aims to increase resilience to climate vulnerability and change of communities in the Pyanj River Basin. The project's impact will be improved livelihoods of Pyanj River Basin communities vulnerable to climate variability and change. | • Useful information and practices on diversified livelihoods to contribute to knowledge sharing. |
| Climate adaptation through sustainable forestry in important river catchment areas in Tajikistan (CAFT) | **Fund:** KfW Development Bank<br><br>**Grant:** US$9,884,880<br><br>**Timeline:** 2015–2018 | Rehabilitation, conservation and sustainable use of forests contribute to the adaptation of the country to climate change and the conservation of biodiversity, as well as to the improvement of livelihoods of the local population in the project areas. | • Useful information and practices on the use and management of agro-biodiversity conservation.<br>• Information and best practices for conservation and adaptation management for replication in other areas of the country. |
| Climate change adaptation in Panj River Basin[304] | **Fund:** Asian Development Bank (ADB)<br><br>**Timeline:** 2015–2020 | The project aims to rehabilitate water supply systems in seven rural settlements adjacent to the town of Kulob located in Vose and Panj districts. | • Best practices and lessons learned on rehabilitation in rural settings can contribute to knowledge sharing. |
| Tajikistan: Water Resources Management in Pyanj River Basin Project[305] | **Fund:** ADB<br><br>**Grant:** US$25,000,000<br><br>**Partner:** Japan Fund for Poverty Reduction<br><br>**Partner grant:** US$5,000,000<br><br>**Timeline:** 2016–2022 | To improve institutional and physical capacities of water resources management (WRM) system in PRB of southern Tajikistan. | • Information on WRM can contribute to the development of water catchment strategies. |

[302] Green Climate Fund (GCF). 2018. Project FP067: Building climate resilience of vulnerable and food insecure communities through capacity strengthening and livelihood diversification in mountainous regions of Tajikistan. Projects and programmes. Available at: https://www.greenclimate.fund/-/building-climate-resilience-of-vulnerable-and-food-insecure-communities-through-capacity-strengthening-and-livelihood-diversification-in-mountainous-r?inheritRedirect=true&redirect=%2Fwhat-we-do%2Fprojects-programmes%3Fp_p_id%3D122_INSTANCE_VKj2s9qVF7MH%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3D_118_INSTANCE_4ZRnUzRWpEqO__column-2%26p_p_col_count%3D2%26p_r_p_564233524_resetCur%3Dtrue%26p_r_p_564233524_categoryId%3D846529 [accessed 11.07.2018].
[303] Asian Development Bank (ADB). 2018. Tajikistan: Building Climate Resilience in the Pyanj River Basin. Sovereign (Public) Project 45354–002. Available at: https://www.adb.org/projects/45354-002/main#project-pds [accessed 11.07.2018].
[304] UNECE 2017 Environmental Performance Review.
[305] ADB. 2018. Tajikistan: Water Resource Management in Pyanj River Basin Project. Sovereign (Public) Project 47181–002. Available at: https://www.adb.org/projects/47181-002/main [accessed 11.07.2018].

| Project title | Fund, grant amount(s) and timeline | Objective | Alignment with proposed project |
|---|---|---|---|
| Conservation and sustainable use of Pamir Alay and Tein Shan ecosystems for snow leopard protection and sustainable community livelihoods[306] | **Fund:** Global Environment Facility (GEF)<br><br>**Fund grant:** US$4,181,370<br><br>**Partner:** UNDP<br><br>**Partner grant:** US$6,410,000<br><br>**Timeline:** 2016–2021 | Improved environmental protection, sustainable natural resource management, and increased access to alternative energy. | • Useful information and practices on the use and management of sustainable natural resource management. |
| Strengthening Critical Infrastructure against Natural Hazards[307] | **Fund:** International Development Association (IDA) Grant<br><br>**Fund grant:** US$25,000,000<br><br>**Partner:** IDA<br><br>**Partner grant:** US$25,000,000<br><br>**Timeline:** 2017–2023 | The objectives of the Strengthening Critical Infrastructure Against Natural Hazards Project for Tajikistan are to strengthen the recipient's disaster risk management capacities, enhance the resilience of its critical infrastructure against natural hazards, and improve its capacity to respond to disasters. | • Potential for information and best practices to be shared. |

[306] UNDP. 2016. GEF Project Document: Conservation and sustainable use of Pamir Alay and Tien Shan ecosystems for snow leopard protection and sustainable community livelihoods. National Biodiversity and Biosafety Centre (NBBC). ATLAS Award ID: 00085264; Project ID: 00092973; PIMS: 5437.
[307] The Word Bank. 2018. Available at: http://projects.worldbank.org/P158298?lang=en [accessed 23.07.2018].

## G. Knowledge management

For details on knowledge management within the proposed project, refer to Component 3 outlined in Part II: A. Component 3 includes activity-specific details on how information-sharing and knowledge management are included in the project design.

Specifically, knowledge-sharing and management has been integrated into the project design through three outputs. These are summarised below.

Under Output 3.1, existing knowledge management centres will be supported through project activities. These existing centres have been selected based on their focus on development work and/or adaptation within Tajikistan. The UCA is a regional academic institution that is focusing its efforts in rural Tajik communities to improve their resilience to climate change. All data collected by the UCA is accessible by the Open Centre under the DoG. The Open Centre is a housing platform for data and information and is available to the public for viewing and use. By supporting both UCA and the Open Centre, the project activities will encourage researchers to access previous and ongoing work to inform future developments. In addition, awareness will be raised among both government, private institutions and communities through providing support to the knowledge centres.

Under Output 3.2, an impact evaluation framework will be conducted that will enable management that is adaptive and integrated.

Both Output 3.1 and 3.2 will then contribute towards the strengthened knowledge exchange practices between communities and government under Output 3.3. Awareness will also be raised through the strengthened interactions between communities and government.

## H. Consultation process

A wide range of stakeholders were consulted with during the scoping and validation phase of proposed project development. A consolidated mission and stakeholder consultation report is attached as Annex 1.

Importantly, the project's Executing Entity, the CEP, was consulted through the iterative process of refining the project design. As the national organisation responsible for implementing adaptation projects in the country, CEP is comprised of numerous technical experts. Therefore, CEP is well-positioned to ensure that the project design is tailored to local requirements, that it benefits vulnerable groups and includes necessary gender considerations.

A Validation Workshop was held in Dushanbe on 22 June 2018 that included representatives from relevant KRB districts, international organisations, academia and partner projects. Primary stakeholders that will be involved in the implementation of the project are detailed in Table 11, while a complete list of all participants present at the workshop is included in Annex 1.

A complete list of all stakeholders consulted with during the development of the Concept and Full Proposal is included in Table 12.

**Table 11.** Primary stakeholders to be involved in project implementation.

| Stakeholder | Brief description |
|---|---|
| **Committee of Environmental Protection (CEP)** | The CEP is the main specialised governmental body responsible for implementation of the state policy on environmental protection in Tajikistan. Responsibilities of the CEP include the following:<br>• developing drafts of governmental policies, strategies and action plans for environmental protection as well as implementation;<br>• drafts laws, by-laws and decisions for the protection of the environment;<br>• performs monitoring of the implementation of laws, by-laws, state policies and measures on environmental protection;<br>• oversees the implementation process of all environmental conventions where Tajikistan is a member;<br>• acts as the GEF Focal Point;<br>• acts as the GCF National Designated Authority; and<br>• acts as the Adaptation Fund Focal Point. |
| **State Agency on Hydrometeorology (Hydromet) of the CEP** | The Hydromet is responsible for environment-, climate- and hydro-meteorological-related monitoring. It is the agency responsible to formulate and inform the GoT and local authorities on short-term weather forecasts. The scope of activities of the Hydromet are broad and include:<br>• observation and data collection on hydro-, meteorological- and climate-related regimes in Tajikistan;<br>• observation over the extreme weather events and other hydrometeorological disasters in the country;<br>• archiving historic and present data and analyses of the patterns tendencies; and<br>• serving as a National Focal Point under the UNFCCC and provides technical support and policy advice to the CEP for its implementation process; as well as representing the GoT in UNFCCC negotiations. |
| **Ministry of Energy and Water Resources (MEWR)** | The MEWR is tasked with the formulation and implementation of national energy- and water-related policies. Particular climate-related activities of the MEWR include:<br>• the design, revision and regular update of national strategies for energy and water development;<br>• drafting respective legal documents for the improvement and development of energy and water sector-based projects;<br>• monitoring the implementation of National Development Programs and Action Plans on renewable energy sources; and<br>• participating in the strategic development projects on hydropower plants construction. |
| **Open Centre under the Department of Geology (DoG)** | The Central Asian Countries Geoportal is an outcome of cooperation between Geological Survey of Finland and the national geo-institutions in Kazakhstan, Kyrgyzstan and Tajikistan. The geo-sector in Tajikistan is managed by the Head Department of Geology under the GoT as a public property to be the central organ of executive power, state policy management and coordination of work. This falls within the sector of: i) mineral exploration; ii) reproduction of mineral resources; and iii) provision of geological information about natural resources of the Republic of Tajikistan.[308,309]<br><br>Representatives from the Open Centre will be involved in capacity building processes and all training workshops. They will be expected to work together with the UCA in managing all collected information to collate and disseminate it to the public. |
| **University of Central Asia (UCA)** | The UCA is an internationally chartered, not-for-profit secular institution. It was formed as a partnership between the governments of Kazakhstan, the Kyrgyz Republic and Tajikistan under the sponsorship of the Aga Khan Development Network (AKDN). Founded in 2000, |

[308] The Committee of Geology and Resources Exploitation, Ministry of Industry and New Technology of the Republic of Kazakhstan carries out of special executive and regulatory functions in the area of geological studies, rational and complex usage of natural resources and state administration of subsoil use. The State Agency of Geology and Mineral Resources of the Kyrgyz Republic is a central institution working under the government of Kyrgyzstan for collecting, storing and distributing of geo-scientific information and providing authorized policy to the legal exploitation of mineral resources.
[309] Central Asian Counties: Geoportal. 2018. Available at: http://www.cac-geoportal.org/en/index.php/about-us [accessed 23.07.2018].

| | |
|---|---|
| | its first campus opened in 2016 in Naryn, Kyrgyzstan, offering five-year undergraduate programmes in Computer Science (BSc) and Communications and Media (BA). In 2017 the Khorog Campus in Tajikistan was opened, offering five-year undergraduate programmes in Earth and Environmental Sciences (BSc) and Economics (BA).<br><br>The primary role of UCA will be the integration of all information and data made available through the project into education and courses going forward. UCA will also be expected to work with the DoG in collecting, collating and making information publicly accessible and available. |

A list of the stakeholders consulted to date and those that will continue to be consulted with during project inception and implementation are listed below.

**Table 12.** A list of all stakeholders consulted with during development of the proposed project.

| Stakeholder | Stakeholder type |
|---|---|
| Aga Khan Development Foundation | Regional development agency |
| Agency of Statistics | Government agency |
| Asian Development Bank | International development agency |
| ClimAdapt | International organisation |
| Committee for Emergency and Civil Defence | Government agency |
| Committee of Environmental Protection (CEP) | Government agency |
| *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) | International development agency |
| European Union | International organisation |
| Food and Agriculture Organisation of the United Nations (FAO) | International development agency |
| Forestry Agency | Government agency |
| KFW Development Bank | International development bank |
| Ministry of Economic Development and Trade (MEDT) | Government agency |
| Ministry of Energy and Water Resources (MEWR) | Government agency |
| Ministry of Transport | Government agency |
| National Agency on Hydrometeorology (Hydromet) | Government agency |
| Swiss Agency for Development and Cooperation (SDC) | International development agency |
| UNDP Disaster Risk Management Programme (DRMP) | UNDP programme |
| United Nations Children's Fund | International development agency |
| United States Agency for International Development (USAID) | International development agency |
| University of Central Asia | Regional academic institution |
| World Bank | International development bank |

## I. Funding justification

### Component 1. Integrated catchment management to build climate resilience.

*Baseline scenario (without AF resources)*

The **baseline scenario** is that rural development in Tajikistan is not informed by an integrated catchment management strategy. Agricultural productivity will continue to decline as increasing climate change impacts accelerate erosion at a landscape scale. Local communities will continue to be exposed to climate hazards because climate risks are not accounted for in district and sub-district planning and development. Climate information and advisories will not be

disseminated to local farmers in vulnerable catchments because of a lack of adequate climate information services in Tajikistan.

*Additionality (with AF resources)*

The **preferred solution** is that a climate-resilient catchment management strategy is developed and operationalised at the district and sub-district level. This strategy will be informed by multi-hazard climate risk models (MHCRMs) and by detailed climate data from automated weather stations. The strategy will detail appropriate risk management approaches for improving resilience to climate risks and identify mechanisms for disseminating advisories tailored to local communities. Local authorities will be capacitated to implement catchment management strategies. The overall climate resilience of rural communities will be increased because of: i) reduced exposure to climate risk as a result of a climate risk management approach to rural development and land management; and ii) increased adaptive capacity as a result of strengthened local government capacity.

**Component 2. Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes.**

*Baseline scenario (without AF resources)*

The **baseline scenario** is that ecosystems in rural Tajikistan continue to be degraded as a result of a combined effect of unsustainable land management practices and the impacts of climate change. Ecosystems goods and services will be further compromised by rapid erosion, resulting in declines of agricultural productivity and hydropower generation. Hydrometeorological disasters will continue to increase, as ecosystem services such as soil stabilisation and flood attenuation are further compromised. This will result in increasingly negative impacts on Tajikistan's economy and the health and well-being of its population.

*Additionality (with AF resources)*

The **preferred solution** is that EbA is implemented by local communities in rural Tajikistan. EbA interventions will provide goods and services that reduce climate change impacts[310] and strengthen rural livelihoods. Agro-ecological extension centres will be supported to ensure they provide relevant technical support to communities on EbA. This support will also ensure that the implementation of interventions will be informed by fine-scale land-use plans.

The sustainability and replicability of EbA interventions will be ensured through the development of a market environment for EbA. Enterprise Plans (EP) will be developed by communities to implement EbA activities that promote climate resilience.

**Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the KRB.**

*Baseline scenario (without AF resources)*

The **baseline scenario** is that lessons learned and best practices on EbA are not systematically collated. Information on climate risks and EbA will continue to be fragmented. This will hinder the

[310] such as soil stabilisation, flood attenuation and groundwater recharge

effective implementation of EbA interventions as uncertainty around the effectiveness of EbA interventions will remain. Without an appropriate evaluation framework, decision-makers will lack reliable information on the benefits of EbA as well as the effectiveness of different interventions within the local context. Local communities will continue to lack access to comprehensive and reliable information on climate risks and adaptation best practices.

*Additionality (with AF resources)*

By providing support to existing knowledge management centres, these entities will be responsible for collating, analysing and disseminating information on climate risks and EbA. Providing this support thereby ensures that up-to-date information is accessible in a coherent manner. This information will be disseminated to decision-makers and local communities via appropriate communication channels, to ensure that all stakeholders benefit from information on climate risk and adaptation measures. The knowledge centre(s) will share information with local communities through mass media channels such as mobile applications, websites, brochures and radio broadcasts. They will also engage with existing local knowledge exchange structures. In this way, knowledge on climate risks and EbA will be disseminated broadly and in a locally-appropriate manner.

An impact evaluation framework will be developed under Component 3 that will enable the evaluation of the benefits of EbA interventions. This framework will promote the use of sampling methodologies to ensure the accurate attribution of social, economic and environmental benefits to EbA interventions. The knowledge centre will continue to manage and apply the framework beyond the project lifespan, ensuring that future EbA interventions in Tajikistan are monitored adequately.

## J. Sustainability of the project

Project components have been designed to ensure the sustainability and replicability of project benefits in the long term. Specifically, project sustainability will be supported through: i) promoting the active participation of relevant regional[311], national and district level stakeholders in decision-making and implementation of project activities; ii) strengthening institutional and technical capacity at *raion* and *jamoat* levels to ensure that stakeholders have adequate knowledge and skills to maintain the benefits of the project EbA interventions; and iii) raising the awareness of the benefits of integrated catchment management practices, including EbA, CSA and SLM activities, at the village level.

Particular aspects of project sustainability per component are described below.

**Component 1** will develop the capacity for catchment management informed by climate risks. Multi-hazard climate risk models (MHCRMs) developed for the KRB in Output 1.1 will inform future planning to develop climate resilience. Such models will then be readily replicable for other catchments across the country. The PES models developed in Output 1.5 will strengthen the sustainability of project interventions by ensuring sustainable financing for climate-resilient management and EbA.

Agro-ecological extensions centres supported and trained under **Component 2** will also contribute to project sustainability. This is because the impacts of the training will continue beyond the lifespan of the project, continuing to provide extension services to local communities. These

[311] such as representatives from international UCA campuses

communities will use these services to inform the implementation and maintenance of EbA interventions, thereby ensuring the sustainability of such interventions. Moreover, EbA interventions are inherently more sustainable than traditional infrastructure, as ecological infrastructure is multi-purpose and flexible. Generally, EbA interventions require less maintenance than non-EbA alternatives and such maintenance can usually be conducted by unskilled labourers. As a result, the proposed interventions will be more likely to be maintained than non-EbA alternatives.

By supporting the knowledge management centre(s) under **Component 3**, it is ensured that's climate information, as well as lessons learned, are accessible for decision-makers and local communities. The impact evaluation framework [under Output 3.2] will enable adaptive management on project interventions and will also allow for accurate attribution of EbA benefits. This will help to demonstrate the cost-effectiveness of EbA, thereby promoting its use to develop climate resilience in communities across Tajikistan.

## K. Environmental and social impacts and risks

The proposed project activities were evaluated against the Adaptation Fund (AF) Environmental and Social (E&S) Principles to identify potential negative impacts. Results of the preliminary assessment of the project according to the UNDP Social Environmental Screening Policy (SESP) and the AF E&S Principles are listed below.

- Risk assessment: Tentative Low.
- Categorisation: Tentative C (no expected adverse social or environmental impacts).
- Result: Requirement for a thorough social and environmental screening process during the project formulation phase.

The proposed project is not expected to cause any significant environmental or social impacts. An overview of the preliminary analysis of potential environmental and social impacts is provided in the following table.

Despite the positive impacts that will enhance the project results, some environmental and social principles of the AF could be triggered by project activities in terms of the E&S impacts and risks. An evaluation of the project against each of the AF E&S principles is detailed in Table 13. A full SESP

The mitigation measures that will be put in place for each identified risk is detailed in Part III: C on environmental and social risk management for project activities.

**Table 13.** Checklist for environmental and social principles for the proposed project.

| Principle | If further assessment required for compliance, outline potential impacts and risks | No further assessment required for compliance |
|---|---|---|
| *Compliance with the Law* | *No further assessment required* | Project activities will be undertaken in compliance with the domestic laws of Tajikistan and with all relevant international laws. |
| *Access and Equity* | Project activities could restrict availability and/or quality of, and access to, resources or basic services – in particular, to marginalised individuals or groups. | Project activities will be designed to provide fair and equitable access to benefits in a manner that is inclusive. Activities will not exacerbate existing inequities, particularly with respect to marginalised or vulnerable groups. |
| *Marginalized and Vulnerable Groups* | Marginalised groups could potentially be excluded from fully participating in decisions that may affect them. | Project activities have taken into account marginalised and vulnerable groups – including children, women and girls, the elderly, indigenous people, displaced people, people living with disabilities, and people living with HIV/AIDS. |
| *Human Rights* | *No further assessment required* | Project activities will respect and, where applicable, promote international human rights. |
| *Gender Equity and Women's Empowerment* | Women may not be adequately represented with regards to decision-making or participation in the design/implementation of the project's activities. As a result, they may have limited access to resources, opportunities and benefits. | Project activities will be designed and implemented so that all genders are: i) able to participate fully and equitably; ii) receive comparable social and economic benefits; and iii) do not suffer disproportionate adverse effects as per UNDP Gender Mainstreaming Strategy. A gender analysis will be carried out during the Full Proposal development phase to ensure this. |
| *Core Labour Rights* | *No further assessment required* | Project activities will observe the core labour standards of Tajikistan as well as those identified by the International Labour Organisation. |
| *Indigenous Peoples* | *No further assessment required* | Project activities will be designed in accordance with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable national and international instruments relating to indigenous people. |
| *Involuntary Resettlement* | *No further assessment required* | Project activities will not cause any involuntary resettlement of communities. |
| *Protection of Natural Habitats* | *No further assessment required* | Project activities will not involve any conversion or degradation of critical natural habitats, including those that are: i) legally protected; ii) officially proposed for protection; iii) recognised by authoritative sources for high conservation value, including as critical habitats; or iv) recognised as protected by traditional or indigenous local communities. |
| *Conservation of Biological Diversity* | There is a risk that alien and/or invasive alien species are used in reforestation activities. | Project activities will be designed and implemented in a way that avoids any significant or unjustified reduction or loss of biological diversity or the introduction of known invasive species. |

| | | |
|---|---|---|
| *Climate Change* | *No further assessment required* | Project activities will not result in any significant or unjustified increase in GHG emissions or other drivers of climate change. |
| *Pollution Prevention and Resource Efficiency* | The application of pesticides may have a negative effect on the environment or on human health. | Project activities will be designed and implemented in a way that meets applicable international standards for maximising energy efficiency and minimising material resource use, the production of wastes, and the release of pollutants.<br><br>Project interventions are not expected to produce any significant amounts of waste or other pollutants.<br><br>Any potential opportunities identified for improved resource efficiency and pollution reduction during the project development phase will be captured in the project design. |
| *Public Health* | Small-scale construction activities under the proposed project may pose safety risks to community members implementing them. | No negative impacts on population health and well-being have been identified during project design. During Full Proposal development and project implementation, care will be taken to prevent any such risks. |
| *Physical and Cultural Heritage* | During project implementation, there is a risk that physical or cultural heritage sites are disturbed. | Project activities will be designed and implemented in a way that avoids the alteration, damage or removal of any physical cultural resources, cultural sites, and sites with unique natural values recognized as such at the community, national or international level. |
| *Lands and Soil Conservation* | *No further assessment required* | Project activities will be designed and implemented in a way that promotes soil conservation and avoids degradation or conversion of productive lands or land that provides valuable ecosystem services. |

# PART III: IMPLEMENTATION ARRANGEMENTS

## A. Implementation arrangements

### Implementing entity

The Committee for Environmental Protection (CEP) under the Government of the Republic of Tajikistan is the government institution responsible for the implementation of the project and will act as the Executing Agency (EA). The Ministry of Agriculture, Ministry of Energy and Water Resources, Agency for Land Reclamation and Irrigation along with other relevant national entities will act as project partners and will become part of Project Steering Committee.

The Committee for Environmental Protection will be responsible for executing this five-year project with the support of the UNDP under UNDP's National Implementation Modality (NIM). At the request of the Government of Tajikistan, UNDP is the Multilateral Implementing Entity (MIE). The project is nationally implemented (NIM), in line with the Standard Basic Assistance Agreement (SBAA, 1993) and the UN Development Assistance Framework (UNDAF) 2016-2020 between the UN and the Government of Tajikistan, as well as Country Programme Document 2016-2020 between UNDP and the Government of Tajikistan.

As a Multilateral Implementing Entity, UNDP is responsible for providing a number of key general management and specialized technical support services. These services are provided through UNDP's global network of country, regional and headquarters offices and units and include assistance in: project formulation and appraisal; determination of execution modality and local capacity assessment; briefing and de-briefing of staff and consultants; general oversight and monitoring, including participation in reviews; receipt, allocation and reporting to the donor of financial resources; thematic and technical backstopping; provision of systems, IT infrastructure, branding, and knowledge transfer; research and development; participation in policy negotiations; policy advisory services; programme identification and development; identifying, accessing, combining and sequencing financing; troubleshooting; identification and consolidation of learning; and training and capacity building.

As outlined in UNDP's application to the Adaptation Fund Board for accreditation as a Multilateral Implementing Entity, UNDP employs a number of execution modalities determined on country demand, the specificities of an intervention, and a country context. Under the national execution modality proposed, UNDP selects a government entity as the Executing Entity based on relevant capacity assessments performed by UNDP. Please note that UNDP uses slightly different terminology to that used by the operational policies and guidelines of the Adaptation Fund. In UNDP terminology, the "executing entity" is referred to as the "Implementing Partner" in countries which have adopted harmonized operational modalities and the "Executing Entity" in countries which have not yet done so. The Executing Entity is the institutional entity entrusted with and fully accountable to UNDP for successfully managing and delivering project outputs. It is responsible to UNDP for activities including: the preparation and implementation of work plans and annual audit plans; preparation and operation of budgets and budget revisions; disbursement and administration of funds; recruitment of national and international consultants and personnel; financial and progress reporting; and monitoring and evaluation. As stated above, however, UNDP retains ultimate accountability for the effective implementation of the project.

The CEP will assume responsibility for the implementation, and the timely and verifiable attainment of project objectives and outcomes. It will provide support to the management unit, and inputs for, the implementation of all activities. The CEP will nominate a high-level official who will serve as the National Project Director (NPD) for project implementation. The NPD will chair the Project Steering Committee and be responsible for providing government oversight and guidance to the implementation. The NPD will not be paid from project funds but will represent a Government in kind contribution.

UNDP has the technical and administrative capacity to support the Committee for Environmental Protection and assume the responsibility for mobilising and effectively applying the required inputs to reach the expected outputs.

The financial arrangements and procedures for the project are governed by the UNDP rules and regulations for National Implementation Modality (NIM). All procurement and financial transactions will be governed by applicable UNDP regulations under NIM.

**UNDP Direct Project Services** as requested by Government: The UNDP, as the Multilateral Implementing Entity for this project, will provide project management cycle services for the project as defined by the Adaptation Fund Board. In addition, the Government of Tajikistan may request UNDP direct services for specific projects, according to its policies and convenience. If requested the services would follow the UNDP policies on the recovery of direct costs. These services (and their costs) are specified in the Letter of Agreement (Annex 8). As is determined by the AF Board requirements, these service costs will be assigned as Project Management Cost, duly identified in the project budget as Direct Project Costs.

## *Comparative advantage*

UNDP's comparative advantage in supporting the implementation of development programmes in Tajikistan is its presence both at the policy and operational levels. This set-up enables UNDP to obtain and use the evidence from the ground to influence policy formulation and discussions. Because of the specific nature of most development projects requiring physical presence on the ground, additional comparative advantages of UNDP include, but are not limited to, its: i) physical presence on the ground; and ii) continuous partnerships maintained with the development actors, local authorities and beneficiary communities. Because of this on-the-ground presence and experience with work in different sectors and communities – including the water sector – UNDP is in a prime position to be the IE for the proposed project.

**Presence on the ground**

UNDP has five Area Offices (Figure 15) located in:

- Gharm in the north-east of Rasht Valley;
- Khujand and Ayni in the north of Soughd Region; and
- Kulyab to the south-east and Shaartuz to the south-west of Khatlon Region.

Kulyab and Shaartuz Area Offices cover all districts of Khatlon Region, including the eight districts bordering Afghanistan, namely Qumsangir, Kabodiyon, Jilikul, Shaartuz, Pyanj, Farkhor, Hamadoni and Shurobod. Figure 15 illustrates the regions covered by each Area Office.

Through these offices, UNDP has implemented over 100 community development, poverty alleviation, disaster risk reduction, energy and environment, conflict management and other development programmes and projects totalling US$52 million. These programmes and projects have benefited over 3,000,000 people living in 46 rural districts, which is ~1,228 rural Tajik communities.

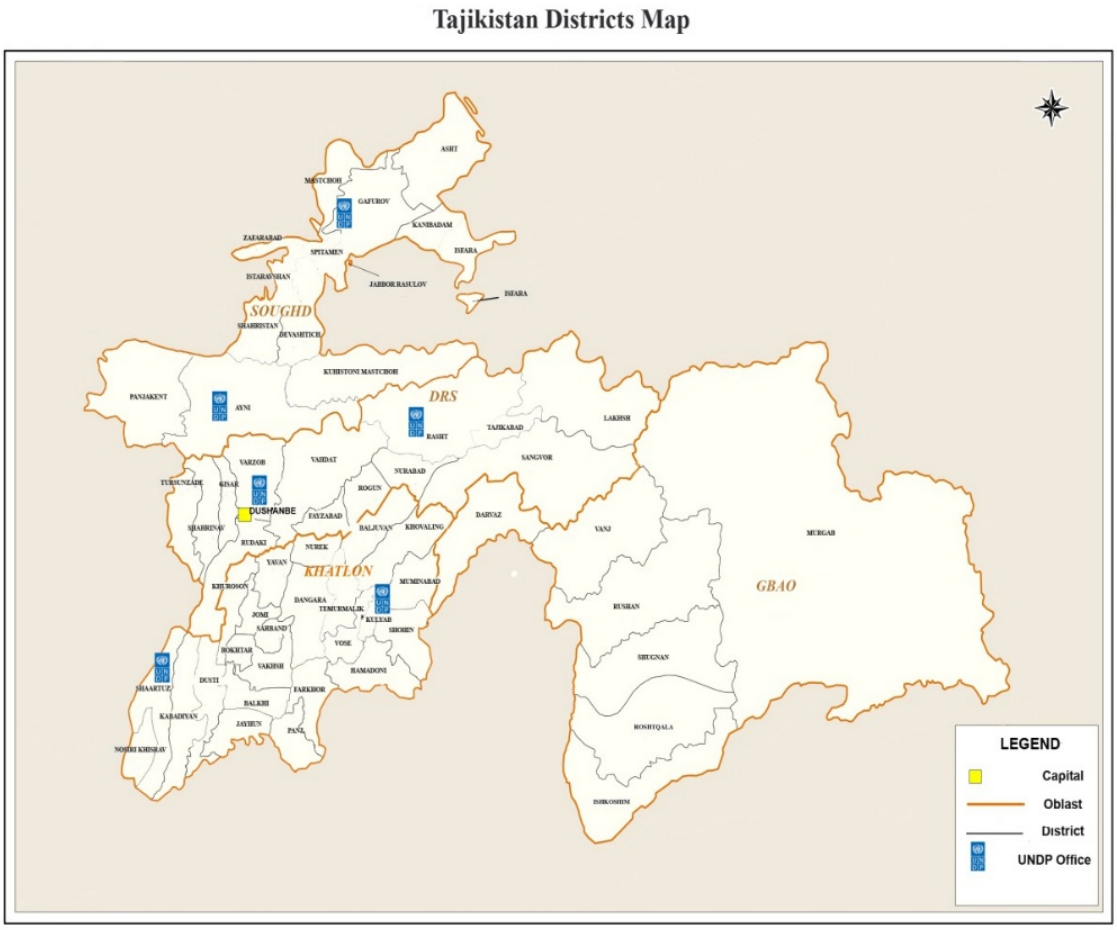



**Figure 15.** Map of Tajikistan indicating the six UNDP Area Offices.

**Experience in the water sector**

UNDP and the GoT have effectively collaborated in the past and because of this, GoT has considerable trust in UNDP's capability. This enables UNDP to facilitate the formation and convening of high-level policy dialogue. As a UN coordinating agency, UNDP is also able to ensure synergies and has access to resources from other UN system agencies, including FAO, UNECE and UN-Water.

UNDP's leadership in and support for the water sector over recent years has grown, presently focusing on policy and governance with pilot interventions in the Ferghana Valley[312]. UNDP's support to the Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme)[313] is evident through the implementation of several projects:

- EU-funded project titled, 'Promoting integrated water resources management and fostering transboundary dialogue in Central Asia';
- UNDP-funded project titled, 'Enabling activities to promote the national consultations on post-Rio agenda and demonstrate IWRM approaches in Tajikistan';
- UNDP/Bureau for Crisis Prevention and Recovery (BCPR) project titled, 'Strengthening conflict management capacities (including transparent resource allocation and sound water management principles) for dialogue in conflict-prone areas of Tajikistan';

[312] particularly with the Isfara Transboundary River Basin
[313] Water Reform Programme 2015.

- Eurasian Development Bank (EDB) project titled, 'Feasibility study to construct and operate small hydro-power stations on irrigation facilities in Tajikistan', Phases I and II;
- Swiss Development Cooperation (SDC) funded project titled, 'Tajikistan Water Supply and Sanitation'; and
- Swedish International Development Cooperation Agency (SIDA) project funded through the Stockholm International Water Institute (SIWI) titled, 'Applying human rights-based approach to water governance in Tajikistan'.

The above projects were included under the umbrella of Integrated Water Resources Management (IWRM) which is a central principle of the GoT-adopted Water Reform Programme. In doing so, UNDP adopted a strategic approach of linking policy work at the national level with practice in the field, ensuring top-down and bottom-up feedback informing both policy-makers and practitioners on effective mechanisms for reform implementation. The UNDP IWRM programming is principally aimed at developing and implementing national IWRM and water efficiency strategies at national and basin level. Because of this, the intervention strategy is supported by both IWRM governance and institutional reform, as well as concrete projects implemented to improve: i) irrigated agriculture; ii) rural water supply and sanitation; and iii) small-scale hydropower service delivery. At the regional level, UNDP contributes to transboundary trust building and conflict prevention through strengthening water cooperation mechanisms in the Fergana Valley.

UNDP has been involved in most policy initiatives for the water sector. Involvement at the national level was aimed towards developing an enabling environment for coordination and establishing a unified approach to policy development. This involvement has resulted in a harmonised reform process towards developing improved water cooperation and conflict mitigation at a regional level. A list of UNDP's actions, roles and responsibilities under the umbrella of IWRM programming is included below.

- UNDP played an active role in elaborating policy proposals for water sector reform, specifically providing designs to principal resolution and introducing IWRM principles into the Water Code[314].
- The development of an analytical review, titled 'Current conditions and perspectives on integrated water resources management in the RT', provided reflections on existing challenges and recommendations in the water resource management field. This review described the legal, institutional, technical and financial (economic) aspects of IWRM as well as detailed perspectives for the country's transition to basin management approach.
- UNDP supported GoT institutions in improving the legal and institutional framework for the country, developing by-laws and implementation mechanisms for the Water Code[315] and the Law on Drinking Water[316].
- UNDP was responsible for facilitating the establishment and support of the Inter-Ministerial Coordination Council (IMCC) on drinking water supply[317]. The IMCC was primarily formed to assist in design and implementation of the state policy on development of the drinking water and water supply sector.
- Because of UNDPs support to the IMCC, significant progress was made on policy proposals and implementation mechanisms for the drinking water and supply sector. The following issues were focused on through UNDPs support:

[314] Water Code 2001.
[315] Ibid.
[316] Law of the Republic of Tajikistan on Drinking Water and Water Supply (Law on Drinking Water). 2010. Government of Tajikistan, Dushanbe.
[317] Swiss Agency for Development and Cooperation (SDC). 2012. The Fourth Meeting of the Inter-Ministerial Coordination Council on drinking water supply discussed realization of human right to water and sanitation in Tajikistan (IMCC). SDC, UNDP and Oxfam.

- practising ownership and operational management rights;
- modelling institutional structures at the district and sub-district levels;
- simplifying procedures for obtaining permits for project implementation;
- modelling effective tariff scheme and scheme implementation; and
- improving governance, transparency, accountability and consumer participation in water systems management.

- UNDP's contribution to transboundary water cooperation has been significant over recent years. Specifically, UNDP assisted with improving water management in the transboundary basin of Syr Darya in the Fergana Valley[318]. This programme benefited border communities of Tajikistan and Kyrgyzstan. UNDP conducted a review, titled 'Consolidated review of water resources management in transboundary Isfara River Basin', for both countries to identify main barriers to water distribution. The review identified the challenges for overcoming the barriers to water distribution between border communities. In addition, the review included recommendations for efficient water management, conflict management and the development of proposals for further interventions to improve transboundary water cooperation between the two countries.
- UNDP has also undertaken a series of ground-level interventions to implement specific elements of the IWRM approach. The range of these interventions are listed below.
  - Rehabilitation of hydrological posts in Matpari, Tangi, Vorukh and Rabot to ensure more accurate and transparent record of hydrological events. The rehabilitation process also included monitoring water resource flows in the Isfara River Basin. Results of this monitoring had an effect on fair regional water distribution between Kyrgyzstan and Tajikistan at both upstream and midstream levels, and between Tajikistan and Uzbekistan at the downstream level.
  - Rehabilitation of water supply facilities project, titled 'Inter-state irrigation canal 'Druzhba' and drinking water supply system in cross-border Chorku Jamoat'. The rehabilitation was accompanied by the application of good governance and sound water management principles. These principles highlighted the importance of transparency for water distribution as a main criterion for sustainability.
  - Providing support for water management through a project titled 'Support to inter-stream water cooperation in Isfara River Basin'. The outcomes of this project ensured sound water management and distribution at the basin level among farming communities at upstream, midstream and downstream levels. This resulted in the reducing the risk of conflicts over resource distribution. Reducing water demand through a demand-driven approach at all stream levels by providing improved maintenance of irrigation canals and management support based on transparency and participation have been central in achieving this result. This is being implemented by providing significant support to previously established Water Users Associations and their federation in Isfara River Basin.

**Project Steering Committee (PSC**) will be convened by CEP and will serve as the project's coordination and decision-making body. The PSC meetings will be chaired by the NPD. It will meet according to necessity, but not less than once in 6 months, to review progress, approve work plans and approve major deliverables. The PSC is responsible for ensuring that the project remains on course to deliver products of the required quality to meet the outcomes defined. The PSC's role will include: (i) overseeing project implementation; (ii) approving all work plans and budgets, at the proposal of the Project Manager (PM), for submission to Istanbul Regional Hub; (iii) approving any major changes in plans or programmes; (iv) providing technical input and

[318] Soughd Region, Isfara River Basin

advice; (v) arbitrating any conflicts within the project and/or negotiating solutions between the project and any other stakeholders and (vi) overall evaluation.

**Project Assurance:** UNDP Tajikistan will support project implementation by assisting in monitoring project budgets and expenditures, recruiting and contracting project personnel and consultant services, subcontracting and procuring equipment. UNDP Tajikistan will also monitor the project implementation and achievement of the project outcomes/outputs and ensure the efficient use of donor funds through an assigned UNDP Team Leader. UNDP will act as the Senior Supplier and Project Assurance.

**National Project Director** (NPD): The NPD will be a member of CEP, assigned to the project for its period of duration. The NPD's prime responsibility is to ensure that the project produces the results specified in the project document to the required standard of quality and within the specified constraints of time and cost.

**Mechanisms for local participation:** the project will use the existing locally established mechanisms for local consultation and participation.

An organogram of the project organisation structure is illustrated in Figure 16.

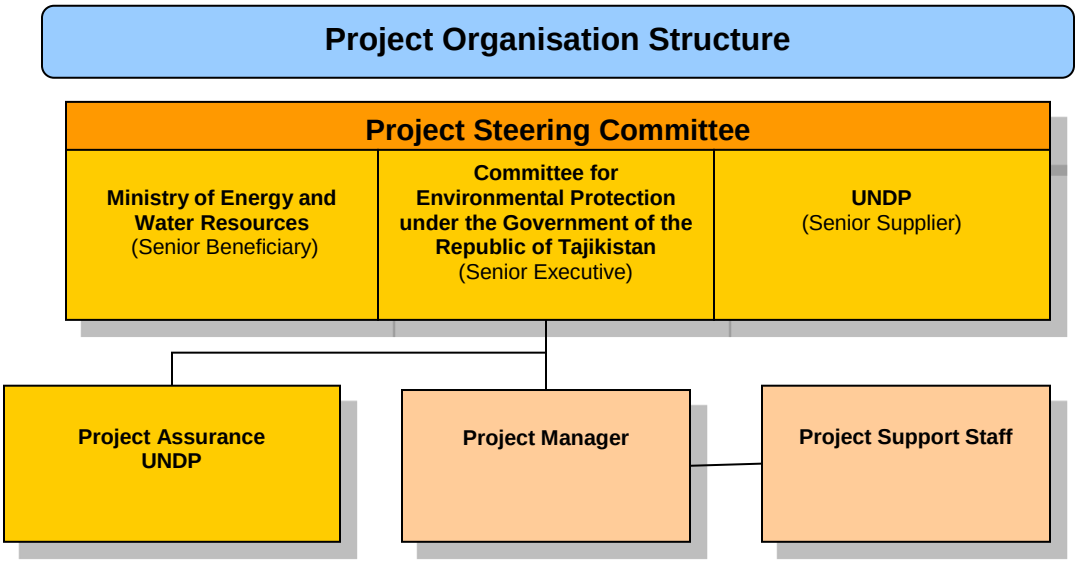



**Figure 16.** Organogram of project organisation structure.

A specially formed **Project Steering Committee** (PSC) will be responsible for the implementation of the project. The PSC will include representative of UNDP in Tajikistan, as well as representatives from relevant stakeholders including CEP and MEWR. In addition, the PSC will be responsible for ensuring the effective coordination of this project with other relevant initiatives in Tajikistan.

In addition, consultative committees will be formed, consisting of representatives from local government in the project areas, community representatives, and individuals with technical expertise. The consultative committees will provide technical guidance and feedback to the PSC.

The day-to-day administration will be carried out by a Project Manager (PM), Project Analyst (PA), Admin. Finance Assistant (AFA), and Project Assistant (PA), who will be located at UNDP premises. As per Government requests, the staff will be recruited using standard UNDP recruitment procedures. The PM will, with the support of the AFA and PA, manage the implementation of all activities, including: preparation/updates of work and budget plans, record keeping, accounting and reporting; drafting of terms of reference, technical specifications and other documents as necessary; identification, proposal of consultants, coordination and supervision of consultants and suppliers; organization of duty travel, seminars, public outreach activities and other events; and maintaining working contacts with partners at the central and local levels. The Project Manager will liaise and work closely with all partner institutions to link the project with complementary national programmes and initiatives.

The PM is accountable to UNDP for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. The PM will produce Annual Work and Procurement Plans (AWP&PP) The PM will further produce quarterly operational reports and Project Performance Reports (PPR). These reports will summarize the progress made versus the expected results, explain any significant variances, detail the necessary adjustments and be the main reporting mechanism for monitoring activities. The PM will be technically supported by contracted national and international service providers, based on need as determined by the PM and approved by the PSC, as needed. Recruitment of specialist services will be done by the PM, in accordance with UNDP's rules and regulations.

## B. Financial risk management

Financial and project management has been conducted according to UNDP's Programme and Operations Policies and Procedures to ensure that financial and project risks are mitigated against. Detailed financial and project risks as well as the associated mitigation strategies identified have been outlined in Table 14.

**Table 14.** Financial and project risk management measures for the proposed project, including risk ratings.

| Risk no. | Identified risk | Risk rating | Mitigation measure |
|---|---|---|---|
| 1. | Disagreement amongst stakeholders regarding demonstration of site selection. | Low | • Intervention sites will be selected using an agreed upon list of criteria and the developed shortlist of EbA interventions to ensure the selection is transparent and equitable.<br>• There will be a participatory approach to project activities, particularly with intervention site selection. |
| 2. | High turnover of staff members in executing and implementing agencies may negatively impact on project deliverables. | Low–medium | • Proposed project will build partnerships between government and non-government agencies to ensure continuity. |
| 3. | Loss of government support may result in lack of prioritisation of proposed project activities. | Low | • Regular stakeholder consultation and involvement will be undertaken to ensure that government maintains its commitment and considers the project as a support mechanism to its existing climate change adaptation programmes. |
| 4. | Institutional capacities and relationships are not sufficient to provide effective solutions to climate problems that are complex and multi-sectoral. | Medium | • The project design has a focus on building institutional capacity. This will ultimately lead to the development of an appropriate institutional framework for analysing climate change impacts on the management of *inter alia* water, land use, natural resources and pastures. |

| | | | |
|---|---|---|---|
| 5. | Capacity constraints of local institutions may limit the ability to undertake the interventions implementation. | Medium | • Human resource capacity will be developed in all targeted regions and villages.<br>• Collaboration and exchange between local institutions and regional/international research institutes will be initiated.<br>• An Integrated Catchment Management Specialist will work closely with the Programme Manager to ensure timely delivery of project outputs. |
| 6. | Priority interventions implemented are not found to be cost-effective. | Low | • Cost-effectiveness is a core principle in the implementation of adaptation measures. Detailed information will be recorded regarding cost-effectiveness. This will be disseminated through the knowledge centres supported by the project and will be of use to future adaptation initiatives for the Kofirnighan River Basin and Tajikistan as a whole.<br>• Interventions to be selected for the EbA shortlist will be chosen based on their previous success and results in the country. |
| 7. | Lack of commitment/buy-in from local communities may result in failure of intervention sites. | Medium | • A stakeholder engagement plan will be developed during the inception phase.<br>• Community stakeholders will continue to be consulted with throughout the project inception and implementation phase. |
| 8. | Current and predicted climate variability and/or extreme climate events result in poor results for EbA interventions. | Medium | • Current and predicted climatic variability has been taken into account in project design. Throughout the inception and implementation phase, any changes in the climate will be considered in planning for the implementation of EbA activities.<br>• Drought- and flood-resilient species will be used, as well as indigenous species wherever possible.<br>• Techniques to assist plant growth particularly in the seedling/sapling phases and to reduce risk of damage from extreme climate events will be used.<br>• Species will be planted in appropriate seasons to reduce risk of hazard impact.<br>• Ensuring diversity in selected seeds and crops will reduce this risk. |
| 9. | Trees and other species planted by the project are cut down by the communities for fuelwood. | Medium | • Community involvement and awareness raising will be undertaken to avoid this risk.<br>• Species chosen for planting will be beneficial as fruiting trees rather than as fuelwood. |

## **C.** Environmental and social risk management

As outlined in Part II: K on the environmental and social principles included in project design, the proposed project activities are unlikely to result in significant negative social and environmental impacts. Most impacts are likely to occur during the construction phase of EbA interventions. These impacts are likely to be minor and without long-term adverse effects.

Despite the positive impacts that project activities will bring into effect for communities and ecosystems within the KRB, some environmental and social risks could be triggered according to the AF E&S and the UNDP SESP. An evaluation of the project against each of the AF principles was conducted in preparation of the SESP Report and is illustrated in Table 13 under Part II: K[319].

The SESP Report will serve to guide all aspects of project implementation. It will be the responsibility of the PSC to ensure that the appropriate risk mitigation measures are implemented during project implementation. Based on the results of the SESP, risk mitigation strategies for the relevant AF E&S Principles have been developed. These are detailed below. For details on the grievance mechanism outlined for the project, refer to Annex 5.

[319] Part II: K includes a checklist for environmental and social principles for project design.

**Principle 1. Compliance with the Law.**
During the development of the Full Proposal, all relevant stakeholders were consulted to ensure that the all legal requirements were met. The project is therefore well-aligned and complies with national and sub-national policies, laws, plans and priorities for sustainable development and climate change adaptation in the KRB. See Part II: D and E for a full description of this alignment and compliance.

**Principle 2. Access and Equity.**
To ensure full implementation and adherence to this principle, project activities are designed to provide equal and accessible benefits to communities in the most vulnerable areas of the KRB. The identification of vulnerable districts was done through a fair and transparent process using the ongoing studies and assessments being conducted across the country as well as in the KRB.

During the implementation of EbA interventions under Component 2, local government authorities at each selected site will ensure that all project activities will not reduce or prevent communities from accessing basic rights. These rights include health services, clean water and sanitation, energy, education, housing, safe and decent working conditions and land rights. All community institutions and individuals will be sensitised towards the approach of prioritising support to most vulnerable communities while ensuring benefits reach further communities. This will mitigate any inter-community conflicts that might arise as a result of focusing on the most vulnerable villages.

**Principle 3. Marginalised and Vulnerable Groups**.
To avoid social exclusion of marginalised communities, orientation/sensitisation will be conducted at both the *jamoat* and village level to ensure equal participation within project activities. Additional social impacts that may be realised will therefore not unjustly impact on marginalised and vulnerable groups.

However, a small risk remains that vulnerable and marginalised groups will have insufficient access to project activities, particularly the climate-smart agricultural techniques and EbA interventions under Component 2.

**Principle 4. Human Rights.**
Project preparation and implementation phases will follow a human-rights based approach. No activities are included in project design that are not in line with established international human rights. Moreover, the project will promote the basic human rights of access to food, water and information.

The project seeks to ensure that benefits of all activities are shared broadly in a non-discriminatory, equitable manner through participatory processes and transparent selection criteria. Extensive stakeholder consultations were held during project preparation[320]. These consultations will continue throughout project implementation. Potential project-related concerns and/or grievances of local communities will be addressed through a grievance mechanism[321].

**Principle 5. Gender Equality and Women's Empowerment.**
The project recognises the importance of gender equality, particularly equal rights, responsibilities, opportunities and access of women and youth in the climate change adaptation. Project activities include 50% proportionate gender consideration in all project interventions, with

[320] See Annex 1 for a consolidated mission and stakeholder consultation report.
[321] See Annex 5 which details the grievance mechanism outlined for the project.

a specific focus on on-the-ground activities under Component 2. Therefore, the project is designed to promote gender equity.

Gender equality and women empowerment civil society organisations will be involved to support the project. This will ensure adherence of all project activities to the gender equality and women empowerment. Despite the inclusion of gender considerations in the design of the project, there remains the low risk that project interventions will not benefit men and women equally.

**Principle 6. Core Labour Rights.**
The Government of Tajikistan (GoT) has ratified the eight core International Labour Organisation (ILO) Conventions. National and regional stakeholders were involved during the design stage of the project to ensure core labour rights have been respected and considered during the design stage. Compliance with all labour rights will be ensured in all project activities through the involvement of labour officers in target villages.

Component 2 will involve labour for the implementation of EbA interventions, where community members will provide the labour. All of the labour involved will be on daily wages where the wages will be determined according to tasks. Wage rate will be calculated on the basis of prevailing minimum wage rate for the assigned task. The record of work done for labour engaged will have to be maintained and the wages paid accordingly. Hours of work and the timing of the hours will be determined in consultation with the labour provided and the prevailing practices in the area.

Positive discrimination in favour of women may be used to provide fair and equal opportunity to women to seek employment as labour. All forms of negative discrimination in respect of employment and occupation will be eliminated. The project will not engage in child labour in any of its activities or interventions. All forms of forced or compulsory labour will be eliminated.

Under Component 2, local community members may be exposed to the risk of accidents while implementing EbA interventions. In addition, there is a low risk of child labour outside the limits of the law.

**Principle 7. Indigenous Peoples.**
There is the risk of inequitable access of indigenous peoples to the project's resources. Project activities have been designed in accordance with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples. In addition, activities are aligned with all other applicable national and international instruments relating to indigenous people in Tajikistan.

**Principle 8. Involuntary Resettlement.**
The project design does not include voluntary or involuntary resettlement.

**Principle 9. Protection of Natural Habitats.**
By implementing EbA activities, the project promotes the improved management of natural landscapes. The project is therefore likely to result in the improved protection of natural habitats rather than having any negative effect. Moreover, the project will consult and involve responsible officers and community representatives at district and village level to ensure this principle is adhered.

Despite this focus on improving ecosystem goods and services, there is a low risk that the construction of EbA interventions could result in the destruction of small areas of natural habitat.

**Principle 10. Conservation of Biological Diversity.**

By implementing EbA activities, the project promotes the improved management of natural habitats. Therefore, the project is likely to result in the improved protection of natural habitats and biodiversity.

Despite this focus on improving ecosystem goods and services, there is a low risk that the construction of EbA interventions could result in negative impacts on biodiversity.

**Principle 11. Climate Change.**
The project will contribute to climate change adaptation efforts in Tajikistan. Through Component 2, the project is designed to improve the delivery of climate information to all government-level decision-makers. Through this improved delivery of information and the enhanced governance coordination included under Component 1, the project addresses climate change adaptation planning.

The project is designed to: i) transfer technology to promote climate change adaptation to local communities to reduce their vulnerability to climate change; and ii) promote the development of innovative, community-based projects to increase resilience to climate change. Therefore, the project will enhance the local-level capacity of local communities to adapt to climate change. The project's climate change interventions focus on EbA activities and none of these interventions are likely to result in an increase in greenhouse gas emissions.

**Principle 12. Pollution prevention and Resource Efficiency.**
The project will not require (during or after implementation) significant amounts of water, energy, materials or other natural resources. It is also highly unlikely that project activities will result in the production of significant quantities of wastes, especially of hazardous or toxic wastes. The project will not produce significant volumes of effluents or air pollutants, including greenhouse gases. All applicable international standards will be met for maximising material resource use and minimising the production of wastes and the release of pollutants.

**Principle 13. Public Health.**
None of the project activities are envisioned to impact negatively on public health. Instead, the project will have positive impacts on health. In particular, through activities in Component 2, reduced nutrient runoff into KRB rivers and its tributaries will increase water quality and improve public health.

**Principle 14. Physical and Cultural Heritage.**
The EbA interventions to be implemented by the project are relatively small-scale and unlikely to result in the alteration, damage or removal of any physical or cultural heritage.

**Principle 15. Lands and Soil Conservation.**
The project will promote the conservation of soil and land resources. Specifically, through the implementation of EbA activities in Component 2 – including agroforestry – soil stability will be increased, the runoff of nutrients from topsoil will be reduced, and the fertility of soil at target sites will be increased.

**Table 15.** Potential impacts, risks and mitigation measures for environmental and social risk management for the project.

| Checklist of Environmental and Social Principles | Potential impacts and risks | Mitigation measures |
|---|---|---|
| *Compliance with the Law* | N/A | Project activities will be undertaken in full compliance with the domestic laws of Tajikistan, as well as with all relevant international laws. |
| *Access and Equity* | Project activities could restrict availability and/or quality of, and access to, resources or basic services. Particularly for marginalised individuals or groups. | To address the potential limitations regarding gaining access to pasture lands and forests, activities under the project will promote alternative business solutions and community enterprise developments that will help communities to generate alternative incomes. The project will also address the need to reduce extensive livestock grazing through: i) enhanced fodder production techniques (within exclusion zones, rotational grazing, on-site production and demonstration plots); ii) productive on-site animal husbandry; and iii) the establishment of watering sites at mid-stream levels of watershed areas (saving livestock energy in search of water sources in the upstream).<br><br>There will be widespread engagement with relevant stakeholders at regional, sub-regional and community levels to agree on rotational routes for the transit of larger herds. Such engagement will also facilitate monitoring of grazing control measures applied locally by large herd owners from other communities, districts and/or regions. *Jamoat*-level monitoring and control mechanisms will be introduced to enforce agreed-upon measures for the mitigation of land degradation and to improve vegetation growth in target pasture lands, as well as to ensure that target communities effectively benefit from project interventions.<br><br>Energy-efficient stoves will also be introduced into target communities to compensate for the limited access to forest resources for energy. Best practices and lessons learned from similar past projects in Tajikistan will be adapted and applied to the Kofirnighan River Basin (KRB) context.<br><br>The project will also support the implementation of long-term financing of an integrated catchment management strategy through Payment for Ecosystem Services (PES) models that will be developed for each target district. These models will further enable communities to access the finance required to undertake initiatives that strengthen and increase access to ecosystem services, as well as build climate resilience within each target district. The PES models will be designed based on a combination of regional, international and local best practices. PES model design will also be informed by the results of existing PES models used in Tajikistan. |
| *Marginalised and Vulnerable Groups* | Marginalised groups could potentially be excluded from fully participating in decisions that may affect them. | Marginalised groups in the KRB include those: i) living in areas exposed to increasing impacts of climate change; ii) food-insecure households; and iii) households with limited or no productive assets, livestock and/or agricultural land plots. Single female-headed households, and those with small children and/or elderly members may also be considered vulnerable. Such vulnerable groups have a limited ability to participate during critical stages of project design and implementation.<br><br>During project inception phase, a vulnerability assessment of target communities will be carried out in a participatory manner, through focused consultations. Where feasible, vulnerable and marginalised |

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| | | groups will be prioritised for adaptation interventions. The Stakeholder Engagement Plan will guide consultations during preparation phases, ensuring the broad representation of relevant community-based organisations and groups. These organisations and groups include farming associations and cooperatives, women's committees, intervention-related initiative groups, pasture development associations, water user associations (WUAs), forestry cooperatives and communal health promoters. Throughout the project, the extent of involvement of vulnerable and marginalised people within such groups and associations will be monitored and assessed.<br><br>Targeted actions that may be prioritised for vulnerable groups may include on-farm adaptation interventions, household plots, improved productivity measures and the selection of demonstration plots with support from farmer field schools (FFSs). Certain enterprise developments and income-generating activities (such as beekeeping, fodder production and livestock productivity support) may also be suitable for the given groups to ensure that benefits are distributed inclusively and in an equitable manner. |
| *Human Rights* | N/A | Project activities will adhere to and, where applicable, promote international human rights.<br><br>The project will directly benefit an estimated 50,000 individuals who are especially vulnerable to the impacts of climate change, through the design and implementation of on-the-ground EbA interventions for more efficient natural resources management. These measures will also provide social and economic benefits to the target population in terms of livelihoods, health and wellbeing. In particular, the project's interventions will: i) increase profit margins and income from farming activities; ii) reduce crop losses as a result of slope instability, drought and dry spells, ineffective agricultural practices and overgrazing of livestock; iii) reduce agricultural inputs and water consumption; iv) reduce the risk of economic failure by diversifying on- and off-farm production; v) reduce the susceptibility of crops to pests; vi) increase food security; vii) increase availability of fuelwood and timber; and viii) increase pasture productivity and fodder production. In addition, project interventions will increase non-material benefits such as ecosystem services, tourism, recreation and the conservation value of the natural Tajikistan landscape.<br><br>Throughout the implementation period, the project will seek to ensure that benefits are shared broadly, and in a non-discriminatory and equitable manner. The project will ensure that all relevant stakeholders participate in decision-making processes and consultations, and that such participatory processes are transparent. Necessary strategies, action plans, site selection criteria and lessons learned will be documented and shared regularly through community-driven consultation platforms facilitated by those implementing the project. |
| *Gender Equity and Women's Empowerment* | Women may not be adequately represented with regard to decision-making or participation in the design and implementation of the project activities. As a result, women may have limited access to resources, opportunities and benefits. | Tajikistan has a relatively large Gender Inequality Index rating of 0.36, with women's labour force participation representing ~59% of the female population, as opposed to men participation representing ~77% of the male population in the country. In rural Tajikistan, the relatively larger rates of labour migration among men typically leave women with large workloads, including formal employment to earn income, household and care responsibilities, and growing of food for household consumption. Project interventions will therefore ensure that women are actively included in stakeholder participation and take part in all decision-making processes. This will ensure that benefits are distributed equitably and fairly among men and women in target zones. In particular, project activities will be designed and implemented so that all genders are: i) able to participate fully and equitably; ii) receive comparable social and economic benefits; and iii) do not suffer disproportionate adverse effects as per the UNDP Gender Mainstreaming Strategy. |

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| | | A gender analysis will be undertaken in the initial phase of the project to develop recommendations on how project activities will promote women's equality and empowerment, including participation in decision-making processes, as outlined in the ESMF. It is anticipated that at least 50% of project beneficiaries will be women.<br><br>Appropriate measures will ensure that women receive an equitable share of benefits and that their status and interests are not marginalised. Participatory processes will include methodologies that enhance the participation of women and promote the inclusion of their views into the activities of the project.<br><br>Monitoring of project outputs will include disaggregated and measurable data related to gender equality and empowerment of women. Furthermore, measures and techniques that contribute to closing the inequality gap between men and women will be promoted, where possible. |
| *Core Labour Rights* | N/A | Project activities will adhere to the core labour standards of Tajikistan, as well as those identified by the International Labour Organisation. |
| *Indigenous Peoples* | N/A | Project activities will be designed in accordance with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples, as well as with all other applicable national and international instruments relating to indigenous people. |
| *Involuntary Resettlement* | N/A | Project activities will not lead to any involuntary resettlement of local communities. |
| *Protection of Natural Habitats* | N/A | Project activities will not involve any conversion or degradation of critical natural habitats, including those that are: i) legally protected; ii) officially proposed for protection; iii) recognised by authoritative sources to be of high conservation value; and iv) recognised as protected by traditional or indigenous local communities. |
| *Conservation of Biological Diversity* | There is a risk that alien and/or invasive alien species are used in reforestation activities. | The project's activities will promote the rehabilitation/restoration of abandoned and overexploited forests and degraded forest ecosystems, as well as reforestation of areas adversely affected by extreme climate events. The use of native and climate-resilient varieties will be promoted, but alien species may be introduced if necessary. Certain alien species may be used for complementary planting (climate-resilient crops seed varieties) in areas being reforested to increase biological biodiversity and enhance climate resilience. Prior to such introduction, relevant experts at the Committee for Environmental Protection (CEP) and among development partner agencies will be consulted on successful examples across the regions. National environmental norms, standards and procedures for the introduction of alien species will be followed in each case. |
| *Climate Change* | N/A | Project activities will not result in a significant increase in GHG emissions or any other drivers of climate change. In contrast, project interventions directly support the implementation of climate change adaptation and mitigation measures, including climate-smart agriculture and sustainable land management in agro-ecological landscapes. Such interventions include: i) the rehabilitation and restoration of degraded forest ecosystems; ii) vegetation growth support; iii) water retention measures; and iv) climate-resilient crop seed planting. All of these interventions prevent and mitigate water-related extreme climate events that have typically threatened the livelihoods and health of target communities. |
| *Pollution Prevention and Resource Efficiency* | The application of pesticides may have a negative effect on the environment or on human health. | Local communities will be supported to adopt improved farming techniques, including organic agriculture, and soil and water conservation. These techniques would reduce the use of fertilisers and harmful pesticides. Although biological pest control is preferred, pesticides may be needed for specific use. In this case, they will be properly managed and stored, following national and international standards, regulations and procedures. |

| | | |
|---|---|---|
| | | Project activities will be designed and implemented in a way that meets applicable international standards for maximising energy efficiency while minimising material resource use, waste production and the release of pollutants. Interventions included in project design are not expected to produce any significant amounts of waste or other pollutants. Any potential opportunities identified for improved resource efficiency and pollution reduction during the project development phase will be captured in the project design. |
| *Public Health* | Small-scale construction activities under the proposed project may pose safety risks to community members implementing them. | All construction activities will follow the relevant environmental impact assessment procedures and will ensure compliance with: i) national construction standards and norms; ii) sanitary norms and regulations; and iii) all relevant national laws and regulations related to forestry, water, environment, and health. Activities will also follow technical guidance and best practices regarding rainwater-harvesting systems, drip-irrigation techniques, and micro-reservoirs.<br><br>Other project activities may include the construction of gabions, terracing, bank enforcement and small dams. Best practices and lessons learned from other previous and ongoing projects in Tajikistan will be used to address community safety risks from such construction. |
| *Physical and Cultural Heritage* | During project implementation, there is a risk that physical or cultural heritage sites are disturbed. | Project activities will be designed and implemented in a way that avoids the alteration, damage or removal of any physical cultural resources and sites, as well as any sites recognised as having unique value at the community, national or international level. Regional experts will be consulted to ensure compliance with national heritage legislation and that project design adheres to best-practice guidelines. |
| *Lands and Soil Conservation* | N/A | Activities under the project will promote soil conservation, while avoiding the degradation and conversion of productive land or land that provides valuable ecosystem services. Specifically, through the implementation of EbA measures under Component 2, soil stability will be increased, runoff of nutrients from topsoil will be reduced and soil horizons at project sites with sheet and/or gulley erosion will be restored. |

## D. Monitoring and evaluation

Monitoring and evaluation (M&E) will be applied in accordance with the established UNDP procedures throughout the project lifetime and will be developed in detail in the Full Proposal. The executing entity, together with the UNDP Country Office, will ensure the timeliness and quality delivery of the project implementation.

**Audit:** The project will be audited according to UNDP Financial Regulations and Rules and applicable audit policies on NIM implemented projects.

**Project start**
A project Inception Workshop (IW) will be held within the first three months of the project start date with those stakeholders with assigned roles in the project management, namely representatives from the Adaptation Fund (AF), UNDP Country Office and other stakeholders where appropriate. The IW is crucial to building ownership for the project results and to plan the first-year annual work plan (AWP).

**Mid-term Review**
The project will undergo an independent Midterm Review (MTR) at the mid-point of implementation. The evaluation will focus on the effectiveness, efficiency and timeliness of the implementation of project activities. Furthermore, the MTR will highlight issues requiring decisions and actions and will present initial lessons learned about project design, implementation and management.

**Project closure**
An independent Final Evaluation will be undertaken three months prior to the final PSC meeting. The final evaluation will focus on the delivery of the project's results as initially planned and as corrected after the MTR.

## Monitoring procedure

UNDP Tajikistan and CEP will be responsible for monitoring and evaluation (M&E) of the proposed project and for project output monitoring in line with the M&E policies and procedures. The M&E system will be governed by the following outlined principles.

- **Accountability**: ability of UNDP to be answerable to donors and to the beneficiaries through availability of specific, timely and relevant data.
- **Evidence-base**: readily available information to support the development of more appropriate and improved programmes in future.
- **Learning**: use of simplified and frequent reporting to support reflection, learning and sharing of good practices and solutions.
- **Transparency**: sharing of information with all of UNDP's stakeholders, including strategies, plans, budgets and reports to promote openness.

The project management team will produce the following deliverables for M&E throughout project implementation.

- An Issue Log shall be activated in ATLAS and updated by the PM to facilitate tracking and resolution of potential problems or requests for change.

- Based on the initial risk analysis submitted (see Annex 4[322]), a risk log shall be activated in ATLAS and regularly updated by reviewing the external environment that may affect project implementation.
- Based on information recorded in ATLAS, a Project Progress Report (PPR) shall be submitted by the PM to the PSC, using the standard report format.
- A project lesson learned log shall be activated and regularly updated to ensure ongoing learning and adaptation within the organisation, and to facilitate the preparation of the lessons learned report at the end of the project.
- A Monitoring Schedule Plan shall be activated in ATLAS and updated to track key management actions and events.
- **Annual Review Report**. An Annual Review Report shall be prepared by the Project Manager and shared with the PSC. As a minimum requirement, the Annual Review Report shall consist of the Atlas standard format for the PR covering the whole year with updated information for each above element of the PR as well as a summary of results achieved against pre-defined annual targets at the output level.
- **Annual Project Review**. Based on the above report, an annual project review shall be conducted during the fourth quarter of the year or soon after, to assess the performance of the project and appraise the Annual Work Plan (AWP) for the following year. In the last year, this review will be a final assessment. This review is driven by the PSC and may involve other stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes.

Together with UNDP, the PSC will carry out two independent external evaluations as follows.

- **Mid-Term Evaluation (MTE)**. The MTE will be carried out in the 6th quarter of the programme implementation and will be independent and external. The evaluation will engage all programme stakeholders and will assess the extent to which progress is being made towards the outputs and their alignment with outcomes. The evaluation may propose mid-course corrective measures and may reassess the objectives and revise implementation strategy.
- **Terminal Review (TR)**. The TR will be conducted at the conclusion of the programme. UNDP will commission a full external evaluation assessing the accomplishment of objectives.

Table 16 and 17 outlined the monitoring and evaluation plan, respectively. These outlines include the purpose of each M&E activity and the respective complementary actions.

**Table 16.** Monitoring plan for the proposed project including frequency and expected action(s).

| Monitoring activity | Purpose | Frequency | Expected action(s) |
|---|---|---|---|
| **Track results progress** | Progress data against the results indicators in the RRF will be collected and analysed to assess the progress of the project in achieving the agreed outputs. | Quarterly, or in the frequency required for each indicator. | Slower than expected progress will be addressed by project management. |
| **Monitor and Manage Risk** | Identify specific risks that may threaten achievement of intended results. Identify and monitor risk management actions using a risk log. This includes monitoring measures and plans that may have been required as per UNDP's Social and Environmental Standards. Audits will be conducted in accordance with UNDP's audit policy to manage financial risk. | Quarterly | Risks are identified by project management and actions are taken to manage risk. The risk log is actively maintained to keep track of identified risks and actions taken. |

[322] Annex 4 includes the detailed Environmental and Social Management Framework (ESMF) for the project.

| Monitoring activity | Purpose | Frequency | Expected action(s) |
|---|---|---|---|
| **Learn** | Knowledge, good practices and lessons will be captured regularly, as well as actively sourced from other projects and partners and integrated back into the project. | At least annually | Relevant lessons are captured by the project team and used to inform management decisions. |
| **Annual Project Quality Assurance** | The quality of the project will be assessed against UNDP's quality standards to identify project strengths and weaknesses and to inform management decision making to improve the project. | Annually | Areas of strength and weakness will be reviewed by project management and used to inform decisions to improve project performance. |
| **Review and Make Course Corrections** | Internal review of data and evidence from all monitoring actions to inform decision making. | At least annually | Performance data, risks, lessons and quality will be discussed by the PSC and used to make course corrections. |
| **Project Report** | A progress report will be presented to the PSC and key stakeholders, consisting of progress data showing the results achieved against pre-defined annual targets at the output level, the annual project quality rating summary, an updated risk long with mitigation measures, and any evaluation or review reports prepared over the period. | Semi-annually, and at the end of the project (final report) | |
| **Project Review/ Project Steering Committee (PSC)** | The project's governance mechanism (i.e., the PSC) will hold regular project reviews to assess the performance of the project and review the Multi-Year Work Plan to ensure realistic budgeting over the life of the project. In the project's final year, the PSC shall hold an end-of project review to capture lessons learned and discuss opportunities for scaling up and to socialize project results and lessons learned with relevant audiences. | Semi-annually | Any quality concerns or slower than expected progress should be discussed by the PSC and management actions agreed to address the issues identified. |

**Table 17.** Evaluation plan for the proposed project including stakeholders and planned date of completion.

| Evaluation activity | Planned completion date | Stakeholders |
|---|---|---|
| Mid-term Review (MTR) | August 2022 | CEP; MEWR |
| Terminal Review (TR) | March 2023 | CEP; MEWR |

The respective costs for M&E are outlined in Table 18 according to the type of M&E activity.

**Table 18.** Monitoring and evaluation costs of the proposed project.

| Type of M&E activity | Responsible parties | Budget (147,160 US$) | Timeframe |
|---|---|---|---|
| Direct Project Monitoring and Quality Assurance including progress and financial reporting, project revisions, technical assistance and risk management | • Project Manager<br>• Project team<br>• UNDP<br>• External consultants – i.e. evaluation team | (supported from staff costs included in Project execution, and from MIE fee) | Quarterly, half-yearly and annually, as needed |
| Evaluations (Mid-term Evaluation and Terminal Review) | • Project Manager<br>• Project team<br>• UNDP | 56,000 | At midpoint and at end of project implementation |
| Audit | • Project Manager<br>• Project team<br>• UNDP | 5,000 | Annually, at year end |

| Type of M&E activity | Responsible parties | Budget (147,160 US$) | Timeframe |
|---|---|---|---|
| Inception meeting, field visits and steering committee meetings | • Project Manager<br>• Project team<br>• UNDP | 86,160 | Inception meeting within first two months and bi-annual PSC meetings (and sub-committee meetings) |
| **TOTAL indicative cost** | | **147,160** | |

*Note: Above costs do not cover UNDP staff time. All UNDP staff costs associated with M&E are covered by the MIE Fee.*

## **E.** Results framework

**Table 19.** Results framework for the proposed project outlining the indicators, targets, assumptions and sources of verification of the outcomes and outputs against the baseline.

| Expected outcome/ outputs | Outcome/ output indicator | Baseline | Target | Sources of verification | Assumptions |
|---|---|---|---|---|---|
| **Outcome 1.** Catchment management strategy to manage climate risks operationalised at *raion* (district) and *jamoat* (sub-district) levels in Kofirnighan River Basin (KRB). | Number of staff trained to respond to impacts of climate-related events (gender disaggregated). | 0 | By the end of the project, at least 30 staff (of which at least 30% are women) trained on integrated catchment management.<br><br>By the end of the project, at least 100 staff (of which at least 30% are women) trained on integrated catchment management. | • Attendance registers from training workshops<br>• Workshop reports<br>• Interviews with selected staff members of relevant ministries | Training workshops provide staff with the capacity to integrate climate resilience into integrated catchment management. |
| Output 1.1. Multi-hazard climate risk models (MHCRMs) developed for target watersheds in the KRB. | Number of risk models developed. | 0 | Gap analysis conducted for KRB that details climate risks for all watersheds.<br><br>By the end of the project, at least one MHCRM developed for each watershed in the KRB (and each target district). | • Gap analysis<br>• MHCRMs that detail climate risks for each watershed and target district<br>• Results of studies including data and GIS information | Gap analysis and MHCRMs will inform the selection of vulnerable sites in the target districts as well as the identification of appropriate EbA interventions. |
| Output 1.2. Providing support for establishing automated weather stations in KRB sub-catchments to provide data for refining the multi-hazard climate models [developed under Output 1.1]. | Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis. | Currently, weather stations do not provide up-to-date and relevant information in a timely manner to inform climate risks. There is limited delivery of climate information to local communities. | Policy- and decision-makers in KRB receive forecasts from Hydromet.<br><br>By the end of the project, policy- and decision-makers in KRB receive forecasts and downscaled national climate information every quarter from Hydromet.<br><br>By the end of the project, local communities in the project interventions sites receive tailored climate information packages. | • Climate information packages<br>• Interviews with government and local communities | Existing climate information producers are committed to participating in the development and implementation of forecasts and area-specific advisories. |

| Expected outcome/ outputs | Outcome/ output indicator | Baseline | Target | Sources of verification | Assumptions |
|---|---|---|---|---|---|
| Output 1.3. Integrated catchment management strategy developed for the KRB. | Integrated catchment management strategy developed.<br><br>Number of staff trained (gender disaggregated).<br><br>Number of community members trained (gender disaggregated). | 0 | By year 3 of the project, at least 30 staff (of which at least 30% are women) trained on integrated catchment management across all target departments.<br><br>By the end of the project, at least 100 staff (of which at least 30% are women) trained on integrated catchment management across all target departments.<br><br>At least 100 community members in each district (of which 30% are women) trained on identification of suitable EbA interventions (600 people in total). | • Project reports<br>• Monitoring and evaluation reports per intervention site<br>• Reports on community consultations, trainings and surveys<br>• Reports on site/field visits | Training workshops provide staff with the capacity to integrate climate resilience into integrated catchment management.<br><br>All communities surrounding project intervention sites are committed to participating in project activities, taking up/adopting climate resilient techniques and practices and providing training to other officers/community members. |
| Output 1.4. Strengthened coordination and training mechanisms for integrated climate-resilient catchment management. | Strengthened coordination evident in streamlined mandates and the number of meetings conducted. | 0 | By the end of the project, at least 2 meetings are held per year between different government sectors, RBOs, district authorities etc. | • Meeting reports<br>• Monitoring and evaluation reports<br>• Annual workplans<br>• Meeting minutes and reports | Institutions, government ministries and agencies are committed to participating in and addressing climate risks, with integrated catchment management central to the adaptation pathway for KRB. |
| Output 1.5. Payment for Ecosystem Services (PES) models to support the long-term financing of integrated catchment management strategy implementation. | PES models developed for the KRB that target communities for EbA interventions | 0 | By the end of the project, at least 1 PES model developed and at least one policy brief submitted to government detailing the model. | • Policy brief on PES model<br>• Meeting reports<br>• Monitoring and evaluation reports | Institutions, government ministries and agencies are committed to participating in and addressing climate risks, with integrated catchment management central to the adaptation pathway for KRB. |

| Expected outcome/ outputs | Outcome/ output indicator | Baseline | Target | Sources of verification | Assumptions |
|---|---|---|---|---|---|
| **Outcome 2.** An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level. | Number of people practising climate change adaptation technologies. | 0 | At least 600 people (100 per district) are implementing EbA interventions for climate risk management. | • Registers of project beneficiaries at each site<br>• Site visits<br>• Community surveys. | Community members continue to practice adaptation technologies once they have been trained and provided with the necessary equipment. |
| Output 2.1. Agro-ecological extension services supported at the *jamoat* level to provide technical support for EbA implementation. | Number of extension service providers trained. | 0 | At least 1 private extension service provider in each target KRB district supported | • Annual workplans<br>• Workshop reports<br>• Monitoring and evaluation reports | All communities surrounding project intervention sites are committed to participating in project activities, taking up/adopting climate-resilient EbA techniques and practices and providing training to other community members. |
| Output 2.2. Watershed Action Plans (WAPs) developed that promote climate resilience and enhance economic productivity for target communities. | Number of WAPs developed. | 0 | By the end of the project, at least 1 WAP developed in each of the 14 target *jamoats*. | • Annual workplans developed for the WAPs<br>• Monitoring and evaluation reports | None of the *jamoats* have overlapping watersheds in the project area. |
| Output 2.3. EbA interventions implemented in target watersheds by local communities. | Number of households at project sites in each district benefitting from EbA activities. | 0 | At least 100 households in each district benefitting from EbA activities (600 households in total). | • Monitoring and evaluation reports per intervention sites<br>• Reports on community consultations/trainings and field visits | All communities surrounding project intervention sites are committed to participating in project activities and taking up/adopting climate-resilient techniques and practices. |
| | Number of hectares of land with EbA activities implemented at project sites in each district | 0 | At least 250 ha of land in each district undergoing EbA implementation (1,500 ha in total). | • Monitoring and evaluation reports per intervention site<br>• Reports on community consultations/trainings and field visits<br>• GIS | All communities surrounding project intervention sites are committed to participating in project activities and taking up/adopting climate-resilient techniques and practices. |

| Expected outcome/ outputs | Outcome/ output indicator | Baseline | Target | Sources of verification | Assumptions |
|---|---|---|---|---|---|
| **Outcome 3.** Existing knowledge management platforms supported for integrated catchment management and EbA. | **Knowledge management centre strengthened through the support of project activities** | 0 | By the end of the project at least 1 knowledge centre has been strengthened. | • Reports and training materials<br>• Monitoring and evaluation reports | Strengthening existing knowledge management centres promotes local knowledge sharing and raises awareness among communities. |
| Output 3.1. Existing knowledge management platforms supported for collating information on the planning, implementation and financing of EbA interventions. | Existing knowledge centre/ platforms/ hubs in Tajikistan are supported and include information and data on KRB and specifically climate risk information. | Climate change research is not coordinated within the KRB and across Tajikistan.<br><br>Knowledge generated through projects is not collated, shared or disseminated. | By the end of the project at least 1 knowledge centre has been strengthened. | • Meeting/workshop reports<br>• Minutes from forum meetings | All representatives involved in the knowledge centres (public institutions, NGOs and resource users etc.) are dedicated to developing, adopting and implementing interdisciplinary approaches to climate resilient EbA techniques and practices for integrated catchment management in the KRB specifically. |
| Output 3.2. An impact evaluation framework (IEF) to enable effective adaptive management of EbA activities. | Evaluation of EbA interventions in target sites conducted. | Several projects have undertaken activities on climate change adaptation within Tajikistan. However, none of these activities have been evaluated according to their impacts for communities. | By the end of the project, an IEF will be developed that details the process of evaluating the impact of implemented EbA measures on communities. | • Site visits<br>• Data collection<br>• Community consultation<br>• Data analysis of EbA impacts | Community members will be more aware of EbA interventions in and surrounding their communities. By conducting the IEF, awareness on the benefits of EbA interventions will be raised. |

## F. Alignment with Adaptation Fund Results Framework

Proposed project alignment with the Adaptation Fund Results Framework is detailed in Table 20.

**Table 20.** Project alignment with the Adaptation Fund Results Framework including Outcome and Output Indicators.

| **Project Objective**(s)[323] | **Project Objective Indicator**(s) | **Fund Outcome** | **Fund Outcome Indicator** | **Grant Amount** (US$) |
|---|---|---|---|---|
| Reduce vulnerability and enhance climate-resilience of small-scale farmers and pastoralists in Tajikistan to respond to the impacts of climate change. | | **Outcome 3.** Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level | **3.** Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses | **10,000,000** |
| **Project Outcome**(s) | **Project Outcome Indicator**(s) | **Fund Output** | **Fund Output Indicator** | **Grant Amount** (US$) |
| **Outcome 1.** Catchment management strategy to manage climate risks operationalised at *raion* (district) and *jamoat* (sub-district) levels in Kofirnighan River Basin (KRB). | **2.1** No. of targeted institutions with increased capacity to minimize exposure to climate variability risks | **Output 2.2** Targeted population groups covered by adequate risk reduction systems | **2.1.2** Percentage of population covered by adequate risk reduction systems | **1,500,000** |
| ***Outcome 2.*** *An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level.* | **5.** Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress | **Output 5.** Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability | **5.1** No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets) | **5,950,000** |
| ***Outcome 3.*** *Existing knowledge management platforms supported for integrated catchment management and EbA.* | **3.** Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses | **Output 3.** Targeted population groups participating in adaptation and risk reduction awareness activities | **3.1** No. and type of risk reduction actions or strategies introduced at local level | **750,000** |

## G. Budget

[323] The AF utilised OECD/DAC terminology for its results framework. Project proponents may use different terminology, but the overall principle should still apply.

| Award ID | 00113350 | | | Project ID | | 00111538 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Title | An integrated landscape approach to enhancing the climate resilience of small-scale farmers and pastoralists in Tajikistan | | | | | | | | | | |
| Business Unit | TJK10 | | | | | | | | | | |
| PIMS No. | PIMS 6219 | | | | | | | | | | |
| Implementing Partner | Committee for Environmental Protection (CEP) | | | | | | | | | | |
| **Outcome/ Atlas Activity** | **Responsible Party/ Implementing Agent** | **Fund ID** | **Donor Name** | **Atlas Budgetary Account Code** | **ATLAS Budget Description** | **Amount Year 1 (USD)** | **Amount Year 2 (USD)** | **Amount Year 3 (USD)** | **Amount Year 4 (USD)** | **Amount Year 5 (USD)** | **Total (USD)** | **Budget Notes** |
| **Component 1. Integrated catchment management to build climate resilience.** | UNDP/CEP | 62040 | AF | 71200 | International consultant | 83,500 | 69,000 | - | - | - | 152,500 | 1 |
| | | | | 71300 | Local consultant | 81,000 | 74,000 | 30,000 | - | - | 185,000 | 2 |
| | | | | 71600 | Travel | 10,000 | 10,000 | 10,000 | 10,000 | - | 40,000 | 3 |
| | | | | 72100 | Contractual Services-Companies | 40,000 | - | 10,000 | 10,000 | 10,000 | 70,000 | 5 |
| | | | | 72300 | Materials & Goods | 70,000 | 70,000 | 70,000 | - | - | 210,000 | 7 |
| | | | | 72400 | Audio Visual&Print Prod Costs | - | 15,000 | 5,000 | 5,000 | 5,000 | 30,000 | 6 |
| | | | | 74500 | Miscellaneous Expenses | 20,000 | 10,000 | 10,000 | 10,000 | 10,500 | 60,500 | 8 |
| | | | | 75700 | Training, Workshops and Confer | 98,000 | 88,000 | 63,000 | 15,000 | - | 264,000 | 4 |
| | | | | | **Total Outcome 1** | **402,500** | **336,000** | **198,000** | **50,000** | **25,500** | **1,012,000** | |
| **Component 2. Ecosystem-based Adaptation, including Climate** | UNDP/CEP | | | 71300 | Local consultant | - | 100,000 | - | - | - | 100,000 | 2 |
| | | | | 71400 | Contractual Services - Individ | 36,000 | 36,000 | 36,000 | 36,000 | 36,000 | 180,000 | 10 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **smart Agriculture and Sustainable Land Management, in agro-ecological landscapes.** | | | | 71600 | Travel | 15,000 | 15,000 | 15,000 | 14,000 | 15,000 | 74,000 | 3 |
| | | | | 72100 | Contractual Services-Companies | - | 3,358,000 | 2,123,500 | 1,123,500 | 123,500 | 6,728,500 | 5 |
| | | | | 74200 | Audio Visual&Print Prod Costs | - | 24,310 | - | - | - | 24,310 | 9 |
| | | | | 75700 | Training, Workshops and Confer | 20,000 | 75,000 | 48,000 | 18,000 | 15,000 | 176,000 | 4 |
| | | | | | **Total Outcome 2** | **71,000** | **3,608,310** | **2,222,500** | **1,191,500** | **189,500** | **7,282,810** | |
| **Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the KRB.** | UNDP/CEP | 62040 | AF | 71200 | International consultant | 36,500 | - | - | - | - | 36,500 | 1 |
| | | | | 71600 | Travel | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 5,000 | 3 |
| | | | | 72100 | Contractual Services-Companies | 20,000 | 20,000 | 12,000 | 19,000 | 20,000 | 91,000 | 5 |
| | | | | 74500 | Miscellaneous Expenses | 10,000 | - | - | - | - | 10,000 | 8 |
| | | | | | **Total Outcome 3** | **67,500** | **21,000** | **13,000** | **20,000** | **21,000** | **142,500** | |
| **Project Execution Cost** | **UNDP** | 62040 | **AF** | 71400 | Contractual Services - Individ | 85,000 | 85,000 | 85,000 | 85,000 | 85,000 | 425,000 | 10 |
| | | | | 71600 | Travel | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 35,000 | 3 |
| | | | | 72200 | Equipment and Furniture | 60,000 | - | - | - | - | 60,000 | 14 |
| | | | | 72400 | Communic & Audio Visual Equip | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 12,500 | 11 |
| | | | | 73100 | Rental & Maintenance-Premises | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 25,000 | 12 |
| | | | | 73400 | Rental & Maint of Other Equip | 5,000 | 5,000 | 5,000 | 5,000 | 2,500 | 22,500 | 15 |
| | | | | 74100 | Professional Services | 1,000 | 1,000 | 29,000 | 1,000 | 29,000 | 61,000 | 13 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 74596 | Direct project cost | 17,000 | 36,000 | 43,000 | 26,000 | 10,000 | 132,000 | 16 |
| | | | | 75700 | Training, Workshops and Confer | 3,000 | - | - | - | - | 3,000 | 4 |
| | | | | | **Total project execution cost** | **185,500** | **141,500** | **176,500** | **131,500** | **141,000** | **776,000** | |
| | | | | | **Total Project Costs** | **726,500** | **4,106,810** | **2,610,000** | **1,393,000** | **377,000** | **9,213,310** | |

| **Budget note number** | **Budget Notes** |
|---|---|
| 1 | International consultant (daily fee of US$650 * 50 days + US$4,000 air fare) for Multi-Hazard Climate Risk Modeling;<br>International consultant (IT expert - daily fee of US$650 * 30 days + US$4,000 air fare) for collecting and collating data;<br>International Consultant (Catchment management expert - daily fee of US650 for 100 days + US$4,000 air fare) on climate strategy;<br>International Consultant (Training expert on integrated catchment management, daily fee of US$ 650 for 30 days + US$ 4,000 air fare) to develop a Training programme on integrated catchment management;<br>International consultant (US$650 * 50 days + US$4,000 air fare) for development of an evaluation framework |
| 2 | National consultant to conduct gap analyses (US$200*125 days)<br>National consultants to support development of Multi-Hazard Climate Risk Models (US$200*100 days)<br>National consultants to support data collection and collation (US$200*50 days)<br>National consultants to support trainings of local community members to receive advisories (US$200*150 days)<br>National consultants to support the development of the climate strategy (2pers* US$200*100 days)<br>National consultants to assist international consultants in conducting training programme on integrated catchment management and to continue training workshops in Year 2 (US$200*100 days)<br>National Environmental Economist and National Policy Expert, for development of PES models (2 pers.*US$200*100 days)<br>National Watershed Expert for participatory mapping (US$200 for 150 days)<br>National Communications Expert for participatory mapping (US$200 for 150 days)<br>National consultants on WAPs development (2pers.*US$200*100days) |
| 3 | Travel to target districts |

| | |
|---|---|
| 4 | Workshops (10 district-level workshops and 3 national-level workshops) on climate strategy; - $25,000<br>Training workshops (6 3-day workshops @US$5,000 per workshop) on integrated catchment management + training materials - $50,000;<br>Training materials, trainings (assume US$10,000 for training materials, 2 trainings per year per jamoat at US$1,000 per training); - $94,000<br>Workshops for RBOs, RBCs, districts and jamoats. Assume 1 workshop in each district + 2 workshops in Dushanbe on strengthening the coordination systems - $50,000<br>Workshops for CEP and other relevant government staff on integrating EbA in catchment management - $20,000<br>Workshops at district and national level (12 district-level workshop, 3 national-level workshops) on PES model development - $55,000<br>Training for EbA and FFS service providers - $91,000<br>Community meetings (Meetings to be held across multiple villages; assume 3 meetings per jamoat, US$500 per meeting) on participatory mapping - $21,000<br>Workshop per jamoat on developing community monitoring plans - $20,000 + Inception workshop - $3,000<br>Training for Nursery staff - $14,000 |
| 5 | Contractual Services for GIS multihazard climate risk data modeling for first year - $40,000.<br>Contract for disseminating regular advisories via SMS - $30,000<br>Contactual services for civil works / Contract for knowledge management centre - database maintenance, knowledge dissemination - $91,000<br>EbA demonstration plots for villages – 100 villages, US$3,000 per plot to be established, plus US$200 for upkeep for each EbA plot per annum * 3 years - $360,000<br>14 nurseries, US$10,000 to establish each nursery and US$973.22 upkeep for each nursery per annum * 4 years - $194,500<br>Inputs for 100 villages to implement EbA - estimated US$58,140 per village - $5,814,000<br>Farmer field schools - 100 villages, assume US$900 per field school per annum - $360,000 |
| 6 | Basic phones + airtime for 100 community representatives; |
| 7 | Materials and inputs for 3 AWS Stations (US$70,000 per station * 3 stations) - $210,000 |
| 8 | Miscellaneous Expenses (including bank charges, insurance); |
| 9 | Printing of mapping materials ($2,310) + printing & miscellaneous ($10,000) + translation services ($12,000) |
| 10 | All project personnel fees (Project Manager, Administrative/Finance Assistant, Field staff (3 @ US7,000 p.a.)<br>Programme Assistant, Project Analyst , Project Engineer) |
| 11 | Communication cost (internet, mobile and landline phones); |
| 12 | Office rent |
| 13 | Mid-term review of the project by team of consultants (28,000 USD); Final review of the project by team of consultants (28,000 USD); Audit Fees (5,000 USD) |
| 14 | Procurement of vehicle for visits to target districts for implementation of project activities; |
| 15 | All cost associated with vehicle running, like regular maintenance, etc.; |
| 16 | Expenditures for the services on HR, procurement, IT, security provided by CO. |

## **H.** Disbursement schedule

A disbursement schedule including budget distributed per year of project implementation is detailed in Table 21.

**Table 21.** Disbursement schedule including milestones.

| | **Upon agreement & signature** (US$) | **After Year 1** (US$) | **After Year 2** (US$) | **After Year 3** (US$) | **After Year 4** (US$) | **Total disbursed** (over 5 years) |
|---|---|---|---|---|---|---|
| **Scheduled date** (tentative) | March 2020 | March 2021 | March 2022 | March 2023 | March 2024 | |
| **Project funds** | 541,000 | 3,965,310 | 2,433,500 | 1,261,500 | 236,000 | 8,437,310 |
| **Project Execution Fee** | 185,500 | 141,500 | 176,500 | 131,500 | 141,000 | 776,000 |
| **Implementing Entity fee** (8.5%) | 61,753 | 349,079 | 221,850 | 118,405 | 32,045 | 783,131 |
| **Total** | | | | | | **9,996.441** |

# PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

## A. Record of endorsement on behalf of the government[324]

A list of all endorsements for the project is provided in Table 22. See Annex 2 for all endorsement letters[325].

**Table 22.** List of endorsements provided for the proposed project.

| | |
|---|---|
| Khayrullo Ibodzoda – Chairman of the Committee for the Environmental Protection (CEP) under the Government of the Republic of Tajikistan | Date*:*<br>January, 19, 2018 |

## B. Implementing Entity certification

*Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project contact person's name, telephone number and email address.*

| | |
|---|---|
| I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project. | |
|  <br>Director, Sustainable Development (Environment) a.i.<br>Executive Coordinator, Global Environmental Finance<br>Bureau for Policy and Programme Support<br>United Nations Development Programme | |
| Date: *August 6th, 2018* | Tel. and e-mail:+1 (212) 906 5143 |
| Project Contact Person: Ms. Keti Chachibaia | |
| Tel. And Email: keti.chachibaia@undp.org | |
| | |

[324] Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.
[325] Annex 2 includes endorsement letters from

## LIST OF ANNEXURES

All annexures have been included as a separate attachment to the Full Proposal.

Annex 1. Consolidated mission and stakeholder consultation report
Annex 2. Endorsements letter
Annex 3. Justification for selection of the Kofirnighan River Basin
Annex 4. Environmental and Social Management Framework (ESMF)
Annex 5. Grievance mechanism
Annex 6. Hydromet list of needs for the repair and rehabilitation of weather stations
Annex 7. UNDP Social and Environmental Screening Procedure (SESP)
Annex 8. Letter of Agreement between UNDP and Government for the provision of Support Services
Annex 9. UNDP Fees for Support to Adaptation Fund Project

---

*End of Full Proposal*

# REQUEST FOR PROJECT
# FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project must be fully prepared (i.e. fully appraised for feasibility) when the request is submitted. The final project document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN P4-400
Washington, D.C., 20433
U.S.A.
Fax: +1 (202) 522-3240/5
Email: afbsec@adaptation-fund.org

## Table of contents


List of acronyms and abbreviations ..... 4
PART I: PROJECT INFORMATION ..... 7
Project Background and Context: ..... 7
Introduction ..... 7
Geographical context ..... 8
Socio-economic context ..... 10
Environmental context ..... 12
Kofirnighan River Basin ..... 16
Ecosystem goods and services ..... 23
C*limate change context* ..... 27
Non-climatic problems ..... 36
Problem statement ..... 37
Alternative solution and barriers ..... 38
Project Objective: ..... 40
Project Components and Financing ..... 41
Projected Calendar: ..... 42
PART II: PROJECT JUSTIFICATION ..... 42
A. Project components ..... 42
Component 1. Integrated catchment management to build climate resilience. ..... 42
Component 2. Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes ..... 50
Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the Kofirnighan River Basin ..... 57
B. Economic, social and environmental benefits ..... 60
C. Cost-effectiveness ..... 66
D. Consistency with national priorities ..... 68
E. Consistency with national technical standards ..... 75
F. Duplication in project design ..... 75
G. Knowledge management ..... 80
H. Consultation process ..... 80
I. Funding justification ..... 82
Component 1. Integrated catchment management to build climate resilience. ..... 82
Component 2. Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes ..... 83
Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the KRB. ..... 83
J. Sustainability of the project ..... 84
K. Environmental and social impacts and risks ..... 85
PART III: IMPLEMENTATION ARRANGEMENTS ..... 87
A. Implementation arrangements ..... 87
B. Financial risk management ..... 94
C. Environmental and social risk management ..... 95
D. Monitoring and evaluation ..... 103
E. Results framework ..... 107
F. Alignment with Adaptation Fund Results Framework ..... 111
G. Budget ..... 111
H. Disbursement schedule ..... 116

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY ..... 117
LIST OF ANNEXURES ..... 118

## List of acronyms and abbreviations

| | |
|---|---|
| **Adaptation Strategy** | Strategy of Adaptation to Climate Change, Prevention and Minimization of its Adverse Effects |
| **ADB** | Asian Development Bank |
| **AF** | Adaptation Fund |
| **AFA** | Administrative/Finance Assistant |
| **ALRI** | Agency for Land Reclamation and Irrigation |
| **AWP** | Annual Work Plan |
| **BCPR** | Bureau for Crisis Prevention and Recovery |
| **BMU** | Federal Ministry for the Environment, Nature Conservation and Nuclear Safety |
| **CAC** | Central Asia and the Caucasus |
| **CACAARI** | Central Asia and the Caucasus Association of Agricultural Research Institutions |
| **CA-CRM** | Central Asian Multi-Country Programme on Climate Risk Management |
| **CAFT** | Climate adaptation through sustainable forestry in important river catchment areas in Tajikistan |
| **CAREC** | Central Asian Regional Economic Cooperation |
| **CBD Strategy** | National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity |
| **CBOs** | Community-based organisations |
| **CCA** | Climate change adaptation |
| **CDP** | Combined Delivery Report |
| **CEP** | Committee for Environmental Protection |
| **CGIAR** | Consultative Group on International Agricultural Research |
| **CIA** | Central Intelligence Agency |
| **CSA** | Climate-smart Agriculture |
| **DDPs** | District Development Plans |
| **DoG** | Department of Geology |
| **DRMP** | UNDP Disaster Risk Management Programme |
| **DRR** | Disaster risk reduction |
| **EDB** | Eurasian Development Bank |
| **EbA** | Ecosystem-based Adaptation |
| **EIAs** | Environmental Impact Assessments |
| **EPs** | Enterprise Plans |
| **ESMF** | Environmental and Social Management Framework |
| **ESP** | March 2016 Revision of the Environmental and Social Policy of the Adaptation Fund |
| **FAO** | The Food and Agriculture Organisation of the United Nations |
| **FFSs** | Farmer Field Schools |
| **GBAR** | Gorno-Badakhshan Autonomous Region |
| **GCF** | Green Climate Fund |
| **GDP** | Gross Domestic Product |
| **GEF** | Global Environment Facility |
| **GHG** | Greenhouse gas |
| **GHG Strategy** | Greenhouse Gas Abatement Strategy |
| **GINA** | Global Database on the Implementation of Nutrition Action |
| **GIZ** | *Deutsche Gesellschaft für Internationale Zusammenarbeit* |
| **GLOFs** | Glacial lake outburst floods |
| **GoT** | Government of Tajikistan |
| **Hydromet** | State Agency for Hydrometeorology |
| **ICAS** | Initiatives in Critical Agrarian Studies |
| **ICARDA** | International Center for Agricultural Research in the Dry Areas |
| **ICR** | Intelligent Character Recognition |

| | |
|---|---|
| **IDA** | International Development Association |
| **IDS** | Institute for Development Studies |
| **IEF** | Impact evaluation framework |
| **ILO** | International Labour Organisation |
| **IMCC** | Inter-Ministerial Coordination Council |
| **IMS** | Information Management Systems |
| **INDC** | Intended Nationally Determined Contribution |
| **ISS** | International Institute of Social Studies |
| **IW** | Inception Workshop |
| **IWRM** | Integrated Water Resources Management |
| **KRB** | Kofirnighan River Basin |
| **KRBMP** | Kafirnigan River Basin Plan and Management Plan |
| **LITACA** | Livelihood Improvement in Tajik-Afghan Cross-border Areas |
| **LSIS** | Living Standards Improvement Strategy of Tajikistan for 2013–2015 |
| **LUP** | Land-use planning |
| **M&E** | Monitoring and evaluation |
| **Masl** | Metres above sea level |
| **MEWR** | Ministry of Energy and Water Resources |
| **MFIs** | Microfinance institutions |
| **MHCRM** | Multi-Hazard Climate Risk Model |
| **MLRWR** | Ministry of Land Reclamation and Water Resources |
| **MTDP** | Mid-term Development Programme 2016–2020 |
| **MTR** | Mid-term Review |
| **NAPCC** | National Action Plan of Tajikistan for Climate Change |
| **NCCAS** | National Climate Change Adaptation Strategy Tajikistan: Building Capacity for Climate Resilience |
| **NDRMS** | National Strategy on Disaster Risk Management for 2010–2015 |
| **NDS** | National Development Strategy |
| **NEAP** | National Environmental Action Plan |
| **NHDR** | National Human Development Report |
| **NIM** | National Implementation Modality |
| **NPACD** | National Programme of Actions to Combat Desertification |
| **NPC** | National Project Coordinator |
| **NPD** | National Project Director |
| **OCSE** | Organisation for Security and Cooperation in Europe |
| **PES** | Payment for Ecosystem Services |
| **PGRFA** | Plant Genetic Resources for Food and Agriculture |
| **PLAAS** | Institute for Poverty, Land and Agrarian Studies |
| **PM** | Programme Manager |
| **PPCR** | Pilot Programme for Climate Resilience |
| **PPR** | Project Progress Report |
| **PRISE** | Pathways to Resilience in Semi-arid Countries |
| **PRS** | Poverty Reduction Strategy |
| **PSC** | Project Steering Committee |
| **PUUs** | Pasture User Unions |
| **Ramsar Convention** | Convention on Wetlands of International Importance especially as Waterfowl Habitat |
| **RBCs** | River Basin Councils |
| **RBOs** | River Basin Organisations |
| **DRS** | Districts of Republican Subordination |
| **SDC** | Swiss Agency for Development and Cooperation |
| **SIDA** | Swedish International Development Cooperation Agency |
| **SIWI** | Stockholm International Water Institute |

| | |
|---|---|
| **SLM** | Sustainable Land Management |
| **SPCR** | Strategic Program for Climate Resilience |
| **TJS** | Tajikistan Somoni |
| **ToT** | Training-of-Trainers |
| **TR** | Terminal Review |
| **UCA** | University of Central Asia |
| **UN Environment/ UNEP** | United Nations Environment Programme |
| **UNDP** | United Nations Development Programme |
| **UNECE** | United Nations Economic Commission for Europe |
| **UNESCO** | United Nations Educational, Scientific and Cultural Organisation |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **Watershed** | In this document, the smallest hydrological unit for management of land and water resources |
| **WAPs** | Watershed Action Plans |
| **Water Reform Programme** | Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 |
| **WB** | World Bank |
| **WBG** | World Bank Group |
| **WHO** | World Health Organisation |
| **WMO** | World Meteorological Organization |
| **WUAs** | Water User Associations |

ADAPTATION FUND

# PROJECT PROPOSAL TO THE ADAPTATION FUND

## PART I: PROJECT INFORMATION

| | |
|---|---|
| Project Category: | Regular Project |
| Country/ies: | Tajikistan |
| Title of Project | An integrated landscape approach to enhancing the climate resilience of small-scale farmers and pastoralists in Tajikistan |
| Type of Implementing Entity: | Multilateral Implementing Entity |
| Implementing Entity: | UNDP |
| Executing Entity/ies: | Committee for Environmental Protection (CEP) |
| Amount of Financing Requested: | US$ 9,996,441 |

*Project Background and Context:*

### Introduction

The Republic of Tajikistan (hereafter Tajikistan) is the most climate-vulnerable country in Central Asia. Extreme rainfall events have become more frequent and intense, the rainfall season has shortened in many parts of the country, air temperatures have risen markedly, and glacial melting is accelerating[1]. As a result, hydrometeorological disasters such as droughts, mudflows and landslides are more frequent and rates of soil erosion across the country are increasing. The socio-economic impacts of these changes are considerable: livelihoods, agricultural productivity, water availability and hydroelectricity production are all compromised[2]. Indeed, natural hazards, most of which are linked to climate change (e.g. droughts and landslides), result in annual losses equivalent to ~20% of the country's Gross Domestic Product (GDP)[3].

The vulnerability of Tajikistan to climate change is exacerbated by a low adaptive capacity as a result of ageing infrastructure, the disproportionate number of women in poverty compared with men[4], and limited institutional capacity. This vulnerability is expected to intensify in the future, and consequently the building of climate resilience across the country is of paramount importance[5].

Given the above context, the proposed Adaptation Fund (AF) project will introduce an integrated approach to landscape management to develop the climate resilience of rural communities in

[1] Third National Communication of the Republic of Tajikistan under the United Nations Framework Convention on Climate Change. 2014. Committee on Environmental Protection, State Administration for Hydrometeorology, Government of The Republic of Tajikistan.
[2] World Bank (WB). 2013. Tajikistan: Overview of climate change activities.
[3] WB 2013 Tajikistan: Overview.
[4] This phenomenon is referred to as the 'feminisation of poverty', where women bear the burden of poverty – particularly in developing countries – as a result of lack of income and gender biases.
[5] WB 2013 Tajikistan: Overview.

Tajikistan. The proposed project's activities will focus in particular within one of the most climate-vulnerable river basins, namely the Kofirnighan River Basin (KRB). An integrated catchment management strategy will be developed for this basin which will be operationalised at *raion* (district), *jamoat* (sub-district) and village levels[6]. The strategy will provide detailed guidelines for suitable landscape management interventions to reduce the vulnerability to climate change.

Important principles underpinning the strategy will include: i) climate risks will need to be managed at a range of spatial scales (catchment and watershed[7]); ii) upstream-downstream interactions at different time scales (e.g. via glacial lake outburst floods, flooding and soil erosion) will need to be understood by planners and decision-makers in the KRB; iii) long-term development plans for the KRB will need to include a focus on climate risk management; iv) a cross-sectoral and integrated approach for managing water resources, forests, pasture land and agricultural land at the watershed level will be required to build climate resilience; v) landscape management interventions will need to focus on Ecosystem-based Adaptation (EbA), which will invariably include elements of both Sustainable Land Management (SLM) and Climate-smart Agriculture (CSA) practices; and vi) existing knowledge management platforms and hubs will need to be used to present lessons learnt within the KRB for promoting future national upscaling and replication of the project's activities.

Complementing the catchment management strategy, the proposed project will directly build the resilience of selected communities by: i) implementing on-the-ground EbA; ii) supporting agro-ecological extension services to provide technical assistance on climate change adaptation practices to local community members; iii) promoting the development of business models that capitalise on EbA interventions; and iv) developing a Payment for Ecosystem Services (PES) approach to support the long-term financing of climate-resilient catchment management plans across Tajikistan.

## Geographical context

Tajikistan is a small, landlocked country bordered by China to the east, the Kyrgyz Republic to the north, Afghanistan to the south and Uzbekistan to the north-west. The total land area of the country is 142,600 km$^2$, making it the smallest of all the Central Asian countries[8,9]. Over 90% of the land is mountainous terrain, with approximately half the country being more than 3,000 metres above sea level (masl). The topography of the country is extremely steep, with elevations ranging from 300–7,495 masl (Figure 1). This elevation range has resulted in a significant inter-seasonally and regionally variable climate. Elevation also influences the mean annual temperature, which ranges from -20ºC–30ºC, depending on the region. Similarly, mean annual precipitation varies geographically, ranging from ~30–1,800 mm per annum, and occurring mostly during a unimodal rain season that lasts ~7 months.

The mountainous regions of Tajikistan are of global importance as a glacial area. Approximately, 60% of the total number of glaciers in Central Asia are located within the country. Together, these

[6] The administration delineations are explained in the following sub-section on the socio-economic context of Tajikistan.
[7] The terms 'catchment' or 'basin' refer to a portion of land drained by a river and its tributaries, and are used interchangeably throughout this document. Catchments/basins can be subdivided into 'watersheds' i.e. areas of land around a smaller river, stream or lake.
[8] Third National Communication 2014.
[9] The total land surface areas of the remaining four Central Asia countries, in order of increasing size, are: i) Kyrgyzstan at 199,900 km$^2$; ii) Uzbekistan at 448,978 km$^2$; iii) Turkmenistan at 491,210 km$^2$; and iv) Kazakhstan at 2,725,000 km$^2$.

glaciers make up ~6% of Tajikistan's land area (Figure 2) and are important water reserves, storing ~406 km$^3$ of water and contributing to between 40 and 60% of the national renewable freshwater resources[10]. Two principle mountain ranges in Tajikistan – namely, the Pamir and Alay – give rise to several glacial-fed streams and rivers that are used to irrigate large areas of farmlands. Increased intensity of glacier melting is likely to lead to significant changes in the hydrological system and a greater risk of water-related natural disasters, such as floods and mudflows[11]. Over the last decade, water-related natural disasters have cost the Government of Tajikistan (GoT) more than US$1 billion and have resulted in the loss of hundreds of lives[12].


**Figure 1.** Map showing the five administrative regions of Tajikistan, namely Sughd, Khatlon, Districts of Republican Subordination (DRS) (previously known as Karotegin Region), Badakhshan and Dushanbe[13,14].

Tajikistan's water resources are an integral contributor to the local economy, specifically for the agricultural and energy sector. Irrigation agriculture and livestock farming account for over 90% of annual water withdrawals, primarily from surface water sources. Despite this disproportionate water resource allocation to the agricultural sector, Tajikistan only develops 700–1,200 ha of land

[10] United Nations Economic Commission for Europe (UNECE). 2017. Environmental Performance Review: Tajikistan, Third Review.
[11] Pathways to Resilience in Semi-Arid Countries (PRISE). 8 September 2018. "COMMENT: Tajikistan's glaciers melting – far more than just a loss of ice". Available at: http://prise.odi.org/comment-tajikistans-glaciers-melting-far-more-than-just-a-loss-of-ice/ [accessed 03.07.2018].
[12] PRISE 2018 "Tajikistan's glaciers melting".
[13] The five administrative regions of Tajikistan are: i) Sugd *oblast*; ii) Khatlon *oblast*; iii) Gorno-Badakhshan *oblast*; iv) Regional Republic Subordination (RRS) – which consists of 13 autonomous districts; and v) Dushanbe.
[14] Maps of the world. 2016. Maps of Tajikistan. Available at: http://www.maps-of-the-world.net/maps-of-asia/maps-of-tajikistan/ [accessed 03.07.2018].

for irrigation annually. This amount is ~10 times less than what was planned in the Water Sector Development Strategy for 2010–2025[15]. Such slow progress in irrigating agricultural land is attributed to insufficient investment into the agricultural sector and has resulted in the country needing to import ~50% of most of its staple foods.

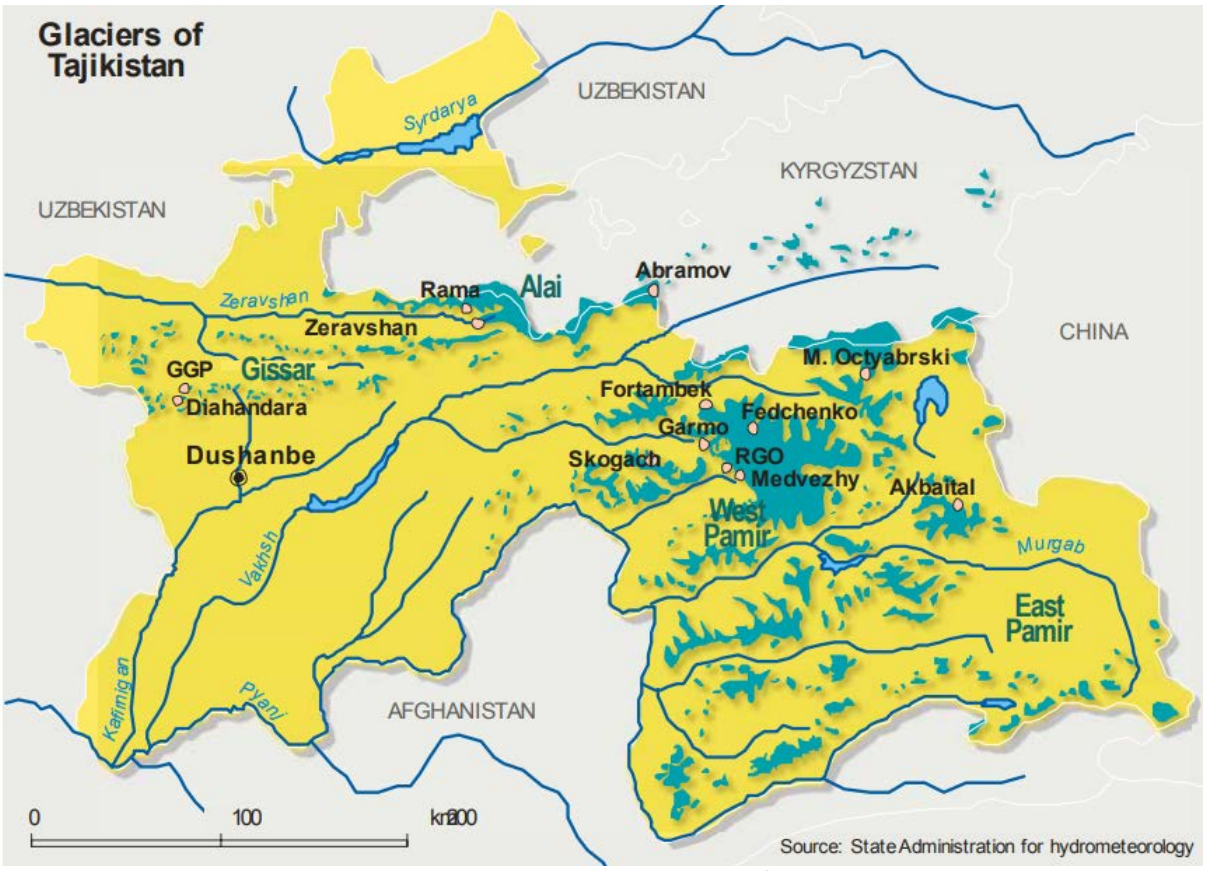



**Figure 2.** Map illustrating the extent of glacier coverage in Tajikistan[16].

## Socio-economic context

Tajikistan has a rapidly growing population, which at present numbers ~8.35 million[17]. Most people live in rural areas and are heavily dependent on agriculture for their livelihoods. Between 2005 and 2014, the population increased by ~22%[18]. Unlike many other countries globally, this rapid growth has not led to increased urbanisation. Indeed, the proportion of rural (~73%) to urban residents (~27%) has remained relatively constant since 2005[19].

[15] Water Sector Development Strategy for 2010–2025. 2009. Ministry of Land Reclamation and Water Resources (MLRWR) & Organisation for Security and Cooperation in Europe (OCSE), Dushanbe, Tajikistan.
[16] Kayumov A. 2016. Glaciers resources of Tajikistan in condition of the climate change. State Agency for Hydrometeorology of Committee for Environmental Protection under the Government of the Republic of Tajikistan. Designer: Minikulov N.
[17] UN DESA/Population Division. 2017. World Population Prospects 2017. Available at: https://esa.un.org/unpd/wpp/Graphs/DemographicProfiles/ [accessed 03.07.2018].
[18] UNECE 2017 Environmental Performance Review.
[19] Ibid.

The economy of Tajikistan is relatively weak compared with neighbouring countries – having the lowest per capita GDP (of ~US$970) in the United Nations Economic Commission for the Europe (UNECE) region. There has, however, been continuous growth in GDP over the last 20 years[20], with a total increase of 100% between 1998 and 2018. This growth has significantly improved the living standards of the population, resulting in a decrease in the number of people living below the poverty line from 53% to 36%[21].

Current socio-economic development trends in Tajikistan are closely connected to growth in the agricultural sector. This is because agriculture accounts for 75% of total employment and 23% of GDP, despite only 7% of the land surface being classified as arable. Cotton farming makes up the majority of the sector and is Tajikistan's main agricultural export product. Other agricultural focal areas include rice, grain, tobacco, corn, potato, vegetables, horticulture, vineyards and cattle breeding[22]. Like in other Central Asian countries, agricultural productivity showed a marked decline during the transition period from the Soviet Regime to independence[23], with productivity levels dropping ~50% by 1997[24]. By 2007, agricultural productivity in the country had, however, almost recovered to pre-transition levels, with the quantity of agricultural produce doubling again between 2005 and 2014[25].

Given the mountainous terrain of the country, transportation networks are integral to economic development[26] because they provide links to markets for multiple sectors, including agriculture. The main economic sectors in Tajikistan are, however, severely at risk from extreme climate events, particularly glacial lake outburst floods (GLOFs) and avalanches. GLOFs pose the most significant large-scale risk to transport networks – and consequently many other sectors – because of their unpredictability and the extent of affected area[27]. These events often cause extensive damage to trade networks, making them extremely detrimental to the economy[28]. In addition, both sudden and slow onset flooding events can cause landslides that have major negative impacts on the population[29].

### *Administrative delineations*

The administrative division of the country is established by its parliament and consists of three tiers of local government. These tiers are described below.

- First tier: sub-district- or *jamoat*-level. These are village and town governments in rural areas.
- Second tier: district- or *raion*-level. These are the administrations of large cities and *raions* which are subordinate to *oblasts.*

[20] Trading Economics. 2018. Tajikistan GDP per capita. Available at: https://tradingeconomics.com/tajikistan/gdp-per-capita [accessed 03.07.2018].
[21] UNECE 2017 Environmental Performance Review.
[22] National Action Plan of Tajikistan for Climate Change Mitigation (NAPCC). 2003. Main Administration on Hydrometeorology and Environmental Pollution Monitoring Ministry for Nature Protection of the Republic Tajikistan, Dushanbe.
[23] causes include the Tajik Civil War, removal of the centralised Soviet infrastructure and limited agricultural expertise
[24] Lerman Z. 2007. Tajikistan: An overview of land and farm structure reforms. The Hebrew University of Jerusalem. Discussion Paper 208.
[25] UNECE 2017 Environmental Performance Review.
[26] NAPCC 2003.
[27] Monhanty A, Mishra M, Mohanty B & BalaSuddareshwara A. 2011. Climate changes and natural hazards in mountain areas. Mountain Hazards 2011. Dushanbe, Tajikistan.
[28] The World Bank (WB). 13 September 2017. Strengthening infrastructure in Tajikistan for disaster and climate resilience. Available at: http://www.worldbank.org/en/news/feature/2017/09/04/strengthening-infrastructure-in-tajikistan-for-disaster-and-climate-resilience [accessed 03.07.2018].
[29] WB 2017 Strengthening infrastructure in Tajikistan.

- Third tier: *oblast*-level. These are the administrations of the capital city Dushanbe, as well as the *oblasts* of the Gorno-Badakhshan Autonomous Region (GBAR), Khatlon and Sougd, all of which are directly subordinate to the national government.

There are also District of Republican Subordination (DRS) which cover districts of Rasht and Gissar Valleys as well as those around the city of Dushanbe.

Tajikistan's capital city, Dushanbe, has 4 city districts, while the country's three *oblasts* have 58 rural districts between them. The GBAR is subdivided into 7 *raions* and 1 city; Sougd into 14 *raions* and 8 cities; and Khatlon into 24 *raions* and 4 cities[30]. Each *oblast, raion* and city has its own *khukumat*, or local council, with a chairperson who is appointed by the president and approved by respective council members. Local councils of second- and third-tier governments exercise the rights of self-government in their respective territories. Their decisions are legally binding for all institutions and organisations within their territories. Legislation does not address local self-government activity below the level of villages and towns. However, grassroots organisations of community self-government, such as *Mahala* committees are widespread and often exercise limited autonomy in solving local issues[31].

## Environmental context

Tajikistan is situated at the confluence of several diverse biogeographic regions. Influenced by variable weather patterns, these regions host a wide range of ecosystems, including glaciers, forests, woodlands, rangelands (steppe and grasslands), semi-deserts, deserts and wetlands[32,33]. The country is part of the Central Asia biodiversity hotspot[34], which supports a rich diversity of flora and fauna[35]. Ecosystems in Tajikistan are home to more than 23,000 plant species (of which ~8% are endemic) and more than 13,500 animal species (of which ~6% are endemic)[36]. Mountain ecosystems, situated between 600 and 7,000 masl, contain ~80% of the country's biodiversity and have high levels of endemism[37]. These mountain ecosystems also provide essential water resource services to their respective regions and to most of the country's summer pastures.

Tajikistan's 142,600 $km^2$ total land area is comprised of diverse ecosystems that support a range of land uses and resources, including:

- ~3% forests and shrublands;
- ~5% intensively-used arable land;
- ~32% agricultural lands, predominantly pastures; and
- ~60% natural (non-agricultural) areas, including glaciers, snowfields, well-vegetated mountain slopes, mountain deserts and rock/pebble fields[38].

[30] Ilolov M & Khudoiyev M. 2001. Local government in Tajikistan. In: Munteanu I (ed.) Developing New Rules in the Old Environment. Local Governments in Eastern Europe, in the Caucasus and in Central Asia. Budapest: Open Society Institute 603–648.
[31] Ilolov & Khudoiyev 2001 Local government in Tajikistan.
[32] Squires VR & Safarov N. 2013. Diversity of plants and animals in mountain ecosystem in Tajikistan. Journal of Rangeland Science 43–61.
[33] National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity (CBD Strategy). 2003. Government of Republic of Tajikistan, Dushanbe.
[34] Fauna and Flora International. 2018. "Tajikistan: Wild riches in a mountainous terrain". Available at: https://www.fauna-flora.org/countries/tajikistan [accessed 03.07.2018].
[35] World Wide Fund for Nature (WWF). 2018. Central Asia: Kyrgyzstan, Tajikistan, and Uzbekistan. Available at: https://www.worldwildlife.org/ecoregions/pa0808 [accessed 03.07.2018].
[36] CBD Strategy 2003.
[37] Squires & Safarov. 2013.
[38] NAPCC 2003.

Of Tajikistan's total land area[39], ~22% is currently conserved[40,41].

Conservation areas within Tajikistan are formally recognised in the form of reserves and environmental protection zones[42,43,44]. Five wetlands are listed in terms of the Ramsar Convention[45] and one conservation area has been declared a United Nations Educational, Scientific and Cultural Organisation (UNESCO) world heritage site[46]. Despite these conservation efforts, degradation continues to occur over large parts of the country[47]. Illegal poaching and uncontrolled harvesting of plant species are of particular concern within the reserves and protection zones[48]. Because there is such rich diversity in the country[49], the extinction risk to biodiversity is also high, with 226 plant species and 162 animal species currently classified as rare or threatened[50]. Expanding protected areas and eliminating threats to species extinction are focal areas for the GoT going forward[51,52].

Most territories of Tajikistan are prone to both natural and anthropogenic factors that contribute to land degradation (Figure 3). Tajik landscapes are affected by harsh climatic processes which degrade their health and function. Such harsh processes include freezing, thawing, physical destruction of soils from fluctuations in diurnal temperatures, dehydration, wind erosion and intense rainfall events[53]. Inappropriate land management such as the unsustainable use of forests and pastures, and the conversion of steep slopes for use in agriculture have contributed to the degradation of landscapes[54]. The effects of the harsh climatic processes coupled with the mismanagement of land are magnified by climate change factors[55]. These factors include increasing air temperatures, increasing intensity of extreme rainfall events and the shortening of rainfall seasons. Climate change events have also resulted in the intensification of desertification, landslides, gully erosion and sheet erosion – with the washout of fertile topsoil affecting more than 100,000 ha[56,57]. Available estimates indicate that ~82% of all land in Tajikistan is degraded by soil erosion to some degree. This translates into ~98% of agricultural land being currently affected by soil erosion, with almost ~89% being affected by medium to 'very high' levels of erosion[58].

[39] Third National Communication 2014.
[40] 3.1 million ha
[41] Third National Communication 2014.
[42] 4 reserves, 2 national parks and 13 wildlife reserves
[43] Third National Communication 2014.
[44] The Food and Agriculture Organisation of the United Nations (FAO). 2008. Country Report on the State of Plant Genetic Resources for Food and Agriculture. Republic of Tajikistan.
[45] Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987.
[46] Third National Communication 2014.
[47] FAO 2008 Country Report.
[48] Ibid.
[49] Fauna and Flora International 2018 "Tajikistan: Wild riches in a mountainous terrain".
[50] CBD Strategy 2003.
[51] e.g. Tajikistan's national programmes on biodiversity and biosafety
[52] FAO 2008 Country Report.
[53] NAPCC 2003.
[54] Third National Communication 2014.
[55] Ibid.
[56] NAPCC 2003.
[57] Third National Communication 2014.
[58] Poverty-Environment Initiative in Tajikistan. 2012. The Economics of Land Degradation for the Agricultural Sector in Tajikistan – A Scoping Study. Final Report, United Nations Development Programme (UNDP) and United Nations Environment Programme (UN Environment).

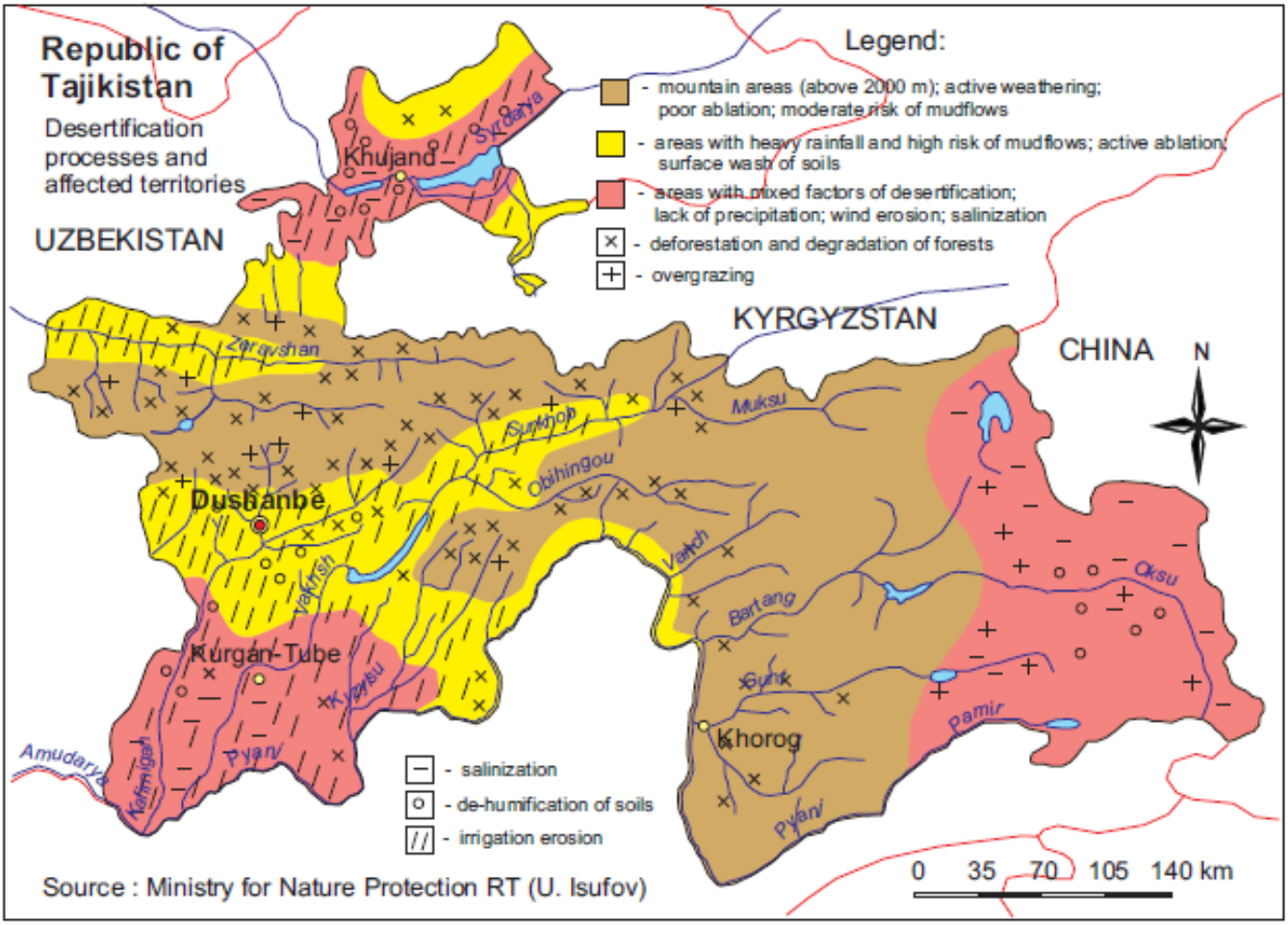



**Figure 3.** Desertification processes and territories in Tajikistan affected by *inter alia*: i) moderate risk of mudflows (brown); ii) high risk of mudflows, heavy rainfall and surface wash of soils (yellow); iii) desertification, lack of precipitation, wind erosion, salinization (pink); iv) deforestation (x); v) overgrazing (+); vi) salinisation (-); and vii) de-humification of soils (o).[59]

### *River systems*

The terrain of Tajikistan has been eroded to form a diverse range of mountains and steep valleys. The country's mountain ranges create several hydrographic areas, which in turn form the two main river systems. These two rivers feed into six primary rivers across the country. In order of decreasing size and length, these six rivers are: i) Bartang; ii) Vahksh; iii) Pyanj; iv) Kofirnighan; v) Zarafshan; and vi) Karatag. Figure 4 illustrates the river basins in Tajikistan.

[59] NAPCC 2003.

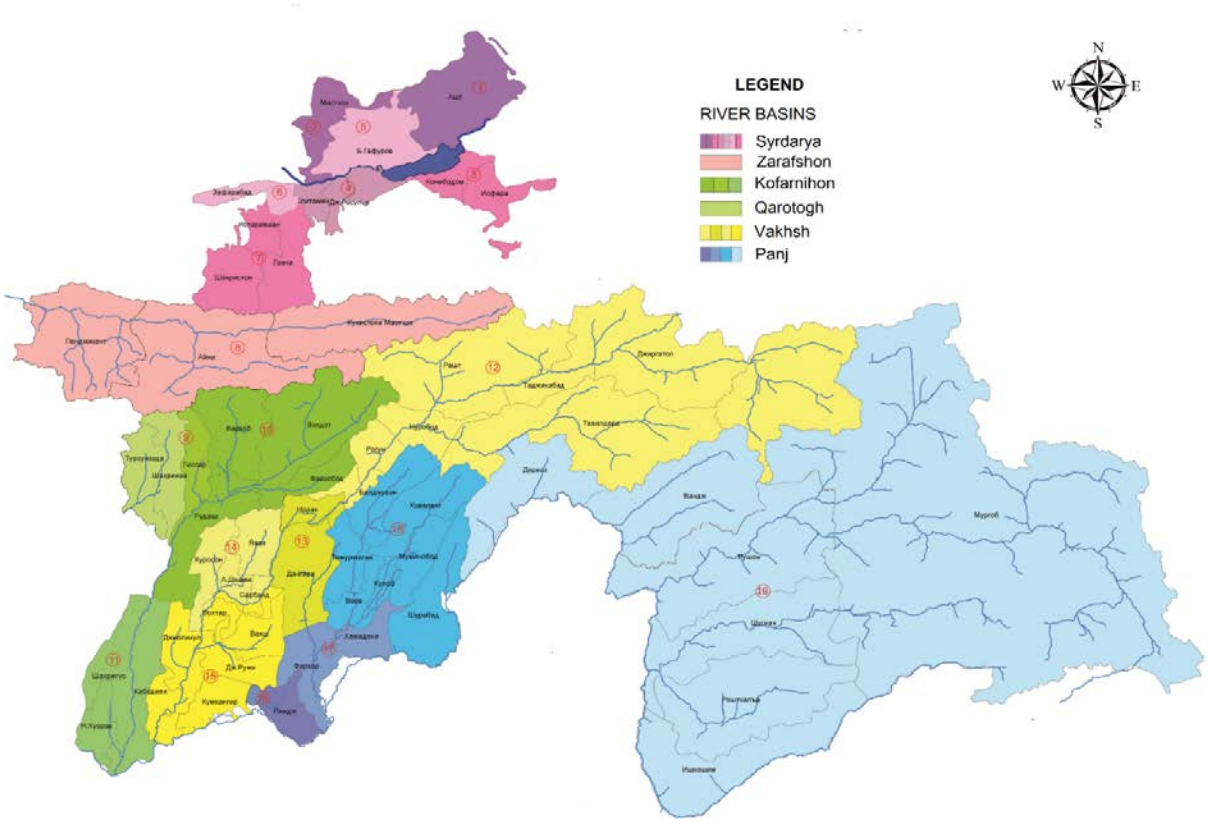



**Figure 4.** Map of river basins in Tajikistan, namely Bartang (labelled as Surdarya), Vahksh, Pyanj, Kofirnighan, Zarafshan and Karatag[60].

The Water Sector Reform Programme of Tajikistan for 2016–2025 (Water Reform Programme)[61] delineates four river basins according to hydrological boundaries. These four basins are the: i) section of the Syr Darya River that is located in Tajikistan; ii) section of the Pyanj River located in Tajikistan; iii) Vakhsh River Basin; and iv) the Kofirnighan River Basin.[62] By defining these river basins, the Water Reform Programme highlights the shift in the GoT towards improving management of these river systems away from using administrative boundaries. The programme also outlines the GoT's goal of promoting the implementation of integrated water resources management (IWRM) at a basin level.

Of the four river basins identified by Tajikistan's Water Reform Programme, the Kofirnighan River Basin (KRB) is one that currently does not have focused efforts being made towards IWRM[63]. Compared to the other three basins, KRB has received the fewest interventions from government and donors to date. The KRB is topographically and climatically very variable and is highly vulnerable to extreme climate events such as GLOFs, floods, mudflows and landslides[64,65]. It is also the smallest of Tajikistan's four basins and is fully encompassed within Tajikistan (i.e. is not

[60] Fergana Valley Water Resources Management (WRM). 2018. Kafirnigan River Basin Plan and Management Plan (KRBMP) Draft. Unpublished, Dushanbe, Tajikistan.
[61] Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme). 2015. Resolution of the Government of the Republic of Tajikistan. Unofficial translation.
[62] Water Reform Programme 2015.
[63] Fergana Valley WRM 2018 KRBMP Unpublished.
[64] State Agency for Hydrometeorology (Hydromet). 2018. Assessment of Kofirnighan River Basin (KRB), natural disasters and needs. Unofficial document.
[65] see sub-section on KRB below

transboundary). A Kofirnighan River Basin Management Plan (KRBMP) has been developed for the basin. Although this plan includes water management, it does not integrate land and natural resources into that management.

## Kofirnighan River Basin

The proposed project focuses its activities within the Kofirnighan River Basin (KRB) as, of the four basins within Tajikistan: i) the KRB has received limited international support for the implementation of integrated catchment management; ii) a large number of communities within the basin are highly vulnerable to a wide range of climate risks; iii) the basin's variable topographic and climatic conditions are highly representative of the conditions in Tajikistan; and iv) there are no transboundary disputes along the river[66]. A detailed justification for the selection of the KRB for project activity implementation has been included as Annex 3.

Situated in the south-western and western parts of the country, the KRB occupies a total area of ~11,600 km$^2$, with the mountain catchment making up 8,070 km$^2$ of this (equating to ~70% of the total basin area)[67]. The basin is divided into two regions, namely the north and the central/south regions[68]. The Gissar Valley encompasses the north region, which includes the city of Dushanbe, while the Kofirnighan and Beshkent valley depressions make up the south region. The Gissar Ridge forms the highland areas, extending for 250 km to elevations of ~4,500 masl and is home to 343 glaciers, covering a total area of 115 km$^2$.[69] The river of Kofirnighan, at ~387 km long, is one of the major contributing inflows of Tajikistan's largest river, the Amu Darya River[70]. It flows through different mountain ranges and zones within the basin including high mountains, intermediate foothills and low and flat zones. The basin's groundwater reserves are economically important and are used to irrigate crops (~98,000 ha) and pastures (~56,000 ha). Most of the irrigated land is in the arid southern sub-basin, while cultivated land in the northern sub-basin is largely rain-fed.

The mountain ranges and glaciers have a major influence on the air temperatures within the KRB. Temperature and precipitation gradients exist along the zones (mountainous, foothill, low), with temperatures increasing as one moves from the mountainous to the low-lying zones, and precipitation decreasing in this direction. In the mountainous areas of KRB, average temperatures range from 18°C in the summer months (hottest summer temperatures being ~35°C) to –8°C in the winter months (with cold air masses sometimes resulting in temperatures as low as –30°C). Intensely hot summer temperatures are typical for the south of KRB, which experiences mild winters compared with the north. Average temperatures in the southern areas of KRB range from ~31°C in the summer months (hottest summer temperatures being ~48°C) to ~2°C in winter (with temperatures dropping to as low as -28°C) [71].

In terms of political divisions, the KRB is made up of 10 administrative districts, 4 cities including Dushanbe, 10 villages and 77 *jamoats* (rural self-governance bodies). This division in the population is recorded in Table 1. As of January 2017, the total KRB population was 2.8 million people, with ~62% living in rural areas and ~38% in towns. Over the past 13 years, the KRB

[66] reducing the project partners and stakeholders to within the country
[67] Tahirov IG & Kupayi GD. 1994. Water resources of Tajikistan of the Republic of Tajikistan. Dushanbe 1:181.
[68] Fergana Valley WRM 2018 KRBMP Unpublished.
[69] Ibid.
[70] Tahirov & Kupayi 1994 Water resources of Tajikistan.
[71] Fergana Valley WRM 2018 KRBMP Unpublished.

population has increased by 712,000 people (representing a ~34% total increase and an annual growth rate of 2.5%).

**Table 1.** Kofirnighan River Basin population numbers according to cities and villages[72].

| No. | Districts and cities | Population[73] | | | Population density[74] | No. of cities | No. of urban-type settlements | No. of *jamoats* |
|---|---|---|---|---|---|---|---|---|
| | | Total | City (%) | Village (%) | | | | |
| 1 | Dushanbe | 816,200 | 100 | 0 | 8162 | 1 | 0 | 0 |
| 2 | Varzob | 76,900 | 3 | 97 | 45,2 | 0 | 1 | 6 |
| 3 | Vahdat | 324,000 | 17 | 83 | 87,6 | 1 | 1 | 10 |
| 4 | Gissar | 287,400 | 14 | 86 | 287,4 | 1 | 1 | 11 |
| 5 | Faizobod | 96,900 | 10 | 90 | 107,7 | 0 | 1 | 7 |
| 6 | Tursunzade | 280,000 | 19 | 81 | 233,3 | 1 | 0 | 9 |
| 7 | Rudaki | 476,500 | 11 | 89 | 264,7 | 0 | 3 | 13 |
| 8 | Nosiri Khusrav | 35,900 | 0 | 36 | 44,9 | 0 | 0 | 3 |
| 9 | Kabodiyon | 173,800 | 7 | 93 | 96,6 | 0 | 1 | 7 |
| 10 | Shaartuz | 120,500 | 14 | 87 | 80,3 | 0 | 1 | 5 |
| **Total** | | **2,802,500** | **38** | **62** | **180,8** | **4** | **10** | **77** |

The State Agency for Hydrometeorology (Hydromet) has conducted research on the river basins in Tajikistan, identifying KRB as a basin particularly vulnerable to extreme climate events[75,76]. Such extreme events have affected 163 communities within the basin. These KRB communities are illustrated in Figure 5, including the main river and tributaries.

A methodology which ranks rural areas in terms of their vulnerability to climate impacts has been used to identify the specific districts within the KRB that are the most vulnerable to climate change[77,78]. Ranking of areas used the following criteria[79]:

- exposure to extreme climate events caused by climate change including temperature, precipitation, floods and drought;
- sensitivity to climate change on sectors/elements including productivity, poverty, access to land resources, dependence on agricultural production and diseases; and
- adaptation potential which included access to health care, education, drinking and irrigated water, cattle density and internal and external migration.

Taking the above criteria into account, the following districts were deemed the most vulnerable districts within KRB: i) Vakhdat, Faizobod and Varzob in the north; and ii) Nosiri Khusrav, Kabodiyon and Shaartuz in the south.[80] These six districts are described in greater detail in the sub-sections below[81].

[72] Agency for Statistics. 2017. Regions of the Republic of Tajikistan. Under the President of the Republic of Tajikistan.
[73] Population census as at 1 January 2017.
[74] Population density is measured per km$^2$.
[75] Hydromet 2018 Assessment of KRB, Unofficial document.
[76] Further information concerning the KRB's vulnerability to extreme climate events is presented under 'Climate change context'.
[77] Asian Development Bank (ADB). May 2016. Tajikistan: Building Capacity for Climate Resilience – Mid-term Report (MTR). Technical Assistance Consultant's Report. Prepared by ABT Associates for the ADB and GoT. Project No: 45436–001; TA 8090.
[78] This methodology was developed under ADB project, titled 'Building capacity for climate resilience in Tajikistan', which contributed to the development of the National Climate Change Adaptation Strategy Tajikistan (NCCAS).
[79] ADB 2016 Tajikistan: Building Capacity for Climate Resilience – MTR.
[80] Fergana Valley WRM 2018 KRBMP Unpublished.
[81] Further information concerning districts' vulnerability to extreme climate events is presented under district descriptions.

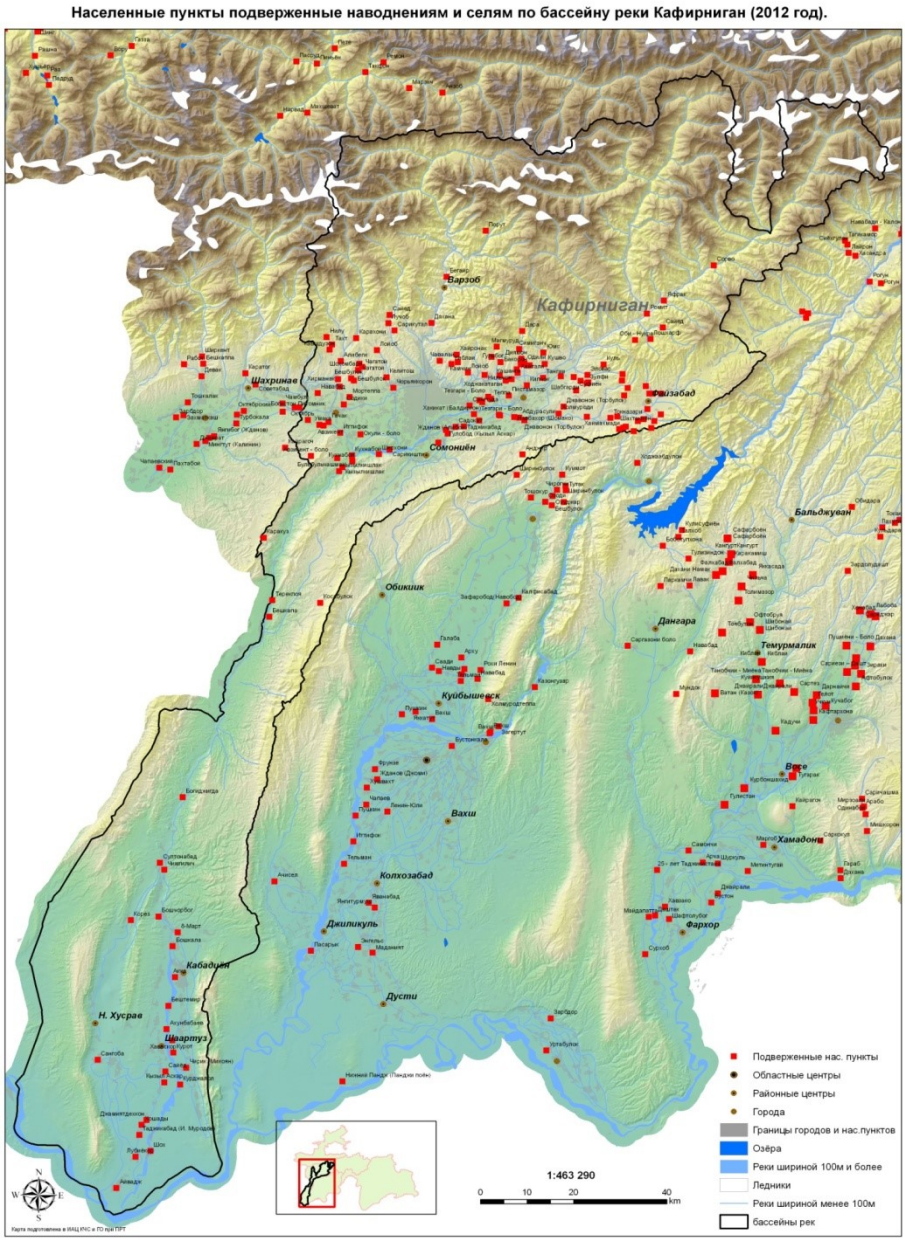



**Figure 5.** Map of Kofirnighan River Basin (outlined in black) indicating the most vulnerable communities to extreme climate events. Communities are indicated by a red dot.

## *Vahdat District*

The district of Vahdat (Figure 6) is situated ~10 km east of Dushanbe and, at 3,700 km$^2$, is one of the largest districts in Tajikistan. Altitude, which ranges from ~1,500 masl to more than 3,000 masl, is a major factor influencing the Vahdat climate. Warm summers and cool winters are experienced up to 1,500 masl, with average temperatures between 25–35°C in summer (July) and -5–0°C in winter (January). Between 1,500–2,500 masl, a moderate climate with a cool summer and a cold winter is experienced. At a height of more than 3,000 masl, cold winters are

the norm, coupled with an average annual precipitation of 700–900 mm. The district has five rivers with the largest being the Kofirnighan River, at a length of 70 km[82].

As of 2017, the total population of Vahdat was 324,000 people, with ~83% of the population living in rural areas[83]. Of the total area of the district, agricultural land comprises ~142,000 ha (~38%), of which ~87% is pasture, ~9% is arable land and ~3% is cultivated with perennial trees. Approximately 58% of Vahdat's agricultural production is derived from the production of crops, whilst the remaining ~42% is derived from livestock products. More than 10% of the population works as migrant labourers outside the district[84].

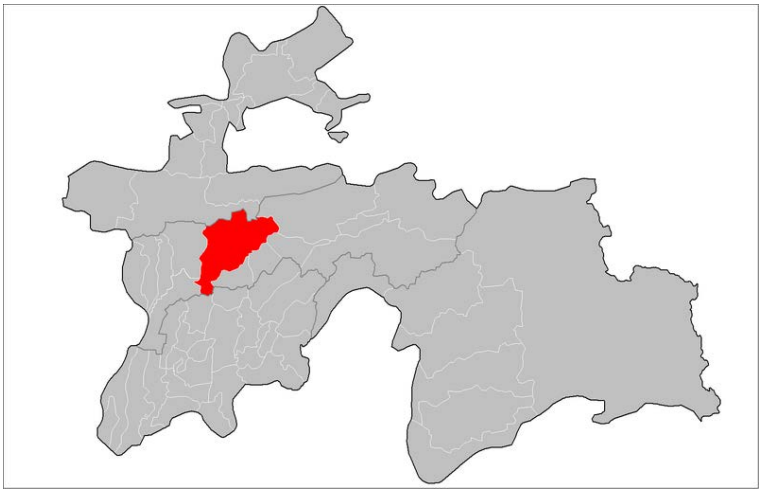


**Figure 6**. Location of Vahdat District within Tajikistan[85].

### *Varzob District*

Varzob District (Figure 7) is situated north of Dushanbe and covers an area of ~1,700 km$^2$. The northern extent of Varzob is comprised of the Gissar Mountain Range with the Varzob River running through the entire district from north to south. The Gissar range results in a variable climate, with cold winters. In winter months, the temperature drops to -31°C, with snow thickness reaching up to 1.5 m. Annual average annual precipitation for the district is 960–990 mm. Snow deposits and glaciers make up ~52 km$^2$ of the total land area in Varzob. These large snow- and glacier-covered areas within the district render most of the territory prone to natural disasters[86].

An array of natural disasters affect the district, including prolonged rainfall events, mudflows, landslides, rockfalls and avalanches. Approximately 31% of existing settlements within the district (22 out of 70) are prone to natural disasters, with ~4% of households located in hazardous areas[87].

[82] Fergana Valley WRM 2018 KRBMP Unpublished.
[83] Ibid.
[84] Ibid.
[85] Government of the United Kingdom (UK). 2018. Romanisation of Russian. BGN/PCGN 1947 System.
[86] Fergana Valley WRM 2018 KRBMP Unpublished.
[87] Ibid.

The total population of the district is ~769,000 people[88], with ~97% of the population living in rural areas. Most of the land in the district comprises mountains (96%), with agricultural lands making up only ~2% (163,133 ha), pastures ~0.8% (67,811 ha) and non-agricultural lands ~1.1% (91,794 ha)[89]. Of the total agricultural land, ~0.6% (260 ha) is irrigated. Cultivated crop species include perennial fruit-bearing trees (309 ha), vineyards (383 ha), mulberry trees (51 ha) and other perennial trees[90] (19 ha). Approximately 56% of Varzob's agricultural production is derived from livestock, with ~44% derived from crops. Of the district's total working population, more than 4% works as migrant labourers outside of the district[91].

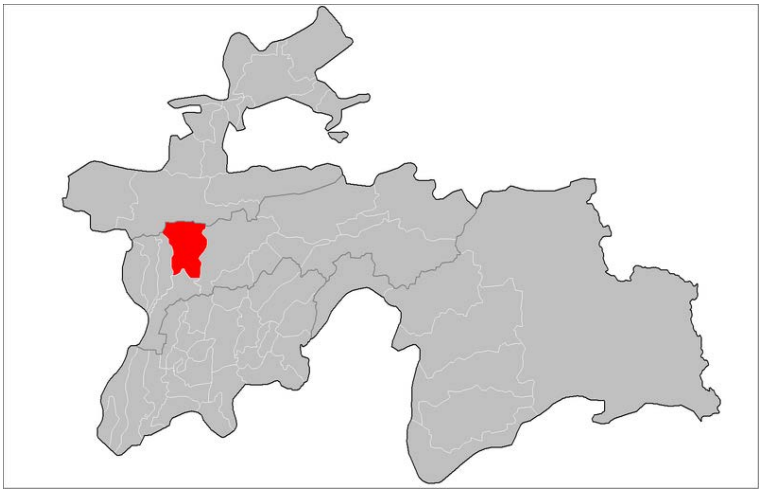


**Figure 7**. Location of Varzob District within Tajikistan[92].

### *Faizobod District*

The district of Faizobod (Figure 8) covers an area of ~900 km$^2$ and is situated at an average altitude of ~1,200 masl. Faizobod climate is medium continental, with average temperatures ranging from ~14-28°C in summer (July) and 3°C in winter (January). Average annual precipitation in the mountainous areas is 1,136 mm and is 767 mm in the valleys[93].

As of 2017, the total population of the district was 96,900 people. Approximately 90% of the district's population live in rural areas, with the remaining 10% living in urban settlements. Land use within the district is divided between pastures (~58%), arable land (~9%), forests and shrubs (~8%) and perennial trees (~5%). The Faizobod agricultural sector is comprised of livestock production (~57%) and crop production (~43%). More than 13% of the population works as labourers in other districts[94].

The main natural disasters occurring within Faizobod are floods, mudflows and landslides. All these disasters are primarily caused by the flooding of the Surkhdara and Elok Rivers. Negative impacts from these disasters threaten 26 villages, which make up ~7% of the district's population. This equates to ~6,559 people or 1,059 households[95].

[88] as of January 2017
[89] Fergana Valley WRM 2018 KRBMP Unpublished.
[90] e.g. walnut orchards
[91] Fergana Valley WRM 2018 KRBMP Unpublished.
[92] Government UK 2018 Romanisation of Russian.
[93] Fergana Valley WRM 2018 KRBMP Unpublished.
[94] Ibid.
[95] Ibid.

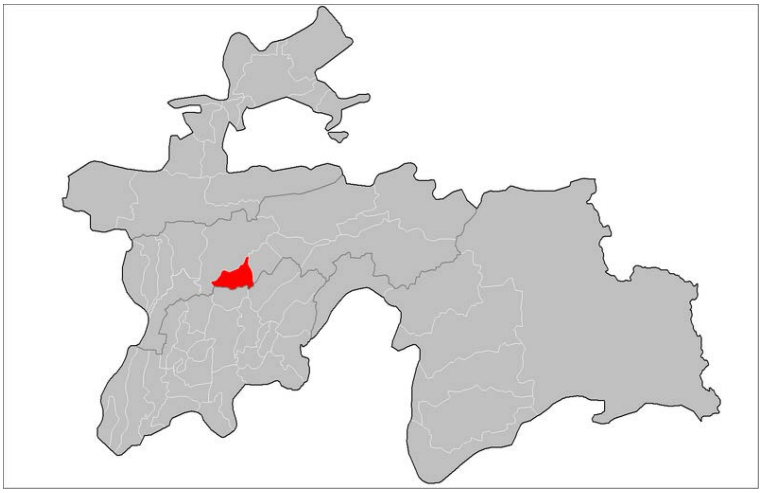
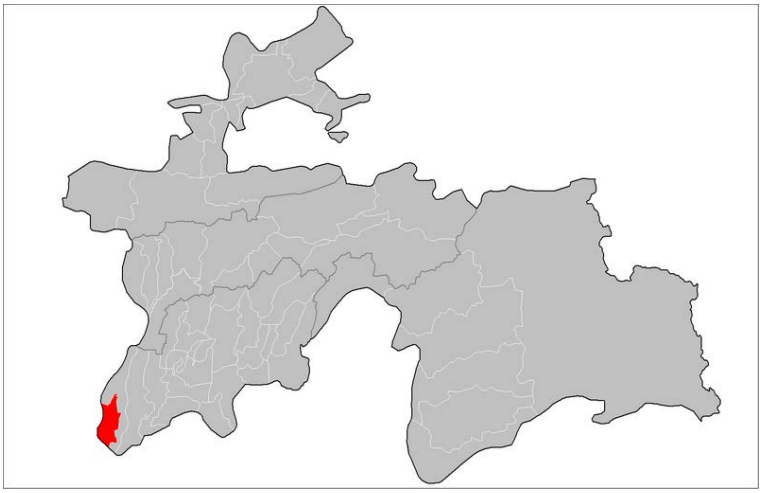


**Figure 8**. Location of Faizobod District within Tajikistan[96].

### *Nosiri Khusrav District*

The Nosiri Khusrav district (Figure 9) is ~800 km$^2$ and occurs at altitudes ranging from 380–400 masl. The climate in the district is dry and subtropical, with hot and dry summers and mild winters. The average temperature in summer (June–August) ranges from 40–55°C and is 10°C in winter (January). Total annual precipitation during winter months reaches 80 mm, with even less precipitation during spring and autumn months (up to 25–30 mm).

In 2017[97], the total population of Nosiri Khusrav was 35,900 people, with the entire population living in rural areas. As of 2014, ~84% (67,423 ha) of the district's total area was comprised of agricultural land, with ~16% (11,022 ha) of this land being irrigated. Of the total working population, more than 12% work outside of the district as labour migrants.



[96] Government UK 2018 Romanisation of Russian.
[97] as of January 2017

**Figure 9**. Location of Nosiri Khusrav District within Tajikistan[98].

### *Shaartuz District*

The district of Shaartuz (Figure 10) covers ~1,500 km$^2$, with a flat topography relative to other KRB districts. Only ~9% of the total district area is occupied by low mountain ranges. These ranges include: i) Bobotog (up to 2,100 masl); ii) Tuyuntog (up to 1,314 masl); and iii) Ariktog (just over 800 masl). The climate of the region is dry and subtropical, with warm-hot, dry summers and mild winters. The average annual temperature is ~32°C[99], with an average annual precipitation of 143 mm. In the low mountain areas, this annual precipitation average reaches 200 mm. The warm summer period lasts for ~190 days with humidity during these months reaching ~23%.

As of 2017, the total population of the district was 120,500 people. Approximately 87% of the population live in rural areas, with the remaining ~13% being situated in urban areas. The density of the population is 80 people per km$^2$. Of Shaartuz's total working population, more than 7% work as migrant labourers beyond district borders.

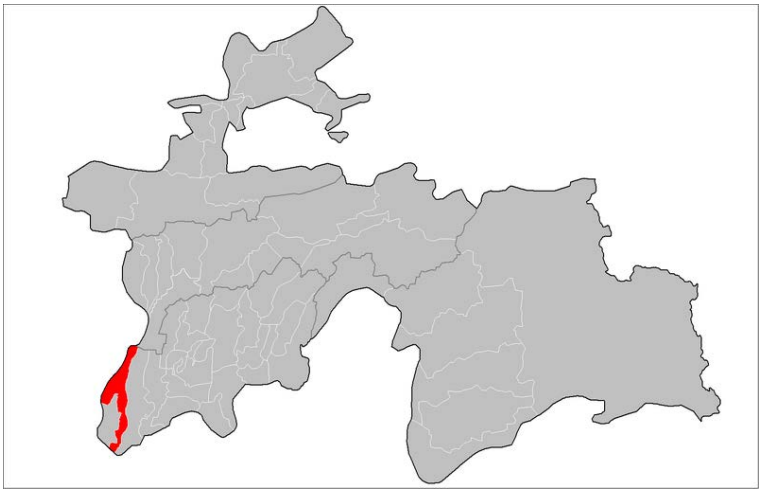


**Figure 10**. Location of Shaartuz District within Tajikistan[100].

### *Kabodiyon District*

The district of Kabodiyon (Figure 11) covers 1,900 km$^2$. It is located in the south of the Gissar and Alai Highlands, at an average altitude of ~788 masl. Kabodiyon is surrounded by the mountain ranges of Bobotog, Oktoi, Karotog and Chilontoy and consequently has a dry and continental climate. In winter (January), air temperatures range from -2–2°C, while summer (July) temperatures range from ~24–41°C.

The total population of the Kabodiyon District[101] is 173,800 people. Approximately 93% of the population lives in rural areas, with a density of ~97 people per km$^2$. More than 11% of Kabodiyon's working population works as migrant labourers outside of the district.

[98] Government UK 2018 Romanisation of Russian.
[99] in the sub-region of Ayvadzhe, and in some years reaches up to 46°C
[100] Government UK 2018 Romanisation of Russian.
[101] as of January 2017

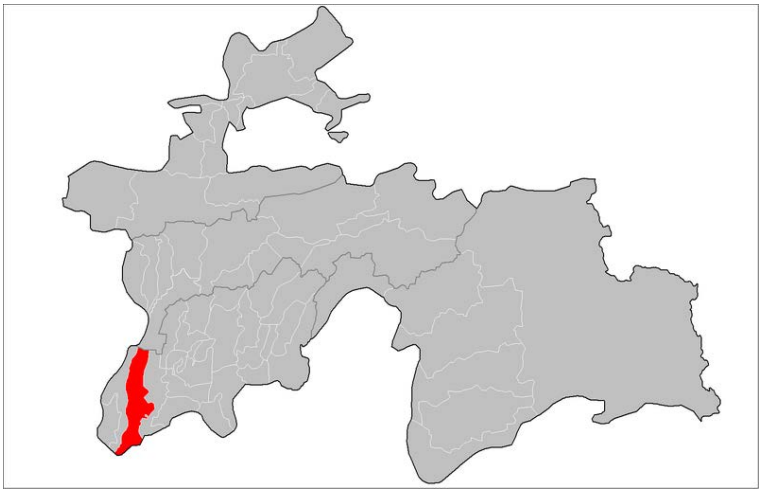


**Figure 11**. Location of Kabodiyon District within Tajikistan[102].

## Ecosystem goods and services

Tajikistan's natural systems provide numerous ecosystem goods and services. These critical ecosystem services can be broadly categorised into:

- provisioning services – products obtained directly from ecosystems;
- regulating services – benefits obtained through the regulation of ecosystems;
- cultural services – non-material benefits obtained through ecosystems; and
- supporting services – services necessary to produce all other ecosystem services.

Ecosystem services that are currently under threat from climate change and the effects thereof in Tajikistan are outlined in Table 2 according to the above four categories.

[102] Government UK 2018 Romanisation of Russian.

**Table 2.** A description of ecosystems goods and services in Tajikistan threatened by climate-induced and anthropogenic factors.

| Service | Description of threat to service |
|---|---|
| **Provisioning services** | |
| **Fresh water** | Catchments – particularly in the Pamir Mountains in western Tajikistan – provide fresh water not only to the country, but to the greater Central Asian region. The impacts of climate change on these areas significantly affect areas downstream. Predicted climate change impacts on river discharge are varied, with models under 'hot and dry' scenarios showing a reduction in river discharge and 'warm and humid' scenarios showing the converse. Additionally, climate-induced rising air temperatures are causing increased melting of glaciers, snow cover and permafrost soils[103]; all of which affect catchment hydrology through increased run-off and large-scale gully and sheet erosion[104]. |
| **Food** | Tajikistan's agricultural sector is an integral component of the country's economy, contributing more than 20% of the GDP[105,106]. Approximately 70% of Tajikistan's population live in rural areas and is dependent on agriculture. Crop and livestock productivity, especially in dry-land farming, are vulnerable to climate variability, particularly drought and extreme temperatures[107], as well as soil erosion, declining soil fertility and unsustainable use of pastures[108]. |
| **Raw materials** | Forests are a critical resource to communities[109], providing food and wood, as well as fodder and grazing to support livelihoods[110]. Permanent pastures currently cover ~3.6 million ha[111,112] of land in Tajikistan. Degradation is widespread in these areas and is primarily characterised by an increase in unpalatable grasses as well as a 15–20% decrease in productivity[113]. Sheep and goats are generally shepherded to high-altitude, summer pastures[114], returning to low-altitude, village pastures for the winter period[115,116]. Cattle are often grazed near villages resulting in severe degradation of rangelands through overgrazing[117]. Climate change impacts – predominantly droughts and extreme temperatures – have been greatest on dry-land farms and pasture lands, resulting in declining crop productivity and livestock carrying-capacity, respectively[118]. |
| **Energy** | Hydropower currently contributes 98% to Tajikistan's energy supply, with coal-, solar- and biomass-derived power providing the balance; however, this supply does not meet the country's annual requirements. Tajikistan has considerable hydropower potential[119,120] and development of more hydropower plants is a national priority[121]. Large-scale soil erosion and intense climate-induced hydrometeorological |

[103] Third National Communication 2014.
[104] NAPCC 2003.
[105] Third National Communication 2014.
[106] Curtain M. 2001. Environmental profile of Tajikistan. Asian Development Bank (ADB).
[107] Third National Communication 2014.
[108] Ibid.
[109] Fauna and Flora International 2018 "Tajikistan: Wild riches".
[110] A large part of the remaining forest area is given for long-term use as pasture.
[111] equivalent to almost 29% of its total land area
[112] The Food and Agriculture Organisation of the United Nations (FAO). 2008. Tajikistan: Reducing the Impact of Price Surge and Agriculture Rehabilitation Programme. Appraisal Document.
[113] Third National Communication 2014.
[114] ~500–1,000 masl
[115] FAO 2008 Tajikistan: Reducing the Impact.
[116] In some cases, where owners cannot afford the costs of shepherding, animals are kept on overgrazed village pastures all year round leading to pasture degradation and deterioration in carrying capacity.
[117] Third National Communication 2014.
[118] Ibid.
[119] approximately 3.6 mln kWh/1 km/year
[120] Third National Communication 2014.
[121] Ibid.

| Service | Description of threat to service |
|---|---|
| | events damage hydropower infrastructure, for example through siltation of dams and damage to turbines[122]. The ability to generate hydropower is negatively impacted by climate-induced fluctuations in river discharge[123]. |
| **Genetic plant resources** | Tajikistan is an important source of agro-biodiversity and is one of the main countries of origin for cultivated plants worldwide[124] for example the mountainous regions of the country host wild plantations of many different species of fruit trees[125,126]. Numerous anthropogenic[127] and natural factors pose a risk to this indigenous plant genetic material[128]. Some of the natural factors exacerbated by climate change include drought, hot and dry winds, extreme frosts, plant diseases, plant pests and soil salination. National plant breeding programmes are prioritising the development of varieties and cultivars adapted to biotic and abiotic stresses, especially increased resistance to drought, disease and pests[129]. |
| **Regulating services** | |
| **Water purification, water regulation and erosion control** | Excessive climate change-induced run-off of water from mountain slopes is causing large-scale soil erosion, including sheet and gulley erosion[130], across the country. This erosion poses considerable risk to Tajikistan's food, water and energy security[131]. Such large-scale soil erosion is affecting water infiltration, percolation and retention and is consequently hampering water purification and regulation services[132]. Inappropriate land-use – such as deforestation, over-grazing and cultivation of steep slopes – further reduces soil function[133]. |
| **Climate regulation; carbon sequestration** | Although pastures in Tajikistan contribute less plant biomass per unit area than forests, pastures cover ~32% of the total land area[134] and consequently fulfil an important function in climate regulation and absorption of atmospheric carbon. The natural vegetation of Tajikistan produces ~80 million tonnes of phytomass annually, ~39% of it occurring above-ground and 61% underground[135]. Pastures are particularly vulnerable to climate change-induced degradation that causes reduced vegetation cover, negatively affecting livestock productivity[136]. |
| **Disease regulation** | Climatic variability increases the vulnerability of Tajikistan's population to infections and diseases including malaria and typhoid[137,138]. The agricultural sector in the country is also increasingly at risk to plant pathogens and pests. Crop breeding programmes in the country are currently aiming to produce crop varieties with enhanced resistance[139] to mitigate these negative effects. |
| **Cultural services** | |

[122] Third National Communication 2014.
[123] Ibid.
[124] UNDP-GEF. 2009. Project title: Sustaining agricultural biodiversity in the face of climate change in Tajikistan: vulnerability and adaptation. GEF Project ID No. 3129 (Atlas Project ID 00070411); UNDP Project ID No. PIMS: 3647. Multi-focal area project with biodiversity and climate change adaptation. Terminal Evaluation Report available at: https://www.thegef.org/sites/default/files/project_documents/3647%2520PIMS_Tajikistan%2520EBD%2520TE%2520July2015.pdf [accessed 03.07.2018].
[125] In many cases, the distinction between cultivated and wild plants is unclear.
[126] FAO 2008 Country Report.
[127] including deforestation, overgrazing, overharvesting for fuelwood and medicinal purposes, and grubbing of old orchard
[128] FAO 2008 Country Report.
[129] Ibid.
[130] Third National Communication 2014.
[131] Ibid.
[132] NAPCC 2003.
[133] Third National Communication 2014.
[134] NAPCC 2003.
[135] FAO 2008 Country Report.
[136] Third National Communication 2014.
[137] The transmission of typhoid is increasing, which has been coupled with a reduction in the quality of drinking water especially during intense rainfall events.
[138] Third National Communication 2014.
[139] FAO 2008 Country Report.

| Service | Description of threat to service |
|---|---|
| **Scenic and cultural resources** | Tajikistan's rich culture derives from natural, heritage and spiritual resources. The country has two UNESCO world heritage sites: i) the Tajik National Park in the Pamir Mountains; and ii) the Proto-urban Site of Sarazm, an archaeological site.[140] The ancient Silk Road network of the Central Asian region passes through Tajikistan[141,142], and is a major tourist attraction along with the numerous towns, castles and ruins along the route[143]. The country's scenic and cultural services are threatened by climate change impacts (such as GLOFs, floods, mudflows, landslides and drought) that cause the damage or degradation of natural, heritage and spiritual resources. |
| **Recreation** | Tajikistan's mountainous areas[144,145] host a hiking industry, and a growing tourism sector has supported the establishment of health resorts around the country's natural springs. Tourism has recently become an important sub-sector in the country's economy[146]. In 2016, tourism contributed 8.2% to GDP (equating to US$0.6 billion). The contribution to employment of this sub-sector, including jobs indirectly supported by it, was ~21% of total employment (490,500 jobs)[147]. The dependence of nature-based tourism on natural resources renders recreational services particularly vulnerable to the impacts of climate change. |
| **Science and education** | Tajikistan's natural protected areas are increasingly being used by schools to promote science and ecological research. The GoT recognises that scientific institutions, in partnership with the institutes of higher education, are important for developing research capacities on climate change and environmental science[148]. Public environmental organisations are also playing an important role in environmental protection and education in Tajikistan. There are ~40 registered environmental NGOs in Tajikistan, primarily addressing biodiversity conservation in and around protected areas. Their principal activities include ecological awareness, education, information generation, information dissemination, and research related to biodiversity and protected area development[149]. Climate change impacts — resulting in the degradation of landscapes (within which research sites occur) and the physical damage to infrastructure (e.g. community education centres) and in-field research equipment — negatively impact the country's scientific and educational services. |
| **Spiritual and religious** | Approximately 90% of Tajikistan's population is Muslim[150,151], with the balance comprising several other religions[152]. Despite having been predominantly Muslim since the 10th century, in some communities, traditional, non-Muslim, cultural practices are still held, particularly among the elderly. Ancestors of Tajik people worshipped nature and natural phenomena, and many of these methods are still being practised. In some mountainous regions, animals such as eagles and hawks are considered animal totems, and the elements of earth, water and fire hold particular cultural significance in day-to-day life and ceremonies. For example, fire is used in wedding rituals (fires are burnt near to the groom's house to light the road; the bride jumps over a large fire before entering her husband's house) and rituals for pregnancy and childbirth (a fire is kept burning during pregnancy, childbirth and for the 40 days of the child's life)[153]. Since some aspects of the spiritual/religious services are underpinned by nature, although difficult to quantify, the climate change-induced degradation of natural resources would result in the gradual erosion of these services. |

[140] United Nations Educational, Scientific and Cultural Organisation (UNESCO). 2018. World Heritage Convention: Tajikistan. Available at: https://whc.unesco.org/en/statesparties/tj [accessed 03.07.2018].
[141] including the areas of Penjikent, Khujand, Istarafshan and Gissar
[142] The road splits west of the Pamirs, one branch passing to the north of the Pamirs and the other to the south. See further: UNESCO 2018 World Heritage Convention.
[143] Third National Communication 2014.
[144] near to Dushanbe city (Varzob, Qaratag, Shirkent and Romit gorges), Kuhistan (the Fann mountains, Marghuzor and Alauddin lakes, Iskanderkul) and the Pamir Mountains
[145] Third National Communication 2014.
[146] Ibid.
[147] World Travel and Tourism Council (WTTC). 2017. Travel and Tourism: Economic Impact 2017 Tajikistan.
[148] Third National Communication 2014.
[149] FAO. 2008. Tajikistan: NFP update.
[150] with Sunni Muslim comprising ~85% and Shia Muslim comprising ~5%
[151] Central Intelligence Agency (CIA). 2018. The World Factbook: Central Asia: Tajikistan. Available at: https://www.cia.gov/library/publications/the-world-factbook/geos/ti.html [accessed 03.07.2018].
[152] There are 85 non-Muslim groups registered with Tajikistan's Department of Religious Affairs at the Ministry of Culture.
[153] Advantour. 2018. "Tajikistan Rituals". Available at: https://www.advantour.com/tajikistan/traditions/wedding-rituals.htm [accessed 23.07.2018].

## *Climate change context*

### *Observed climate change*

Tajikistan has experienced a considerable warming of its climate since 1950[154] (Figure 12). The most recent warming trend from 1976 to 2010 averaged ~0.15ºC per decade in winter and spring, ~0.3ºC per decade in summer and ~0.2ºC per decade in autumn. From 2001 to 2010, the country experienced the warmest decade in its history (12)[155]. Average temperatures for the decade were: i) 1ºC above the long-term average in the foothills (0–1,000 m); ii) 0.8ºC above the long-term average in the mid-hills (1,000–2,500 m); and iii) 0.2ºC above the long-term average in the highlands (above 2,500 m).[156]

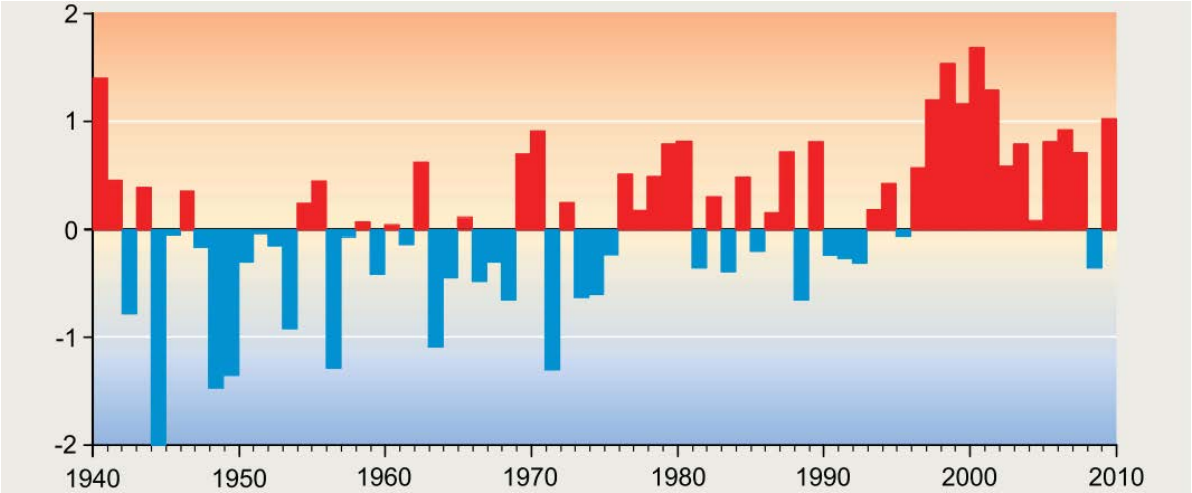



**Figure 12.** Illustration of the annual temperature (ºC) departure from the average long-term norm for the period 1961–1990 in Tajikistan[157].

The temperature changes across Tajikistan have been accompanied by increasingly erratic rainfall (Figure 13) which has resulted in both: i) an increase in rainfall intensity; and ii) longer dry spells.[158] In recent years, the amount of precipitation[159] received across the country has been above the long-term annual average. For example, from 1940–2010, average annual precipitation increased by ~7%. This trend has not been uniformly distributed across the country, with some regions experiencing increases in annual rainfall and others experiencing decreases. Decreases in annual precipitation have been experienced in the following regions:

- mid-hills and highlands of Central Tajikistan;
- valleys of southwestern and northern Tajikistan;
- foothills of Turkestan range;
- highland areas of Eastern Pamir; and
- foothills, mid-hills and highlands of the Khatlon region.

[154] Third National Communication 2014.
[155] State Agency for Hydrometeorology. 2018. Under the Committee for Environmental Protection under the Government of the Republic of Tajikistan Available at: http://www.ijozat.tj/index.php?option=com_content&view=section&id=30&lang=en [accessed 03.07.2018].
[156] Third National Communication 2014.
[157] State Agency for Hydrometeorology 2018.
[158] Ibid.
[159] 'Precipitation' refers to the combined amount of rainfall and snowmelt.

Over the same period, annual precipitation increased in the Rasht and Darvaz regions by 14–18%, the Western Pamir region by 12–17% and in the Fedchenko Glacier by 36%[160].

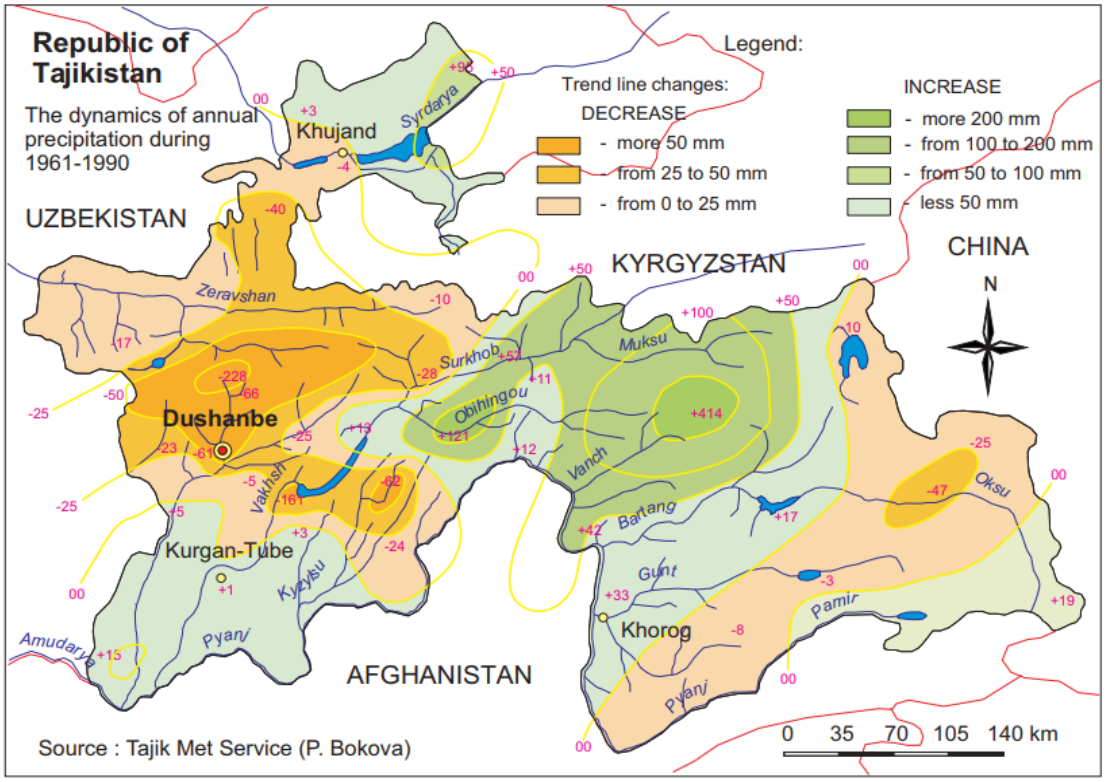



**Figure 13.** Changes of mean annual precipitation observed across Tajikistan during 1961–1990[161].

The number of days with precipitation (hereafter referred to as 'rain days') has decreased across the country since 1961[162]. By contrast, the number of days in which heavy precipitation events have occurred have increased[163]. The decrease in rain days coupled with the increase in heavy precipitation events equates to an increase in rainfall intensity in Tajikistan[164].

Fewer rain days and increased temperatures have resulted in a greater incidence of intense dry spells across Tajikistan[165]. In the major crop-growing regions, droughts that impact yields by at least 20% have been increasing in frequency over the past decade. Currently, these droughts occur once in every[166]:

- 3 years in south and south-east Tajikistan, Danghara, Kulyab, Bokhtar, Kabodiyon and Shaartuz regions;
- 4 years in the Eastern Tajikistan region; and
- 5 years in the North-Tajikistan region.

[160] NAPCC 2003.
[161] Third National Communication 2014.
[162] Ibid.
[163] Kayumov 2016 Glaciers resources of Tajikistan.
[164] Third National Communication 2014.
[165] World Food Programme (WFP). 2017. Climate Risks and Food Security in Tajikistan: A Review of Evidence and Priorities for Adaptation Strategies.
[166] The Food and Agriculture Organisation of the United Nations (FAO). 2017. Drought Characteristics and Management in Central Asia and Turkey. FAO Water Report 44: Policy Support and Governance.

Severe droughts – those that reduce average crop yields by at least 50% – have been observed once in every[167]:

- 4–5 years in the Bokhtar, Kabodiyon, Vakhsh and Shaartuz regions;
- 6–8 years in the Danghara, Kulyab, Temurmalik, Baljuvon, Vose and Balkhi regions;
- 9–11 years the in Devashtji, Spitamen and Istaravshan regions; and
- 12–15 years in the Kanibadam Asht and Isfara regions.

### *Climate risks, impacts and vulnerabilities*

As noted previously in this document, Tajikistan is the most vulnerable country to climate change in Central Asia[168]. This vulnerability is attributed to the country's: i) weak social structures; ii) low adaptive capacity; ii) underdeveloped infrastructure; iv) low-income insecurity; v) poor service provision; vi) strong dependence on agriculture; and vi) institutional constraints. Losses from natural hazards currently amount to ~20% of the country's GDP[169] and climate change impacts are predicted to increase the frequency and magnitude of such losses. In the future, loss amounts are expected to rise from ~US$50 million in 2014 to ~US$132 million by 2030[170] (Table 3).

**Table 3.** Total countrywide damages caused by climate change and extreme climate events[171].

| Risks and hazards | Total damage countrywide | | | |
|---|---|---|---|---|
| | **2014** (US$) | **2030** (US$) | **Increase** (US$/year) | **Increase** (%) |
| Rise in temperature | 22,230,000 | 42,210,000 | 19,980,000 | 90 |
| Drought | 22,230,000 | 42,210,000 | 19,980,000 | 90 |
| Pasture degradation | 4,131,000 | 41,310,000 | 37,179,000 | 900 |
| Mudflows | 432,000 | 2,331,000 | 1,899,000 | 440 |
| Intense precipitation | 342,000 | 531,000 | 189,000 | 55 |
| Water logging | 324,000 | 504,000 | 180,000 | 56 |
| High water and flooding | 144,000 | 2,313,000 | 2,169,000 | 1,506 |
| Gusty winds | 144,000 | 144,000 | 0 | 0 |
| Decrease in air temperature/freezing | 126,000 | 126,000 | 0 | 0 |
| Duration of snow cover | 90,000 | 90,000 | 0 | 0 |
| Landslides | 63,000 | 540,000 | 477,000 | 757 |
| Agricultural insects and pests | 63,000 | 630,000 | 567,000 | 900 |
| Dust storms | 45,000 | 45,000 | 0 | 0 |
| Avalanches | 27,000 | 270,000 | 243,000 | 900 |

Negative effects of climate change on the Tajik population include: i) glacial and permafrost melt; ii) increased rainfall intensity; and iii) longer and more frequent dry spells.[172] Together, these effects have increased the rate of topsoil erosion, threatening the food, water and energy security of the country[173]. Approximately 33% of all agricultural losses in the country are currently

[167] FAO 2017 Drought Characteristics and Management.
[168] WFP 2017 Climate Risks and Food Security.
[169] Ibid.
[170] National Climate Change Adaptation Strategy Tajikistan: Building Capacity for Climate Resilience (NCCAS). 2016. Asian Development Bank (ADB) and the Government of Tajikistan (GoT). Draft prepared by Abt Association with the GoT Committee of Environmental Protection (CEP).
[171] United Nations Development Programme (UNDP). 2014. Central Asian Multi-Country Programme on Climate Risk Management (CA-CRM). Regional Project Document. Atlas Award ID 59476.
[172] UNDP 2014 CA-CRM.
[173] Third National Communication 2014.

attributable to climate change and variability[174]. Furthermore, it has been projected that crop yields in Tajikistan will decrease by an additional 5–30% by 2050, with the potential for severe negative impacts on the country's economy[175].

Glacial melt poses a particularly large risk to the population of Tajikistan, currently averaging ~2 $km^3$ per year and leading to meltwater flows which often result in large-scale sheet and gully erosion[176]. Further negative impacts of meltwater flows include high frequency, low–medium impact hazards (such as extreme river flows and flooding, mudflows and landslides), and low frequency, high impact hazards (such as GLOFs) [177]. These low frequency, high impact hazards are particularly problematic because they are likely to trigger multiple other hazards, such as flash floods and landslides, as well as aggravate the scale and magnitude of such hazards. The impacts of flooding, mudflows, landslides and other hazards have resulted in considerable economic damages and losses of life across Tajikistan. Such damages and losses of life are particularly marked in the KRB (Table 4).

**Table 4.** Economic damages as a result of climate hazards occurring within the Kofirnighan River Basin, including number of events occurring from 1998–2014 and losses in life[178].

| **Climate hazard** | **Number of events** (occurring from 1998–2014) | **Economic damages** (US$) | **Loss of life** (no. of people) |
|---|---|---|---|
| Flooding | 31 | 5,577,682 | 0 |
| Mudflows | 98 | 191,898,148 | 38 |
| Avalanches | 8 | 326,808 | 8 |
| Landslides and rockfalls | 39 | 138,115 | 3 |
| Drought | 17 | 3,359,363 | 0 |
| Earthquakes | 83 | 1,37,017 | 0 |
| **Total** | **276** | **202,437,132** | **49** |

The negative impacts described above have been exacerbated by increasingly erratic rainfall. Floods and droughts caused by such erratic rainfall directly impact water quality and quantity across the country, and have also contributed to topsoil erosion[179]. The increasing rate of topsoil erosion is a threat to Tajikistan's food, water and energy security, which impacts the livelihoods, health and wellbeing of the population with regards to: i) food production, whereby decreasing soil fertility is reducing crop and livestock productivity; ii) water supplies, whereby the siltation of rivers is further contributing to declining water quality; and iii) energy security, whereby damage from silt to turbines in hydropower plants and reservoirs is reducing the efficiency of hydropower generation.

The KRB has been identified as a region within Tajikistan that is particularly vulnerable to the impacts of extreme climate events, with almost 200 communities living in the basin experiencing severe negative impacts[180,181]. All four of Tajikistan's agro-ecological zones are represented

[174] National Human Development Report (NHDR). 2012. Tajikistan: Poverty in the Context of Climate Change. United Nations Development Programme (UNDP), Dushanbe.
[175] Third National Communication 2014.
[176] Jacob P. 9 October 2016. "Global warming imperils Tajikistan's landscape". Aljazeera. Available at: https://www.aljazeera.com/news/2016/10/global-warming-imperils-tajikistan-landscape-161009175837236.html [accessed 03.07.2018].
[177] WFP 2017 Climate Risks and Food Security.
[178] Committee for Emergency Services (CoES). 2018. Statistical damages data for 1998–2014. Provided by the UNDP DRMP.
[179] Ibid.
[180] Hydromet 2018 Assessment of KRB, Unofficial document.
[181] Further information concerning the KRB's vulnerability to extreme climate events is presented under 'Climate change context'.

within the KRB as a result of the considerable altitudinal variation from south to north[182]. This altitudinal variation also results in the KRB being vulnerable to a wide range of climatic hazards, including both sudden-onset and slow-onset climate events, such as GLOFs and droughts, respectively. Communities in the KRB are frequently exposed to such extreme climate events. Flooding and landslides pose the greatest threats to these communities, with flooding seasons differing between upper, middle and lower reaches of the KRB. Upstream reaches experience floods from April to June, the middle reaches from March to May, and the downstream reaches from February to May. Because of the longer season in the downstream areas, the risk of flooding and landslides is much greater for these communities[183].

Six districts within the KRB have been identified as the most vulnerable to the impacts of climate change. These are the: i) Vakhdat, Faizobod and Varzob districts in the north; and ii) Nosiri Khusrav, Kabodiyon and Shaartuz districts in the south.[184] Many of the households in these districts are located in hazardous areas and experience a number of climate-related threats and disaster events including: i) floods; ii) mudflows; iii) landslides; iv) rockfalls; and v) avalanches[185]. In addition to increased exposure to climate-related threats, these are all rural communities with limited adaptive capacity because of their dependence on agriculture for livelihoods, and limited opportunities for alternative income. About one-third of the agricultural losses in Tajikistan are currently attributable to climate change and variability[186], meaning that communities in the KRB who rely on agriculture for income are extremely vulnerable to the current and future impacts of climate change.

The impacts of climate change are likely to be different in the northern sub-basin of the KRB to those in the southern sub-basin. Rural communities in the Vakhdat, Faizobod and Varzob districts are expected to become increasingly exposed to hydrometeorological hazards such as increased flooding, landslides and GLOFs. In particular, the steep terrain in these areas increase the likelihood of sudden onset multi-hazard risks, such as landslides occurring directly after a GLOF or similar flooding event. Concomitantly, watersheds in the northern sub-basin are frequently degraded as a result of unsustainable land-use practices that increase the likelihood and impact of the above-mentioned risks. Such unsustainable practices also increase the rate of erosion and soil loss, which compromises agricultural productivity in these regions and increases flood risk in downstream areas.

Communities in the Nosiri Khusrav, Kabodiyon and Shaartuz districts, conversely, are increasingly exposed to slow onset hazards such as drought and river bank erosion. In these areas, water availability is the greatest threat to livelihoods. Water availability is limited by poorly functioning irrigation supply infrastructure. This infrastructure is being damaged by: i) high levels of sedimentation from water-borne and wind-borne sediment; and ii) floods in the Kofirnighan River that damage irrigation dams and canals. Floods in the Kofirnighan River also cause riverbank erosion that results in the loss of arable land.

### *Future climate projections and scenarios*

[182] Tajikistan's agro-ecological zone are classified according to elevation, with the lower zones (1 and 2) primarily being used to grow irrigated crops such as cotton and sub-tropical fruit. Zones of higher elevation (3 and 4) are primarily rain-fed agriculture and used primarily for pasture land and for growing wheat, barley and lucerne.
[183] Hydromet 2018 Assessment of Kofirnighan River Basin.
[184] Fergana Valley WRM 2018 KRBMP Unpublished.
[185] Further information concerning district-specific vulnerability to extreme climate events is presented under district descriptions.
[186] NHDR 2012 Tajikistan: Poverty in the Context of Climate Change.

Climate models, developed during the preparation of the Third National Communication, project a number of negative impacts from climate change[187,188]. Specifically, rising temperatures and an increase in intensity of rainfall events have been predicted (Figure 14).

Average temperatures in Tajikistan are projected to increase by 2.9°C by 2050[189]. By the end of the 21st century, temperatures are projected to further increase in the: i) southern districts of the country (including the districts of Nosiri Khusrav, Kabodiyon and Shaartuz); ii) mountains of central Tajikistan (including those in the KRB); and iii) the mountains of the western Pamir.[190] In addition, diurnal temperature ranges and the occurrence of heat waves are predicted to increase, most notably in the country's southern lowlands. These temperature changes will exacerbate glacial and permafrost melt[191]. Glacial cover is projected to reduce by 15–20%, with most small glaciers predicted to disappear in 30–40 years. Ultimately, it is expected that reduced glacial cover will reduce the renewable water resources of Tajikistan.

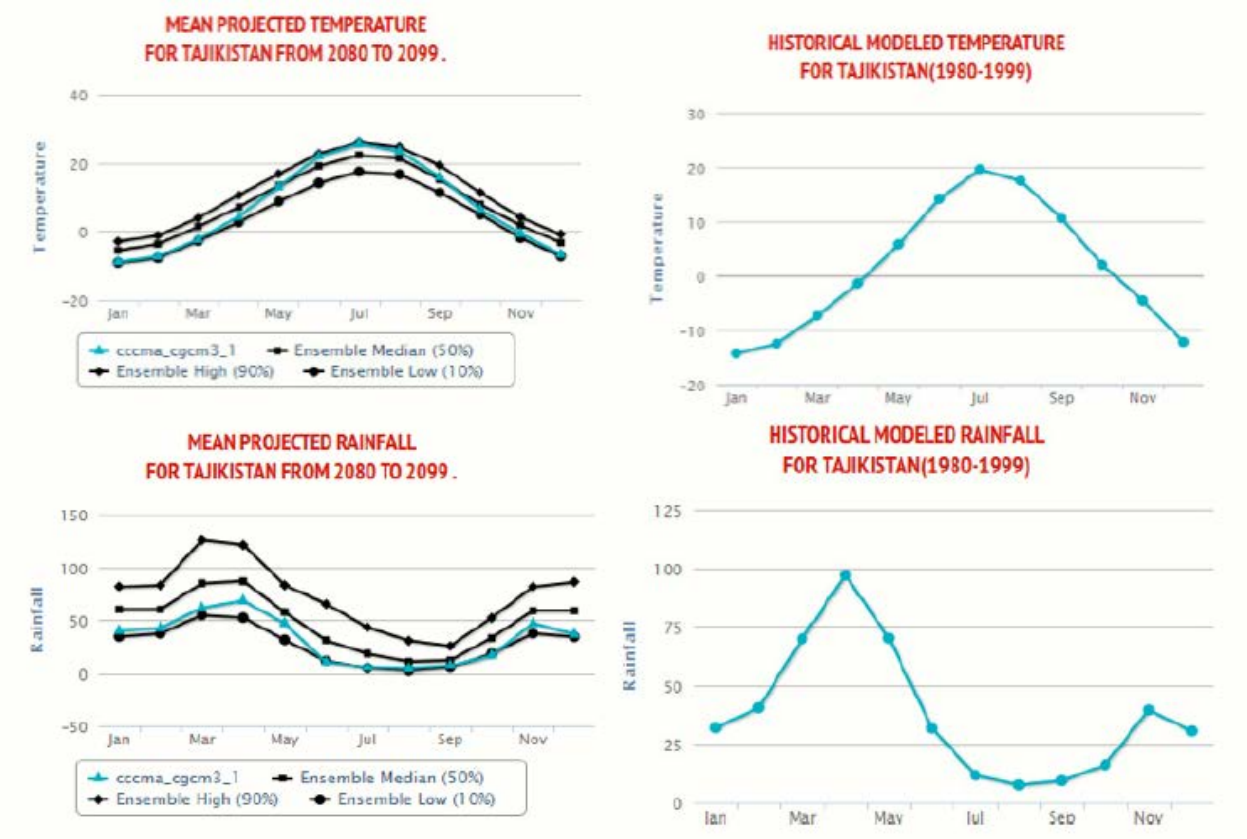



**Figure 14.** Projected mean temperature and rainfall for 2080–2099 against historically-modelled data for 1980–1999[192].

[187] The climatic models used were the CCSM3, ECHAM5 and CSIRO.
[188] WFP 2017 Climate Risks and Food Security.
[189] Third National Communication 2014.
[190] Ibid.
[191] Dusik J & Sheraliev B. 2016. Strategic framework for developing and prioritizing climate change adaptation initiatives in the agricultural sector in Tajikistan. Technical Report. Research Gate.
[192] WFP 2017 Climate Risks and Food Security.

No significant change in mean annual precipitation is predicted by 2050 in Tajikistan[193]. However, precipitation patterns will continue to change, resulting in[194]:

- an increased variation in maximum and minimum precipitation levels;
- wetter summers and drier winters, causing both flooding and prolonged periods of drought; and
- an increased rainfall intensity.

These climatic changes will have negative impacts on climate-sensitive sectors, including agriculture, water, energy and transport. For example, a decrease in dry-season water availability will adversely affect the agricultural sector, which in turn increases the risk of food insecurity in the country. Decreasing water availability is also likely to result in a climate change-induced migration of farmers to areas with improved water access. This shift in the population would result in an increase in the number of people living in areas exposed to extreme climate events such as floods and landslides[195]. It is predicted that by 2050, ~77% of the country population will be living in areas with considerable exposure to extreme impacts of climate change[196].

Climate change has had negative and lasting impacts on different sectors in Tajikistan. An overview of these impacts on the agricultural, water, energy and transport sectors is provided in the sub-sections below.

Agriculture

The predicted decrease in agricultural yields as a result of decreasing water availability and soil loss will directly impact ~2 million people in Tajikistan[197]. Agricultural yields are predicted to decline by as much as 30% by 2100[198], which is likely to result in rising food costs[199,200]. This will cause an increase in poverty levels and a decline in food security in the country[201].

Coupled with a decrease in water availability, increasing temperatures will result in greater crop evapotranspiration rates. Farmers will consequently need to alter their planting and harvesting practices to accommodate longer growing seasons while managing reduced water availability for agriculture use[202]. Reduced water supplies in the drier regions of the country are expected to result in major economic losses for farmers[203].

Water and energy

Tajikistan's energy production and transmission are predicted to be negatively impacted from changes to precipitation regimes[204]. Energy and water systems are interconnected and therefore

[193] Dusik & Sheraliev 2016 Strategic framework for developing and prioritizing climate change adaptation.
[194] WFP 2017 Climate Risks and Food Security.
[195] NCCAS 2016.
[196] World Bank (WB). 2013. Tajikistan – Overview of Climate Change Activities. World Bank. Washington, DC.
[197] WB 2013 Tajikistan – Overview.
[198] Schellnhuber HJ, Reyer C, Hare B, Waha K, Otto IM, Serdeczny O, Schaeffer M, Schleußner CF, Reckien D, Marcus R & Kit O. 2014. Turn down the heat: confronting the new climate normal. The World Bank. Washington, DC.
[199] Heltberg R, Reva A & Zaidi S. 2012. Tajikistan: Economic and Distributional Impact of Climate Change. World Bank Knowledge Brief #50. World Bank. Washington, DC.
[200] World Health Organisation (WHO) Europe. 2009. Protecting health from climate change in Tajikistan. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).
[201] NCCAS 2016.
[202] Ibid.
[203] Ibid.
[204] Ibid.

any changes in precipitation amounts[205] or an increased drought risk has the potential to adversely affect energy production and supply to the population. For example, changes in river flow and increasing erosion are likely to impact hydroelectric production capacity, while reduced availability of water is likely to increase energy costs for pumping water[206].

Transport

Farmers and pastoralists in Tajikistan will be further negatively affected by climate change impacts on the transport sector[207]. Roads and railways are predicted to be damaged and/or washed away as a result of more frequent and severe flooding events. Increases in the rate of erosion and landslide frequency are also expected to result in both transport blockages and increased maintenance costs for road infrastructure. The continued rise in temperatures is also predicted to damage the surface material of roads resulting in temporary or permanently blocked transport routes[208].

### *Adaptation gaps in Tajikistan*

Currently, there are a number of gaps that hinder the effective implementation of climate change adaptation in Tajikistan. Many of these gaps are related to limited institutional and technical capacity for the implementation of adaptation projects to develop the climate-resilience of Tajikistan communities.

Importantly, there is no targeted, national climate change adaptation policy in place in Tajikistan. The two primary national strategies that guide development in the country currently do not include climate change and adaptation. These strategies are the 'National Development Strategy for the Republic of Tajikistan for the period up to 2030' (NDS)[209] and 'Mid-term Development Programme 2016–2020' (MTDP)[210,211]. To address this gap, development of the National Climate Change Adaptation Strategy Tajikistan (NCCAS)[212] began in 2016 with a focus on building capacity within the country for climate resilience. The NCCAS is currently in draft form and has yet to come into effect, however the strategy preliminarily highlights the following as focal points[213]:

- existing laws, regulations, and codes on environmental protection, energy, drinking water supply, construction, and disaster risk management do not incorporate climate change; and
- policy, strategy, and legislative environments do not incentivise governments to reduce vulnerability and pursue adaptation measures.

In additional to the NCCAS, the Agricultural Reform Programme for 2012–2020[214] lists 'developing agricultural technologies for climate-change adaptation and resilience' as one of 22 specific objectives in Tajikistan[215]. However, there is little acknowledgement of climate change

[205] including from a reduction in snowpack as well as increased variation in snowmelt timing
[206] NCCAS 2016.
[207] Ibid.
[208] Ibid.
[209] National Development Strategy for the Republic of Tajikistan for the period up to 2030 (NDS). 2016. Republic of Tajikistan, Dushanbe.
[210] NDS 2016.
[211] Poverty Reduction Strategy for the Republic of Tajikistan for 2010–2012 (PRS). 2010. Republic of Tajikistan, Dushanbe.
[212] NCCAS 2016.
[213] Ibid.
[214] Agricultural Reform Programme for 2012–2020 of the Republic of Tajikistan. 2012. Ministry of Agriculture, Government of Tajikistan.
[215] World Health Organisation (WHO). 2012. Policy – Program on Agricultural Reform 2012–2020/Program of Reforming of Agriculture of the Republic of Tajikistan for 2012–2020. Global Database on the Implementation of Nutrition Action (GINA). Available at: https://extranet.who.int/nutrition/gina/en/node/14962 [accessed 11.07.2018].

challenges in other sectoral policies, including water and health. This limited mainstreaming is compounded by a lack of clear, institutional responsibilities and governance for land and water management at a catchment level. The absence of a cross-sectoral approach to climate change adaptation poses a significant barrier to integrated, landscape-level, adaptive planning.

In 2015, the GoT took steps to shift towards managing water resources according to hydrographic rather than administrative boundaries[216]. The Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme) aims to promote the implementation of Integrated Water Resources Management (IWRM) at the basin level. Through the programme, River Basin Organisations (RBOs) and River Basin Councils (RBCs) will be established in each of the six identified basins in the country, as well as in sub-basins, where required. RBOs will mainly be responsible for: i) planning the use and protection of water resources annually and in the long-term; and ii) monitoring the distribution of water as well as the state of rivers. Concurrently, RBCs will mainly be responsible for reviewing the plans developed by the RBOs and managing interactions with stakeholders such as water users and Water User Associations (WUAs). RBOs are expected to become operational in 2019, with the GoT being expected to allocate ~US$160,000 annually towards the operation of RBOs and RBCs. While the Water Reform Programme is likely to modernise water management in Tajikistan, it does not adequately consider the impacts of climate change on the water sector. While climate change impacts are acknowledged to impact water resources, the extent of these impacts is not well understood – particularly at the river basin level. Furthermore, the focus of the Water Reform Programme is restricted largely to water resources management and does not adequately consider the impacts of multiple hazards at the river basin and watershed level. While flood management will be the responsibility of RBOs, other climate-linked hazards such as erosion and landslides are not addressed through the programme[217].

The latest version of the PRS, the 'Living Standards Improvement Strategy of Tajikistan for 2013–2015' (LSIS)[218], is one of the first non-ecological strategy documents to acknowledge climate change as a threat to development in the country. This acknowledgement has been in response to the reliance on agricultural productivity and disaster risk information from previous hydrometeorological events, including glacial melt. The most recent NDS, for the period 2016–2030[219], reflects the significance of climate change as a barrier to achieving the desired development goals for the country by 2030.

Climate change expertise currently only exists within a limited number of institutions in Tajikistan, most notably the State Agency for Hydrometeorology (Hydromet) of the Committee for Environmental Protection (CEP). Within these institutions, specialists have either specific skills (e.g. meteorologists, hydrologists) or broader knowledge (e.g. environment, water management) related to climate change and its impacts. As a result, the staff employed by these institutions do not have the technical capacity to recognise the need for climate change adaptation and implementing necessary measures for it.

During the Soviet era, these research institutions were staffed by qualified and trained international and regional scientists. However, since the early 1990s, climate and agricultural

[216] Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme). 2015. Resolution of the Government of the Republic of Tajikistan. Unofficial translation.
[217] Water Reform Programme 2015.
[218] Living Standards Improvement Strategy for the Republic of Tajikistan for 2013–2015 (LSIS). 2013. Republic of Tajikistan, Dushanbe.
[219] NDS 2016.

research in Tajikistan has been critically underfunded which has resulted in limited scientific capacity. Salaries in research are poorly remunerated and financial research resources are limited[220]. The former capacity building and reward systems that functioned under the Soviet Regime are no longer in place, while the existing culture of centralised decision-making limits initiative and innovation.

An additional problem facing research in the country is that limited incentives and strong hierarchical barriers have reduced the recruitment of young research scientists. As a result, most research staff are nearing retirement age. Furthermore, limited contact with the international scientific community, and limited English language skills, have resulted in a technology lag which, in turn, has prevented scientists from keeping abreast of scientific advances. Indeed, only recently have initiatives such as the University of Central Asia (UCA) and the Central Asia and the Caucasus Association of Agricultural Research Institutions (CACAARI) have been established in Tajikistan. A brief description of each of these initiatives is outlined below.

- The **UCA** is an internationally chartered not-for-profit secular institution. It was formed as a partnership between the governments of Kazakhstan, the Kyrgyz Republic and Tajikistan under the sponsorship of the Aga Khan Development Network (AKDN). Founded in 2,000, its first campus opened in 2016 in Naryn, Kyrgyzstan and offers five-year undergraduate programmes in Computer Science (BSc) and Communications and Media (BA). In 2017 the Khorog Campus in Tajikistan was opened, offering five-year undergraduate programmes in Earth and Environmental Sciences (BSc) and Economics (BA).
- The **CACAARI** was established in 2,000 when leaders of the eight National Agricultural Research Systems (NARS) came together under the aegis of the Consultative Group on International Agricultural Research (CGIAR) Central Asia and the Caucasus (CAC) Program facilitated by the International Centre for Agricultural Research in Dry Areas (ICARDA). The purpose of the organization is to facilitate regional cooperation in agricultural research for development by providing a neutral platform where ideas and experiences can be shared. Moreover, the association acts as a two-way communicative mechanism, supporting information flow between global organizations and local partners. The membership is open to research institutions, universities, NGOs and farmer associations located in Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan[221].

## Non-climatic problems

There are a number of non-climatic environmental challenges in Tajikistan that are exacerbating vulnerability to climate change. Such challenges include land degradation, which is compromising and poor water supply[222]. Following the collapse of the Soviet Union in 1991, previously collectivised farms were divided. The disruptions following this division put pressure on Tajik farmers who had become accustomed to collective structures and living within *avlods*[223]*.* There are now few associations or institutions which support individual farmers, as most present-day state and collective farms work with groups of *dehkan*[224] farmers. A country-wide organisation

[220] Central Asian Countries Initiative for Land Management Multi-Country Support Project (CACILM). 2009. Research Prospectus: A Vision for Sustainable Land Management Research in Central Asia. Sustainable Agriculture in Central Asia and the Caucasus. Regional Office of ICARDA for Central Asia and the Caucasus.
[221] CACAARI. 10 February 2017. Meeting of the GFARC Steering Committee. Available at: http://www.cacaari.org [accessed 23.07.2018].
[222] World Bank Group (WBG). 2008. Tajikistan: Country Environmental Analysis. Washington, DC.
[223] an extended patriarchal family that serves as an informal mutual support structure
[224] A *dehkan* farm is a term for an individual or family farm in Central Asia.

exists to provide support to the *dehkan* farmers, but small-scale farmers do not benefit significantly from this.

Unsustainable land management practices in Tajikistan – including overgrazing and overploughing on steep slopes – have resulted land degradation, which has been characterised by the reduced productivity of agricultural lands and pastures[225]. These unsustainable land management practices have also compromised the supply of water to the population of Tajikistan, specifically by increasing erosion. Accelerated erosion has resulted in an increase in suspended solid material in the Kofirnighan River. This negatively impacts water supply, as suspended solids damage pumps and other water supply infrastructure. These damages increase the treatment costs for producing potable, industrial and irrigation water.

In addition to damaging water supply infrastructure, suspended solids also increase the downstream flood risk. When suspended solids settle out of suspension, they reduce the capacity of the river channel and increase the likelihood and extent of flooding. Other negative water quality impacts are currently being experienced as a result of agricultural practices in the KRB. Fertiliser and other agricultural inputs are washed from agricultural land and into streams and rivers. These inputs are commonly nutrients, which cause downstream eutrophication of water bodies. Nutrients may also reduce the suitability of water for human consumption – in particular, nitrates in fertiliser may be converted into toxic nitrites. Climate change is expected to exacerbate the negative impacts of agriculture on surface water quality in Tajikistan. This is because the use of agricultural inputs is likely to increase as increased rates of erosion negatively impact soil fertility.

Further to the above-described unsustainable land management practices, the quality and quantity of water in Tajikistan has been affected by deforestation. Firstly, and as with overgrazing and overploughing, deforestation has caused increased erosion in several river basins in the country, including in the KRB. Trees are important for sustaining ecosystem functions in the following ways: i) the high infiltration rate in forests reduces the incidence of surface runoff and reduces erosion transport; and ii) the binding effect of tree roots enhances slope stability, which reduces erosion. Hence, with deforestation, these ecosystem functions are being compromised. Secondly, deforestation has also impacted river flows in Tajikistan and within the KRB. Because trees regulate river flows (specifically through promoting transpiration and infiltration), deforestation in Tajikistan has led to water deficits (droughts) during the dry season and water excesses (floods) during the wet season. With the combined effects of erosion and compromised river flows, deforestation is severely impacting the hydrological functioning in the KRB as well as in river basins throughout Tajikistan.

## Problem statement

The problem to be addressed by the proposed project is that the livelihoods of small-scale rural farmers and pastoralists in the Kofirnighan River Basin (KRB) of Tajikistan are being negatively affected by climate change. Rising temperatures and extreme climate events, including floods and droughts, are resulting in: i) damages to crops; ii) increased rates of soil erosion and concomitant declines in agricultural productivity; and iii) damages to properties and infrastructure. These effects are greatly exacerbated by a baseline situation of unsustainable management of land and water resources in the KRB. Future prospects for rural communities in this river basin are limited, with their livelihoods expected to be further threatened as climate change impacts intensify, making sustainable management of their natural resources increasingly challenging.

[225] WBG 2008 Tajikistan: Country Environmental Analysis.

## Alternative solution and barriers

### *Preferred solution*

The preferred solution would be for the small-scale farmers and pastoralists within the KRB of Tajikistan to become resilient to climate change impacts. This would be achieved by developing and then implementing a climate-resilient catchment management strategy for the KRB, which will enhance the provision of ecosystem services in the river basin. Such a strategy would promote a wide range of new approaches, including: i) long-term planning at the river basin scale, informed by integrated catchment management principles; ii) explicit consideration of the trends, risks and impacts of extreme climate events and their interactions in catchments of various scales iii) consideration of all landscapes (i.e. urban, pastoral, agricultural as well as conservation areas) within the KRB; iv) the use of ecosystem goods and services under climate change conditions to support climate-resilient livelihoods; v) ecosystem-based adaptation (EbA) interventions, including watershed rehabilitation and sustainable management of all natural resources; and vi) the development of appropriate adaptation responses by communities and relevant public services for both sudden- and slow-onset climatic events.

### *Barriers*

Barriers to implementation of the above solution within the KRB include: i) a lack of coherent climate risk information coupled with limited knowledge sharing within the country; ii) weak institutional structures for developing integrated catchment management strategies; iii) limited technical capacity of public services to promote climate change adaptation among communities; and iv) limited knowledge among communities of the benefits of EbA. The activities within the project are designed to overcome these barriers and are detailed in Part II[226].

**Barrier 1. Lack of systematic production, collection and sharing of climate risk information.** A wide range of projects and programmes have been conducted in river basins across Tajikistan, which have assessed the impact of various environmental and socio-economical factors on the population. However, most of these initiatives have not accounted for climate change and its associated risks, resulting in these risks not being included in basin-level planning and management.

Furthermore, the current sectoral approach in governance has resulted in insufficient information on climate risks (particularly advisories) being shared between sectors. This has resulted in development initiatives being unable to contribute to the building of Tajikistan's climate resilience. For example, a management plan is in development for the KRB[227], but does not take an integrated approach to landscape planning and will not include climate risk projections.

The relevant climate information authority in Tajikistan, Hydromet, also lacks the necessary capacity to measure and collect climate risk information. In the KRB, three of the major hydrological stations[228] have been identified as having poor performance, with equipment that is outdated and poorly maintained. This limitation has resulted in communities in the KRB not receiving advanced climate risk information on events such as flooding or landslides.

[226] Part II: A, where details on the project components, outcomes, outputs and activities are provided.
[227] The KRBMP is being developed by Fergana Valley Water Resources Management and is to be completed in 2019. Further details are presented in the environmental context sub-section.
[228] These three stations are the Tartki and Chinar on the Kofirnighan River and Romit on the Sardai-Miyona River.

An additional limitation is that all information and data being generated on climate and climate change in the country are not currently being housed in a secure and accessible information centre. Although centres for storing such information do exist in Tajikistan in the form of hubs or platforms, the population and relevant institutions are not being appropriately informed of the services provided by such centres. Relevant centres include the Open Centre being hosted by the Department of Geology and an information centre being established by the Ministry of Water and Energy. These centres are still in a nascent stage, with a limited capacity for cross-sectoral information sharing. As a result, information on climate risks is not available on a central, readily accessible platform.

With the limited sharing of existing knowledge within the country on climate change risks, there is a significant gap in available knowledge on appropriate adaptation interventions. Specifically, rural Tajik communities have limited or no access to information on climate risks and appropriate adaptation practices.

**Barrier 2. Limited institutional capacity to include climate change adaptation into river basin management plans and policies, and to apply catchment management approaches to climate risk reduction.**

Integrated land and water resource management is particularly relevant under climate change conditions and the associated increase in climate risks. This is because upstream land uses, such as agriculture, affect downstream risks, such as flooding. These interactions between land use and climate risks are complex and not well understood in Tajikistan. This is particularly true for a topographically diverse basin such as the KRB, where both steep mountainous regions and arid lowlands occur. The basin is affected by multiple climate risks but lacks an integrated catchment management approach for the management of such risks.

While a river basin management plan is currently being developed for the KRB under the Water Reform Programme, this management plan will focus on water resources management. Cross-sectoral management of land and water resources as well as multi-hazard climate risk management will not be covered by the proposed basin management plan. Consequently, the RBOs and RBCs that will be established in the northern and southern KRB sub-basins will not be capacitated to plan for the implementation of integrated climate-resilient practices at the basin, sub-basin and watershed scales.

**Barrier 3. Limited technical capacity of local government to implement adaptation activities that promote climate resilience within local communities.**

Local government authorities in the KRB currently lack the knowledge and expertise to monitor extreme climate events, transmit early warning information and take adequate and appropriate response measures to manage climate risks. This limitation results in local KRB communities receiving minimal training and information on climate change adaptation. In particular, public services from local government that provide climate advisories, agricultural extension services and livestock health services do not take climate risks into account. The end result is that local communities: i) are not being regularly updated on local, regional nor international best practices for reducing the impacts of climate change; and ii) are not being made aware of climate risks in time to take adequate action.

**Barrier 4. Limited knowledge among communities of livelihood benefits from implementing climate risk reduction and EbA measures.**

Farmers and pastoralists in Tajikistan have had limited exposure to EbA and its benefits for reducing the impacts of climate change as well as improving livelihoods. This is particularly true for communities in the KRB, where there have been limited climate change projects and initiatives.

Consequently, KRB rural community members do not have the technical capacity to implement EbA interventions and are also not incentivised to do so. Because of this limitation in climate change projects and initiatives within the KRB, communities have not been exposed to demonstration plots that showcase the benefits of EbA activities for improving climate resilience. It is also unlikely that rural community members in KRB will autonomously implement EbA interventions because farming practices in the country have shown limited innovation since the end of the Soviet era.

*Project Objective:*

The objective of the proposed project is to enhance the livelihoods of the small-scale farmers and pastoralists living in the Kofirnighan River Basin under future climate change conditions. Such conditions are expected to include increased frequencies and intensities of extreme climate events such as intense rainfall, flooding and droughts. Three interrelated outcomes within the project (detailed in Part II[229]) will contribute to achieving this objective, namely: i) catchment management strategy to manage climate risks operationalised at *raion* and *jamoat* levels in the KRB; ii) an integrated approach to building the climate resilience of agro-ecological landscapes operationalised at a village level; and iii) existing knowledge management platforms supported for integrated catchment management and EbA.

The overarching approach of the project is to employ integrated catchment management within the KRB. To this end, a climate-resilient catchment management strategy will be designed for the basin which will enable national rural development planners, local government and local communities to manage a wide range of climate risks. As noted in the introduction of this document, this strategy will be underpinned by the following concepts and principles:

- climate change can cause or exacerbate multiple hazards (e.g. GLOFs, floods, mudflows, landslides, soil erosion and drought), all of which need to be taken into account when designing adaptation measures;
- management of climate risks needs to be tailored for a particular spatial scale (e.g. catchment or watershed);
- there are complex upstream-downstream interactions (involving flooding and erosion processes) that need modelling before effective adaptation interventions can be designed;
- long-term development planning for the KRB will require careful consideration of the multiple hazards associated with climate change;
- a cross-sectoral approach, which takes linkages between sectors (e.g. agriculture, conservation, energy and water) into account, is required for effective adaptation;
- a landscape approach that considers urban environments, rural villages, agricultural fields and all ecosystems (forests, pastures) is critical for managing climate risks in the long-term; and
- adaptation in the KRB will require considerable investment in EbA interventions that increase the supply of critical ecosystem goods and services under conditions of climate change.

With regards to the project's implementation of EbA within the KRB, communities will be trained on EbA interventions for managing pastoral, forest and agricultural landscapes at a watershed scale under climate change conditions. These interventions will follow the principles of sustainable land management (SLM) and climate-smart agriculture (CSA) wherever applicable. The training will be targeted, in particular, at the *raion* (district) and *jamoat* (sub-district) levels. In so doing, the project will enhance support services to villages and enable participatory, local-level planning.

[229] See Part II: A, which gives a project overview and details the components, outcomes, outputs and indicative activities of the project design.

The lessons learned from the project will enable a policy and investment framework to be developed for replicating and scaling up EbA interventions across the country. Existing knowledge management platforms and hubs will be used for promoting this replication and upscaling.

Each of the proposed project's activities have been designed to address the climate change problem described in Part II[230], and to contribute to overcoming the barriers described above.

*Project Components and Financing*

The duration of the project is proposed to be five years (60 months) beginning in 2020 and ending in 2024.

Table 5 presents the proposed components, expected outcomes, concrete outputs and indicative activities of the project, which are further detailed in Part II[231]. During the development of the Full Proposal, the activities were outlined to ensure their alignment with national target areas. A detailed breakdown of costings per activity is provided in Part III[232].

**Table 5.** Project components, expected outcomes and an outline of concrete outputs, with component-level grant amounts.

| **Project Components** | **Expected Outcomes** | **Expected concrete Outputs** | **Amount** (US$) |
|---|---|---|---|
| 1. Integrated catchment management to build climate resilience. | 1. Catchment management strategy to manage climate risks operationalised at *raion* (district) and *jamoat* (sub-district) levels in Kofirnighan River Basin (KRB). | 1.1. Multi-hazard climate risk models developed for target watersheds in the KRB. | 1,012,000 |
| | | 1.2. Support provided for establishing automated weather stations in Kofirnighan River Basin watersheds. | |
| | | 1.3. Integrated catchment management strategy developed for the KRB. | |
| | | 1.4. Strengthened coordination and training mechanisms for integrated climate-resilient catchment management. | |
| | | 1.5. Payment for Ecosystem Services models developed for the KRB. | |
| 2. Ecosystem-based Adaptation, including Climate smart Agriculture and Sustainable Land Management, in agro-ecological landscapes. | 2. An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level. | 2.1. Agro-ecological extension services supported at the *jamoat* level to provide technical support for EbA implementation. | 7,282,810 |
| | | 2.2. Watershed Action Plans developed that promote climate resilience and enhance economic productivity for target watersheds. | |
| | | 2.3. EbA interventions implemented in target watersheds by local communities. | |
| 3. Knowledge management on building | 3. Existing knowledge management | 3.1. Existing knowledge management platforms supported for collating information on the planning, implementation and financing of EbA interventions. | 142,500 |

[230] See Part II: A, which gives a project overview and details the components, outcomes, outputs and indicative activities of the project design.
[231] Ibid.
[232] See Part III: G, which illustrates the budget and detailed budget notes.

| | | | |
|---|---|---|---|
| climate resilience through integrated catchment management and EbA in the KRB. | platforms supported for integrated catchment management and EbA. | 3.2 An impact evaluation framework established to enable effective adaptive management of EbA activities. | |
| **4. Component sub-total** | | | **8,437,310** |
| 5. Project Execution cost (9.20%) | | | 776,000 |
| 6. Implementing Entity Fee (8.5%) | | | 783,131 |
| **7. Total Project Cost** | | | **9,996,441** |

*Projected Calendar:*

The projected timeline for the proposed project is a five-year implementation from 2020–2024. Estimated milestones are outlined in Table 6.

**Table 6.** Projected milestones and expected timeline for the proposed project.

| Milestones | Expected dates |
|---|---|
| Start of Project Implementation | January, 2020 |
| Mid-term Review | June, 2022 |
| Project Closing | March, 2024 |
| Terminal Evaluation | June, 2024 |

## PART II: PROJECT JUSTIFICATION

### *A. Project components*

To achieve its objective of enhancing the climate resilience of small-scale farmers and pastoralists in Tajikistan, the proposed project focuses on strengthening the integrated management of the KRB and implementing concrete on-the-ground EbA interventions. The three components of the project are: i) integrated catchment management to build climate resilience; ii) Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes; and ii) knowledge management on building climate resilience through integrated catchment management and EbA in the Kofirnighan River Basin. The first component will strengthen the institutional and technical capacity of government and local communities to manage climate risks. The second component will support local communities to implement interventions that reduce climate risks by enhancing the ecosystem functionality of degraded watersheds. The last component will compile and disseminate lessons learned for future national and regional upscaling and replication.

The outcomes, concrete outputs and indicative activities under each component are described below.

### Component 1. Integrated catchment management to build climate resilience.

The GoT has initiated a water sector reform[233] that will result in water resources being managed according to hydrographic boundaries rather than administrative ones. For the KRB, this will result in the establishment of River Basin Organisations (RBOs) and River Basin Councils (RBCs) in the northern and southern sub-basins by the end of 2019. While this will strengthen the management of water resources throughout the KRB, the KRB Management Plan (KRBMP) that is being developed will not address: i) the linkages between land and water management and the consequent impacts on climate risks; and ii) the importance of an EbA approach to risk reduction at the watershed level. Consequently, Component 1 has been designed to build on the KRBMP that is currently being developed and facilitate climate-resilient integrated catchment management in the KRB.

*Outcome 1. Catchment management strategy to manage climate risks operationalised at raion (district) and jamoat (sub-district) levels in Kofirnighan River Basin.*

Under this outcome, integrated land and water resources management principles will be introduced to Tajik authorities at the *raion* and *jamoat* levels to effectively address the climate change impacts described in Part I[234]. An integrated, climate-resilient catchment management strategy for the KRB will be developed using a multi-hazard climate risk approach. This strategy will detail the climate risks in each KRB watershed and will provide the *raion* and *jamoat* government levels with guidelines for managing these risks. This will enable climate-resilient land-use management in the KRB.

Outcome 1 will be achieved through five linked outputs. These outputs will: i) contribute towards improved transparency on multi-hazard climate risks throughout the KRB through risk modelling and improved climate data production; ii) develop a cross-sectoral strategy for managing these risks throughout the KRB by using an integrated catchment management approach; iii) strengthen the capacity of government bodies and local communities for managing climate risks by implementing EbA; and iv) incentivise ecosystem management as a risk management approach by developing a framework for a Payment for Ecosystem Services (PES) approach.

Output 1.1. Multi-hazard climate risk models developed for vulnerable watersheds in the Kofirnighan River Basin.

A gap analysis will be conducted based on all available information that covers the KRB, including baseline projects and the ongoing assessment being conducted as part of the KRBMP[235]. It is expected that the outputs of the KRBMP will include watershed delineation for the KRB, as well as information on water scarcity at the watershed level. However, it is not expected to include information on risks related to water access and climate change impacts on basin hydrology. The gap analysis will inform the identification of watershed-level risks to be prioritised for the north and south sub-basins of the KRB.

Under this output, priority risks, which will include flooding and landslides, will be modelled at the watershed level for the north and south KRB sub-basins. For climate-specific risks – which also include floods, landslides and droughts – downscaled climate predictions will be included in the risk models. These models will inform the development of cohesive Multi-Hazard Climate Risk Models (MHCRMs) for the KRB.

[233] Water Reform Programme 2015.
[234] See Part I: Project Background, on the climate change context in Tajikistan.
[235] scheduled to be completed in 2019

The MHCRMs will be used to inform the development of detailed Watershed Action Plans (WAPs) under Outcome 2. In addition, the models and their results will be archived and disseminated through knowledge centres that will be supported under Outcome 3.

Indicative activities to be implemented under Output 1.1 are detailed below.

**Activity 1.1.1.** Conduct a gap analysis on existing risk information in the Kofirnighan River Basin.

A detailed gap analysis will be conducted on the KRBMP. The analysis will be informed by existing information on *inter alia*: i) the vulnerability of the KRB; ii) baseline projects in the KRB and surrounding regions; iii) the ongoing assessment for the development of the KRBMP[236]; and iv) water availability in the KRB. The collation of data on water availability will support the assessment of identified climate risks[237] as well as producing the climate change projections that will inform the MHCRMs [Activity 1.1.3[238]].

The gap analysis will take into account all recommendations and watershed delineations made through the KRBMP assessment. If the assessment does include watershed delineations, the design of the integrated catchment management strategy for the KRB will refer to those delineations.

Once the gap analysis has been completed, missing primary data will be collected for the KRB. Satellite imagery will be used to obtain land use, vegetation cover and slope data. Where existing data on soils is limited, ground-truthing studies will be conducted. For watersheds that are expected to be particularly vulnerable, satellite imagery will be supplemented with topographic models derived from high-resolution drone imagery.

To accurately consider the impacts of climate change on the risk profile of the KRB, regional climate change predictions will be downscaled. These downscaled predictions will be used in Activity 1.1.2 to inform the climate risk models.

**Activity 1.1.2.** Develop Multi-Hazard Climate Risk Models for the Kofirnighan River Basin.

Multi-Hazard Climate Risk Models (MHCRMs) will be developed at the watershed scale for the KRB. These models will be calibrated with historical data, but will also be run using downscaled climate change predictions developed under Activity 1.1.1. Notably, multi-hazard models will consider the relationships between different types of hazards. In many cases, the onset of one hazard alters the likelihood or impact of another hazard. For example, a GLOF may result in river bank destabilisation that could trigger a landslide event. Similarly, landslides and other forms of mass movement may alter river morphology and increase the risk of flooding. These interactions may be closely linked temporally and spatially (e.g. a GLOF triggering a landslide). Conversely, some hazards may interact across larger temporal and spatial scales; for example, rapid erosion upstream in a catchment may result in downstream sediment accumulation, which slowly increases downstream flood risk.

In this activity, priority hazards such as GLOFs, floods, mudflows and landslides will be modelled for the KRB. While different priority risks have been identified in both the north and south sub-basin of the KRB, the vertical linkage between the two regions will markedly impact the risk

[236] scheduled to be completed in 2019
[237] Validation of the identified climate change risks for the KRB is being conducted under Activity 1.1.2.
[238] Use of square brackets is specifically to highlight linkages between outcomes, outputs and activities.

profile. In particular, land uses in the northern sub-basin (upstream area), will have impacts on the southern sub-basin (downstream area) risk profile. For example, inappropriate land uses in the upstream areas could result in increased sedimentation, erosion and landslides, as well as reduced dry season water availability, in the downstream areas. Conversely, upstream land uses that maintain the ecosystem functionality of watersheds will result in downstream benefits of drainage control, flood reduction, improved water quality and increased dry season water flow.

Output 1.2. Support provided for establishing automated weather stations in Kofirnighan River Basin watersheds.

Currently, there are 11 weather stations across the KRB, which equates to an approximate density of one station per 1,000 $km^2$. This is regarded as an appropriate density[239,240] according to WMO guidelines[241]. Notwithstanding this, existing weather stations throughout Tajikistan face technical challenges, limited automation and problems regarding data quality. In addition, weather stations are being degraded because of insufficient resources and technical capacity to rehabilitate them following extreme climate events.

Under this output, the State Agency for Hydrometeorology (referred to hereafter as 'Hydromet') will be supported by providing capacity building to repair existing weather stations in the KRB. Support to Hydromet will also be provided in the form of equipment for the rehabilitation and upgrading of selected weather stations. This support will improve the quality and quantity of hydrometeorological data that is collected from the weather stations. Collected data will contribute to building an in-depth understanding of the climate change risks on different soil types and land units. The data will also be used to deliver climate risk information and adaptation advisories to agro-ecological extension service providers [supported under Output 2.1]. In addition, the data will be used to refine the MHCRMs [Activity 1.1.3 and 1.1.4].

Indicative activities to be implemented under Output 1.2 are detailed below.

**Activity 1.2.1.** Provide technical support for the modernisation of automated weather stations in the most vulnerable districts of the Kofirnighan River Basin.

In order to provide relevant and up-to-date climate risk information and associated advisories for rural farmers and pastoralists in KRB, weather stations need to be regularly updated. In addition, following extreme climate events, weather stations should be inspected for potential repair needs. Existing weather stations within the KRB, although regarded as operational, are in need of rehabilitation. This is in response to limited resources for regular inspections following extreme climate events that have resulted in the stations undergoing significant wear and tear[242].

Of the 11 total weather stations in KRB, 3 have been identified for rehabilitation and modernisation, namely 'Tartki' and 'Chinar' situated on the Kofirnighan River, and 'Romit' on the Sardai-Miyona River. The rehabilitation will ensure that the three stations are capable of procuring a greater density of data required for the climate projections for their respective areas.

[239] Third National Communication 2014.
[240] World Meteorological Organization (WMO). 2008. Guide to Meteorological Instruments and Methods of Observation. Seventh Edition, WMO-No. 8.
[241] World Meteorological Organization (WMO). 2018. Country Profile Database: Tajikistan Regional Association II (Asia). Available at: https://www.wmo.int/cpdb/tajikistan [accessed 19.07.2018].
[242] Currently, KRB weather stations frequently collect unreliable or insufficient data. Therefore, high-quality climate information cannot be disseminated to the respective end-users. Automated data collection protocols will be implemented at all weather stations in the KRB and suitable data management software will be acquired. This software will ensure that data collected by weather stations is accurate and that all data is safely stored.

Hydromet will be supported through this activity by providing training to relevant technical personnel on the ongoing maintenance of weather stations, as well as repairs following extreme climate events. In addition, required equipment will be provided to Hydromet under this activity to rehabilitate the existing three identified weather stations. Support will also be provided to install stream gauging equipment. This equipment will include sensors to automatically measure stream velocity, depth, width and water turbidity, as well as supporting infrastructure. Supporting infrastructure will include cabling, observer cabins and electric drum winches (details of hydrometric equipment are presented in Annex 6).

**Activity 1.2.2.** Collect and collate data from improved automated weather stations.

All data and information from both existing and supported automated weather stations [under Activity 2.1.1] will be collected. This data will be collated for dissemination through the existing knowledge centres in the country [Outcome 3] for analysis and further dissemination in usable formats. In addition, historic records dating back 100 years will be digitised.

To date, data collected from weather stations have been digitally archived through the process of scanning written records. However, this data is not usable for the necessary analysis that should take place in order to inform climate risk projections because it is in image format. In light of this shortfall, this activity will involve using Intelligent Character Recognition (ICR)[243] software to automatically convert scanned images into machine-readable data. This will significantly improve the historical weather records for the KRB and will be considered an innovative advance in climate data management capability in the country.

**Activity 1.2.3.** Use collected data to inform climate risk information and adaptation advisories for agro-ecological extension service providers.

The collected and collated data from available automated weather stations in the KRB [under Activity 2.1.2] will be fed into the existing knowledge management centres supported under Outcome 3. This data will then be used to develop climate risk and advisories for farmers and pastoralists. Adaptation advisories will be tailored to the local needs based on the collected data as well as existing climate forecasting for the country. Mobile service providers will be engaged with to identify partners for the long-term and to ensure sustainability of advisory delivery. Advisories will be disseminated to all agro-ecological extension service providers in KRB so that they are able to make informed decisions on adaptation recommendations.

By developing and disseminating advisories, the adoption of climate-resilient and high market-value crop and seed varieties will be promoted. These seed varieties include – but are not limited to – lucerne (*Medicago sativa* L.) and sainfoin/'especet' (*Onobrychis viciifolia* Scop.)[244]. Not only will advisories inform the selection of crops that take climate risks into account, they will inform alternative agricultural options for communities. Such options could include introducing fodder production into agricultural practices and establishing agroforestry and intercropping practices. The introduction of alternative land-use options will result in increasing soil fertility and conservation of natural resources for valuable ecosystem services for future seasons[245].

[243] ICR is an advanced optical character or handwriting recognition software system that enables different fonts to be learned by a computer. This system has been used to improve accuracy and recognition levels within data collection and analysis.
[244] FAO. 2008. State of Plant Genetic Resources for Food and Agriculture (PGRFA) in the Republic of Tajikistan: Country Report. By Prof. Dr Hafiz Muminjanov, Dushanbe.
[245] FAO 2008 PGRFA: Country Report.

Included in the advisories will be guidance on planting time and season specific to the target areas. The guidance will include suggested crop types, timing of planting and reason for selection.

*Output 1.3. Integrated catchment management strategy developed for the Kofirnighan River Basin.*

Under Output 1.3, an integrated catchment management strategy will be developed for the KRB. This strategy will outline how to implement integrated land and water resources management in watersheds throughout the KRB in order to manage climate risks. The strategy will address the linkages between upstream and downstream impacts at the river basin scale and outline approaches for identifying and managing such impacts at the watershed scale.

The integrated catchment management strategy will further inform the KRBMP that is currently being developed. RBOs and RBCs in the KRB will be closely involved in the development of the strategy. Staff from RBOs and RBCs, along with relevant staff from CEP, Agency for Land Reclamation and Irrigation (ALRI) and local government at *raion* and *jamoat* levels will be trained on the implementation of the strategy. Strategic approaches and objectives of the strategy will be operationalised at *raion* level through District Development Plans (DDPs).

Indicative activities to be implemented under Output 1.3 are detailed below.

**Activity 1.3.1.** An integrated catchment management strategy developed for the Kofirnighan River Basin to inform and facilitate cross-sectoral landscape planning.

This activity will build on the training provided under Activity 1.3.2 to develop an integrated catchment management strategy for the KRB. Relevant government authorities will be included in the design of the strategy to ensure that it is coherently linked with existing sectoral and local level policies. The strategy will detail how the identified climate risks [under Activity 1.1.2] will be managed using a cross-sectoral approach to integrated catchment management. The strategy design will consider all relevant individual sector mandates and align their objectives within the context of integrated management for the KRB.

Based on the MHCRMs [developed under Output 1.1], the strategy will provide guidance on risk management at various catchment scales within the KRB. This means that factors such as soil erosion and flood risk will be incorporated into cross-sectoral land-use planning to facilitate efficient management across all relevant government sectors. These sectors include *inter alia* water, environment, agriculture, and education.

The strategy will provide overall guidance for the integrated management of watersheds by local communities. This guidance will ensure that WAPs developed under Outcome 2 take downstream impacts into consideration and that interactions between different watersheds are accounted for in a strategic manner.

**Activity 1.3.2**. Training programme delivered on mainstreaming climate risks for integrated catchment management planning.

Relevant government and academic staff will be trained on mainstreaming climate risks into integrated catchment management planning. Identified agencies include CEP, Hydromet, MEWR, ALRI, the Department of Geology (DoG), RBOs of the KRB and UCA. Additional agencies and entities to be trained will be identified during the project inception phase. These partners will be trained on international best practices for integrating climate risks into integrated catchment

management. In addition, this training will include identifying relevant risk management measures for existing and emerging climate risks. The overall objective of the training programme will be for relevant institutions, government levels and departments to effectively implement an integrated catchment management strategy for managing the impacts of climate change.

Trainings will be tailored to the specific needs of the department/institution to ensure that all partners acquire equal knowledge on the most appropriate mechanism for integrated management. All relevant sectors will be included to ensure that – although mandates will continue to differ slightly – the goals of each align with the strategy for the KRB.

Sub-activities for the trainings under Activity 1.3.2 are outlined below.

- 1.3.2.1. Training conducted to relevant CEP representatives to integrate catchment management into implementation and monitoring activities for all projects going forward, both those with a focus on climate change and without.
- 1.3.2.2. Training provided to the personnel of the supported knowledge management centres – including the DoG Open Centre and to UCA – on assessing available climate risk information and ensuring it is all made available through the relevant portals/hubs.
- 1.3.2.3. Training provided to *raion*-and *jamoat*-level government departments on integrated catchment management and identifying climate risks that require such a management approach.

**Activity 1.3.3.** Provide training for selected communities on identification of EbA activities and implementation.

Rural communities across the six identified most vulnerable districts of the KRB will be selected for training on identifying and implementing appropriate EbA interventions. These identified six districts include Vahdat, Varzob and Faizobod Districts in the north of the KRB and Nosiri Khusrav, Shaartuz and Kabodiyon Districts in the south of KRB[246]. From these districts, it is expected that communities in ~100 villages across 14 *jamoats* will benefit from training on EbA interventions.

The selected communities will be trained by representatives from those institutions trained under Activity 1.3.2, including district and *jamoat* representatives of CEP. This training-of-trainers (ToT) approach will build the capacity of selected communities to identify climate risks, and to design and implement appropriate EbA interventions. All trainings will be delivered in local Tajik dialects specific to each target district. This will ensure that trainings are accessible to all participants.

<u>Output 1.4. Strengthened coordination and training mechanisms for integrated climate-resilient catchment management.</u>

Relevant co-ordination and training mechanisms will be strengthened for the implementation of integrated climate-resilient catchment management. Co-ordination structures to be strengthened include the RBOs and RBCs in the KRB. These entities are currently being established and, by project inception, will have been capacitated on water management at the catchment level. The proposed project will build their capacity on climate-resilient catchment management that includes land use as well as the management of water resources under climate change conditions. Training on cross-sectoral management will be provided to RBOs and RBCs in the KRB, as well as *raion* and *jamoat* level staff. This training will strengthen the existing coordination structures in the KRB to include integrated and climate-resilient management of land and water resources.

[246] Details on these six districts are provided in Part I, where the environmental context of Tajikistan is described.

Opportunities for establishing/supporting existing local training mechanisms will be identified. Currently, no institutionalised or systematic training mechanisms exist for farmers and pastoralists.

Indicative activities to be implemented under Output 1.4 are detailed below.

**Activity 1.4.1.** Strengthen existing training mechanisms at the *raion* and *jamoat* levels.

Under this activity, existing training programmes will be strengthened at the *raion* and *jamoat* government and administration levels. The programmes will be adopted from existing mechanisms within the *raion* and *jamoat* government for targeted catchment and/or watershed management. Improved training programmes will include coordination mechanisms for integrating holistic landscape management practices through the integrated catchment management strategy [Output 1.3]. Trainings will be coordinated between the RBOs and RBCs to ensure that the process of continued training is adopted into regular management within the government.

**Activity 1.4.2.** Training provided on integrating EbA into catchment management.

Following on from Activity 1.4.1, the strengthened training programmes will be carried out for *raion* and *jamoat* level government officials in the targeted districts[247]. The training will focus on providing support for agro-ecological extension services and will include EbA measures as part of an integrated approach to management. Main recipients of this training will include RDPP, CEP and *jamoat* government-level officials to ensure that the administrative and organisational processes are strengthened for EbA implementation.

This training will be linked with activities under Output 2.1 where community demonstration plots of EbA interventions will be established [under Activity 2.1.2] and farmer field schools will be conducted [under Activity 2.1.3]. All trainings will be delivered in local Tajik dialects specific to each target district. This will ensure accessibility to all willing and necessary participants.

Output 1.5. Payment for Ecosystem Services models to support the long-term financing of integrated catchment management strategy implementation.

Payment for Ecosystem Services (PES) has been identified as a viable approach for conserving the supply of ecosystem goods and services of Tajikistan under climate change conditions. Currently, no viable models for PES have been identified in the KRB. However, there are a number of ecosystem services within the KRB that could be eligible for a PES approach. These include water provision, flood reduction, sediment retention and biodiversity conservation. The activities of this project will support the delivery of the above ecosystem services and, consequently, the possibility of implementing PES in the KRB will be investigated under this output.

The indicative activity to be implemented under Output 1.5 is detailed below.

**Activity 1.5.1.** Suitable Payment for Ecosystem Services models developed for the KRB.

Under this activity, appropriate PES models will be developed for the KRB. Relevant ecosystem services will be identified, such as water provision from restored and ecologically-sound watersheds. Willing buyers and willing sellers for each ecosystem service will be identified and

[247] Vahdat, Varzob, Faizobod, Nosiri Khusrav, Shaartuz and Kabodiyon Districts.

engaged with to determine: i) the feasibility of PES for a particular ecosystems service; and ii) pricing structures for PES-compatible ecosystem services. Where willing buyers and willing sellers of a particular ecosystem service have been identified, potential intermediaries will be engaged with. Intermediaries may include government entities, NGOs and financial institutions. Negotiation platforms will be established between buyers, sellers and intermediaries to determine prices and payment methods for the delivery of ecosystems services.

## Component 2. Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes.

Adaptation measures such as EbA are increasingly being recognised as a cost-effective approach for building the climate resilience of vulnerable communities. In the context of watersheds, EbA interventions are most effective when implemented in degraded landscapes. In the KRB, many watersheds are degraded because of unsustainable land management practices – such as overgrazing and deforestation – and the impacts of climate change. These watersheds are prone to increased risks of flooding, mudflows and landslides and are characterised by low agricultural productivity. Implementing EbA interventions such as erosion control measures, agroforestry and sustainable pasture management in these watersheds will restore ecosystem services of flood reduction, soil stabilisation and increased water availability. Concomitantly, these interventions will provide long-term benefits to local communities by: i) providing climate-resilient and ecologically-sound livelihood opportunities; and ii) reducing both the likelihood and impact of climate risks.

EbA interventions for watershed management function optimally as part of an integrated upstream-downstream approach that considers risk avoidance and risk protection. For example, if a watershed is prone to flooding, EbA interventions in the upstream areas can promote ecological processes of flood attenuation and runoff infiltration that reduce downstream flood impacts. Downstream communities can then be further protected by combined grey-green infrastructure such as reinforced river banks that are stabilised with riparian vegetation. Under Component 2, vulnerable watersheds in the KRB will be climate-proofed through the implementation of integrated watershed management with a focus on an EbA approach that provides long-term benefits to local communities.

### *Outcome 2. An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level.*

The integrated catchment management strategy developed under Outcome 1 will inform development across all economic sectors at a catchment scale in the KRB. It will not, however, be sufficiently detailed to inform land-use management practices at a watershed scale. Outcome 2 will consequently include the development and operationalising of Watershed Action Plan (WAPs). These plans will have an overarching focus on addressing climate risks, thereby ensuring full alignment with the catchment management strategy [developed under Output 1.3]. A total of six districts[248] have been identified for EbA implementation, namely Vahdat, Varzob, Faizobod, Nosiri Khusrav, Shaartuz and Kabodiyon. This implementation will serve to demonstrate the cost-effectiveness and adaptation benefits of such EbA interventions.

Under this outcome, an integrated approach for building community resilience to climate change will be established, demonstrated and subsequently implemented. This approach will be informed

[248] Refer to the Part I sub-section on the environmental context in Tajikistan for details on these districts.

by detailed WAPs and community enterprise plans that will focus on building the climate resilience of the communities.

There are four outputs to achieve the above-described outcome. These outputs are interlinked through the respective activities by providing support to communities and implementing EbA activities in target regions. The four outputs and their indicative activities are detailed below, including linkages between the three project outcomes.

Output 2.1. Agro-ecological extension services supported at the *jamoat* level to provide technical support for EbA implementation.

Agro-ecological extension services are currently provided by private enterprises – largely agronomists – at the *jamoat* level on an ad-hoc basis in response to farmer requests. Through a ToT approach, these service providers will be supported to ensure that communities have access to the necessary guidance for effectively implementing EbA.

Indicative activities to be implemented under Output 2.1 are outlined below.

**Activity 2.1.1.** Agro-ecological extension services supported by training existing service providers on EbA, climate-resilient agriculture and multi-hazard climate risk management.

Currently, agro-ecological extension services are being provided to farmers and pastoralists by private enterprises at the *jamoat* level. Under this activity, these existing service providers will be supported to ensure that communities have access to the necessary guidance for effectively implementing EbA. This support will be through a ToT approach that ensures all knowledge sharing is ongoing among *jamoats* and communities. Training will include a focus on EbA, climate-smart agriculture (CSA) and sustainable land management (SLM) to ensure that an integrated approach to management is adopted following the provision of extension services. By providing additional training on multi-hazard climate risk management, existing extension service providers will be informed of the relevant and up-to-date technologies for climate information.

The ToT programme provided to the existing agro-ecological extension service providers will include training on specific processes that are essential to implementing an effective integrated catchment management strategy. These specific processes include measures on EbA, CSA and SLM that all contribute to improved river and water management. The processes are outlined below.

- **Developing land-use plans (LUPs) that take into account all natural resources within and surrounding a particular area**. Efficient land-use planning will prevent social conflicts over land and ensures the sustainable use of available resources. LUP could involve the implementation of rotational grazing and/or cropping as well as intercropping or alternate harvesting. In this way, LUP contributes to increased soil fertility and improved productivity. The ToT programme will train extension service providers on developing land-use plans for specific areas within the target districts. Importantly, this training will differ between regions and within districts because of considerable variability in landscapes.
- **Developing implementation protocols for EbA that are specific to particular soil types, ecosystems and landscape units**. Together with LUP, such implementation protocols will assist with ensuring maximum sustainability of all available resources. Such protocols make use of previous seasons' experiences and outputs to adapt for future seasons. Training to extension services providers will be focused on the process of identifying potential EbA measures to be implemented in a specific region. The training will also include how to

determine the appropriate intervention according to the landscape and needs of the community.

- **Training extension service providers on the technical implementation of EbA, including theoretical and practical aspects**. This is because the providers are private enterprises, meaning that farmers may often request guidance rather than hands-on assistance. Extension services consequently need to be able to describe in detail the identified EbA measure as well implement it on the ground.
- **Connecting agricultural producers to markets**. Improving market connectivity among agricultural producers will be a focus in the training of extension service providers. Currently, farmers are not adequately making use of the existing extension services. This could be because of many reasons, however the reason that has been highlighted is that farmers are not aware that such services specific to EbA are available.
- **Introducing agro-processing to extension service providers.** Through agro-processing, there will be added value to primary agricultural products. Training will focus on what the different options are for processing/transformation of raw and intermediate products and how it could benefit the communities.
- **Training extension service providers on post-harvest storage handling.** This will promote the use of post-harvest storage facilities among Tajik farmers to reduce crop losses to pests and to improve prices received at markets. Training will include the appropriate steps immediately following harvest such as cooling, cleaning, sorting and efficient packing.
- **Training farmers on improving livestock productivity.** With climate change, farmers are likely to become more reliant on their livestock for their livelihoods. By focusing on supporting the health and nutrition of livestock, the resilience of local communities will be improved. Such examples of guidance would be to establish small fodder production units for livestock and to shift from an entirely plant-based diet to a semi-animal-based protein.
- **Developing advisories from climate risk information received from Hydromet**. These advisories will be delivered to farmers to inform their decision-making for the season ahead.

**Activity 2.1.2.** Establish EbA demonstration plots in each of the target villages.

Under this activity, community demonstration plots will be established in the target villages. These plots will consist of the main EbA interventions to be implemented. The training provided under Activity 1.4.2 will serve as the base for the implementations of these plots. These demonstration plots will be the main platform for: i) demonstrating enhanced crop and livestock productivity; ii) training farmers and pastoralists on the technical details of how to implement EbA interventions; and iii) demonstrating how the interventions reduce climate change-induced soil erosion.

The EbA measures included in the demonstration plots will be selected from the shortlist of EbA interventions to be developed under Activity 2.2.2. Examples of the measures that have been identified as successful and/or potentially successful in the KRB are described in Table 7.

**Table 7.** EbA measures that have been identified as successful/potentially successful in the KRB. In the 'Applicable area' column, 'N' denotes the northern sub-basin while 'S' denotes the southern sub-basin.

| No. | Description | Applicable area |
|---|---|---|
| 1 | Construction of 'protection' gabions along rivers to provide buffers during flash floods. | N,S |
| 2 | The introduction of water-saving irrigation techniques such as drip irrigation, dry farming, composting/mulching and making use of cover crops. | N, S |
| 3 | Rehabilitation/restoration of degraded forest ecosystems making use of *saxaul* species, as well as others. | N, S |
| 4 | Sustainable harvesting for livelihoods from existing 'healthy' forest ecosystems. | N |

| No. | Description | Applicable area |
|---|---|---|
| 5 | Establishing livestock exclusion zones for the growing of fodder crops such as 53ucerne and sainfoin. | N, S |
| 6 | Establishing shelterbelts and integrating bio-drainage measures to reduce wind erosion and improve water infiltration. | N, S |
| 7 | Introducing indigenous and palatable grass seeds into degraded rangelands. | N, S |
| 8 | Introducing rotational grazing of livestock between pastures to assist with increasing field water absorption and decreasing water runoff. | N, S |
| 9 | Pasture management such as land-use planning and introducing improved management measures such as exclusion zones and rotational grazing of livestock. | N, S |
| 10 | Establishing joint forest management involving communities and local government. | N, S |
| 11 | Introducing intercropping and agroforestry, and in specific areas may include apiculture, i.e. beekeeping. | N, S |
| 12 | Introducing sustainable long-term community services such as renewable energy and energy-efficient stoves. | N, S |
| 13 | Setting up shelterbelts in areas frequently exposed to erosion. | S |
| 14 | Establishing commercial plantations making use of an array of indigenous fruit species in 53ucerne53d and degraded lands. | S |
| 15 | Introducing organic mulching for farmers to use on croplands which promotes soil fertility as well as water-saving. | S |
| 16 | Diversifying crop use, including drought-tolerant and climate-resilient crops. | S |
| 17 | Establishing greenhouses for horticulture including local lemon, tomato and cucumber. | S |
| 18 | Establishing community woodlots in 53ucerne53d and abandoned areas for fuelwood. | S |
| 19 | Providing additional and improving existing extension services provision which will include developing advisories for farmers. | S |
| 20 | Establishing on-farm water resource management. | S |
| 21 | Rehabilitating existing irrigation, drainage and pumping systems. | S |

The proposed techniques outlined above will include EbA practices as well as CSA and SLM measures. EbA is currently not being undertaken by local communities because of limited technical capacity to plan, implement and sustainably finance the interventions. Under this activity, this capacity will be enhanced at the village level. In addition, Outcome 1 will contribute to building the capacity by strengthening local extension services and village governance structures.

**Activity 2.1.3**. Farmer field schools conducted in target villages making use of demonstration plots.

The strengthened training programmes under Activity 1.4.2 will inform the development of a curriculum for farmer field schools (FFSs). These FFSs will be conducted in the target villages of Vahdat, Varzob, Faizobod, Nosiri Khusrav, Shaartuz and Kabodiyon Districts and will include training on EbA, CSA and SLM. Specifically, trainings will demonstrate the importance of improved livestock husbandry and community-based rangeland practices. FFSs will be advertised through the activities under Outcome 3. Through the provision of FFSs, local community capacities will be built with specific wide-spread knowledge of EbA, CSA and SLM.

Training of *jamoat*-level extension service providers will be focused on within the FFSs. By including these local experts in the FFSs, the project will promote farmer interaction whereby both government and communities learn from previous experiences. This will allow upstream versus downstream experiences to be shared as well as the development of possible measures that will benefit each other in the future. Through the establishment of demonstration plots [under Activity 2.1.2], training by community members to fellow community members will take place. This will facilitate a training-of-trainers (ToT) approach which further promotes sustainability of project

interventions. Community leaders will be selected to take part in the training and sharing of experiences.

Curricula of the FFSs will include training on avoiding soil erosion threats at the community level. This training will be tailored to: i) increase infiltration of rainwater into topsoils; ii) increase the water-retention capacity of soils; and iii) restore soil horizons in landscapes with sheet/gulley erosion. Such management of soils will be underpinned by increasing the vegetative cover of the landscape and the organic matter content of the soil. To this end, a wide range of land management techniques will be presented for implementation to improve SLM in target villages. Such management interventions and techniques are separated according to the northern and southern sub-basin of the KRB. The specific EbA measures proposed for the northern and southern sub-basins are outlined in Table 7 above.

The proposed techniques outlined above will include EbA practices, which are usually a form of CSA and/or SLM. EbA is currently not being undertaken by local communities because of limited technical capacity to plan, implement and sustainably finance the interventions. Under this activity, this technical capacity will be enhanced at the village level. In addition, Outcome 1 will contribute to building the capacity by strengthening local extension services and village governance structures.

*Output 2.2. Watershed Action Plans developed that promote climate resilience and enhance economic productivity for target communities.*

Under this output, climate risk information will inform the development of fine-scale Watershed Action Plans (WAPs). These WAPs will assist local government and communities in ensuring that all identified EbA measures are carried out in an efficient and effective manner. The WAPs will include detailed budgets that will assist in determining the extent to which EbA measures can be implemented.

WAPs will be developed through a participatory process with communities from target villages in Vahdat, Varzob, Faizobod, Nosiri Khusrav, Shaartuz and Kabodiyon Districts. Such participatory processes will be conducted by holding regular consultation meetings in the villages with local government, PUUs and other relevant organisations. Through this output, the appropriate EbA measures in each watershed will also be shortlisted for future implementation.

Indicative activities to be implemented under Output 2.2 are detailed below.

**Activity 2.2.1.** Participatory mapping conducted at the watershed level.

All mapping will be conducted in a thorough participatory manner with local communities and community-based organisations (CBOs). These CBOs are likely to include forestry organisations and Pasture User Unions (PUUs). Experts undertaking the mapping will be required to consult with local communities, learning from their on-the-ground experiences in the region. Communities will also be part of the final decision-making process for the shortlisting of EbA interventions [under Activity 2.2.2]. The meetings will be to consult with communities on their knowledge of watershed mapping, as well as to inform, update and make decisions for the future planning.

PUUs are currently in place in certain regions of the country. These PUUs have been established through previous and ongoing projects. Further development of these associations will be supported under this activity by conducting participatory mapping of each target watershed in the KRB. The mapping will make use of ecological, hydrological and agricultural data as well as

regional and local experts to determine the most appropriate EbA measures to be implemented at the watershed level to improve community resilience.

These ecological, hydrological and agricultural experts will also assist with determining the most appropriate land-use management changes necessary to address the climate change threats in the villages' surrounding landscapes. The recommendations will take into account the integrated catchment approach of the project, based on the strategy developed under Output 1.3.

**Activity 2.2.2.** Watershed Action Plans developed for vulnerable watersheds in the Kofirnighan River Basin.

Results of the participatory mapping conducted at the watershed level [Activity 2.2.1] will inform the selection of a wide range of EbA measures for each targeted watershed. These interventions will be assessed to form a shortlist that will be used for implementation recommendations going forward.

The land-use plans informed by these recommendations will be treated as working documents, primarily because of the: i) participatory nature of the mapping; ii) selection of shortlisted EbA interventions; and iii) monitoring to be conducted of implementation interventions. These working documents are flexible in nature in that they can be changed in an iterative manner as more relevant and up-to-date information becomes available. Importantly, these WAPs will be carefully aligned with the integrated catchment management strategy developed under Outcome 1 [under Output 1.3]. WAP development will be facilitated by district representatives from CEP and *jamoat*-level government in a participatory process with local communities living in the watersheds.

These WAPs will outline what types of EbA interventions will be implemented in which areas, propose sustainable rates of extraction for local ecosystems, and identify the types of protection measures that need to be undertaken. This will ensure that the plans will be responsive to local needs, while also building local community ownership of WAPs. Through the participatory development of WAPs, local community members will gain an increased understanding of climate risks, DRR and the importance of sustainably managing watersheds.

Output 2.3. EbA interventions implemented in target watersheds by local communities.

Under Output 2.3, local communities will be supported in implementing EbA interventions identified in Output 2.2. These interventions will reduce climate risks in two ways. Firstly, interventions such as reforestation, agroforestry and sustainable pasture management in degraded watersheds will strengthen the provision of ecosystem services. These ecosystem services include increased groundwater recharge and soil stabilisation, which will reduce the downstream impacts of flooding, landslides, soil erosion and limited water availability. Secondly, project activities will include protection interventions downstream. These interventions will include river bank stabilisation and flood protection.

The sustainability of watershed rehabilitation activities will be ensured by promoting local community livelihoods that are decoupled from unsustainable natural resource extraction. This will be done by using economically valuable species such as fruit and nut trees for watershed reforestation wherever possible. In addition, the environmental sustainability of local community livelihoods will be increased through the implementation of sustainable livelihood alternatives. Such alternatives will include low energy cookstoves, as well as harvesting fuelwood and timber species from local community woodlots.

**Activity 2.3.1.** Support local communities to implement priority EbA interventions.

Under this activity, local community members in ~100 villages across 14 *jamoats* will be supported in implementing the priority EbA interventions demonstrated in Output 2.2. Communities will be provided with technical assistance and inputs for implementing risk-reduction activities such as watershed reforestation, erosion control measures and flood reduction measures. Additionally, inputs will be provided for measures that increase energy efficiency and consequently reduce unsustainable practices (such as low-energy cook stoves).

Nurseries will be established in each of the 14 *jamoats* to provide local community members with suitable climate-resilient species for watershed reforestation, agroforestry and intercropping. Economically useful species such as fruit trees or high-value timber trees for woodlots will be prioritised and species selection will be informed by local conditions as well as community needs.

Selection of the EbA interventions will be informed by an assessment of their social, environmental and economic impacts within a community. Local communities will be consulted to agree on which EbA interventions should be implemented in the different land categories. The proposed EbA interventions that will be assessed for selection on the shortlist have been listed under Output 2.1 [specifically under Activity 2.1.3].

**Activity 2.3.2.** Support local community members in developing Enterprise Plans (EPs) based on EbA interventions.

Under this activity, local communities will be supported in developing EPs. Local community members will receive training on enterprise development and be educated on the economic viability of ecologically-sound natural resource-based businesses. By demonstrating the economic viability of EbA interventions for watershed restoration to local communities, this activity will contribute towards the sustainability and scalability of project interventions.

Local community members will be trained on how to start and maintain enterprises based on EbA interventions. Training will include cash flow prediction, product processing and accessing suitable markets. Possible enterprise plans identified during the project development stage include beekeeping, fodder crop production, agricultural production from fruit and nut trees and supporting services. These are outlined below.

*Beekeeping*
Beekeeping is readily integrated into EbA activities that promote the planting of flowering plants, such as fruit trees or fodder crops. Honey is a highly marketable product in local markets and can be sold at up to TJS40[249] (~US$4) per kilogram. It is generally sold locally and also exported to surrounding Central Asian countries.

*Fodder production*
Fodder crops such as 56ucerne (*Medicago sativa* L.) or sainfoin (*Onobrychis viciifolia* Scop.) can markedly improve the productivity of livestock agriculture. Pastures generally produce ~1.6 dry tonnes of feed per hectare per annum. Comparatively, fields planted with fodder crops can produce up to 10 dry tonnes of feed per hectare per annum. Fodder crops can be used as ground cover for intercropping with orchards or in agroforestry. Leguminous fodder crops, such as 56ucerne and sainfoin, also increase soil fertility by fixing nitrogen. While fodder crop production

[249] 'TJS' refers to Tajikistan Somoni.

can be profitable, with lucerne being sold at up to TJS15 (~US$1.50) per pressed kilogram on local markets, prices are highly variable according to season and climatic conditions.

*Agricultural production from fruit and nut trees*
Fruits and nuts are readily sold on local markets. Amongst others, peaches (*Prunus persica* L.), apricots (*Prunus armeniaca* L.), figs (*Ficus carica* L.), sour cherries (*Prunus cerasus* L.), pears (*Pyrus sp.* L.), plums (*Prunus divaricata* Led.) and apples (*Malus pumila* Mill.) are commonly grown fruit trees, while pistachios (*Pistacia vera* L.), walnuts (*Juglans regia* L.) and almonds (*Prunus dulcis* Mill.) are commonly grown nut trees. Pistachios and wild sour cherries, in particular, are frequently planted to stabilise slopes. Community members will be assisted in selecting the appropriate tree species to plant based on local soil conditions, climatic factors and markets.

*Supporting services*
A number of the interventions that will be undertaken in the proposed project will require supporting services. For instance, the introduction of low-energy cookstoves will require local community members that have the prerequisite skills to manufacture such stoves. During project implementation, supporting services for the long-term implementation of project activities will be identified and local community members trained on how to provide such services. In addition, to ensure productivity of fruit trees, pruning and grafting methods will be taught to local communities [for inclusion in Activity 2.3.1 and the establishment of nurseries].

**Activity 2.3.3.** Monitor the impacts of EbA interventions.

Continuous monitoring will be done at the community-level to provide an evidence-base on the effectiveness of EbA interventions and to enable adaptive management to take place. Community monitoring plans will be developed to enable continuous monitoring of WAPs [developed in Activity 2.2.2]. Local community members will monitor the impacts of EbA interventions and other actions implemented under WAPs. Authority figures in the local communities will be trained on interpreting monitoring information and taking adaptive management decisions based on the available information. In addition, monitoring information will be shared with *jamoat*-level government officials and extension service providers, who will use this information to inform their decision-making at *jamoat* level.

Monitoring is likely to include the extent of damages from climate-related disasters, such as floods and landslides. In addition, the reliance of local community members on unsustainable practices will also be monitored. Indicators will be identified in community monitoring plans but are likely to include the amount of fuelwood harvested from natural forests.

## Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the Kofirnighan River Basin.

The activities of the proposed project have significant upscaling potential throughout Tajikistan and in Central Asia. Other countries in the region face similar climate change risks and are likely to benefit from adopting an integrated catchment management approach using EbA. Consequently, lessons learned from this project will provide an evidence-base to both inform and promote project activities beyond the project's geographical scope. To ensure that lessons learned are adequately collected, collated and disseminated, this component will focus on strengthening knowledge management around integrated catchment management and EbA in Tajikistan.

*Outcome 3. Existing knowledge management platforms supported for integrated catchment management and EbA.*

A number of projects to address climate change impacts have been implemented at a village level across Tajikistan in the past decade. Many of these projects have had considerable success in terms of reducing soil erosion, raising finance for EbA interventions and increasing crop and livestock productivity. Consequently, numerous lessons have been learned for climate change adaptation activities in the country. These lessons include:

- establishing governance structures, from a national to village scale, to support EbA interventions;
- methods for engaging local communities;
- mechanisms for sharing lessons and best practices between villages;
- methods to undertake applied research in a participatory community approach;
- use of technology, such as smartphone applications, for training on and monitoring of interventions; and
- incentives[250] required to ensure long-term implementation and maintenance of EbA interventions by local communities.

The lessons listed above have, to date, not been collated, analysed and shared. They remain dissipated across projects and are consequently often viewed as unreliable because their underlying data is not available for public viewing. Under this outcome, activities will support existing knowledge management platforms and hubs to facilitate the exchange of lessons learned across Tajikistan. By providing much-needed support to these platforms, information will be readily accessible and available for dissemination to different organisation levels, including national government ministries to the villages. This method will ensure that local knowledge sharing continues beyond the project lifespan and also raises awareness of the benefits of EbA for integrated catchment management in the country. The evidence base assembled under this outcome will ultimately be used by policy-makers for informing the revision of legislation, policies and strategies relevant to upscaling EbA across Tajikistan.

There are three outputs to achieve the above-described outcome. These outputs are interlinked through the respective activities to ensure the necessary support is provided to knowledge sharing platforms to facilitate information transfer. The three outputs and their indicative activities are detailed below, highlighting the linkages between the three project outcomes.

*Output 3.1. Existing knowledge management platforms supported for collating information on the planning, implementation and financing of EbA interventions.*

Currently, several knowledge management platforms and hubs exist within Tajikistan as a result of previous and ongoing development projects. Because of this, a network already exists for the housing, viewing and transfer of new information. Such institutions include the University of Central Asia (UCA) and the Open Centre under the Department of Geology (DoG). These institutions are mandated with the responsibility of collating, analysing and disseminating information on climate risks and suitable adaptation options. By providing support through training and information transfer, this output will promote the sustainability of these platforms.

Indicative activities to be implemented under Output 3.1 are outlined below.

[250] e.g. financial, environment, cultural and aesthetic

**Activity 3.1.1.** Existing knowledge management platforms responsible for collating, analysing and disseminating information on climate risks and suitable adaptation options will be supported.

The existing knowledge management platform that has been identified for facilitation and support through Output 3.1 is the Open Centre under the DoG. As a reputable academic institution, the UCA will also be supported considering its goal and mandate to expand to rural regions of Tajikistan and other Central Asian countries. Through supporting these two institutions, awareness raising activities will be promoted on climate risks and the benefits of integrating EbA into landscape management.

In order to effectively provide support to the platforms, all new information to be provided will be screened to ensure it is scientifically sound. An emphasis will be placed on information underpinned by credible scientific analysis methods. Anecdotal information will be also be made available with, however, the caveat that further research is needed to determine its accuracy.

Training will be provided to the relevant platform representatives under Outcome 1.

**Activity 3.1.2.** Data and information will be collected from automated weather stations, agro-ecological extension centres and international publications.

All data and information collected under Outcome 1 from *inter alia* automated weather stations, local extension centres and from international publications will be collated for inclusion in the supported information centres. While the Open Centre will provide a repository of information, to be disseminated to local communities, national decision-makers and academics, UCA will facilitate active sharing and training of the information.

*Output 3.2. An impact evaluation framework established to enable effective adaptive management of EbA activities.*

To increase the quality of information available on the platform(s), Output 3.2 will include the development of an impact evaluation framework. This framework will be used for assessing EbA interventions implemented through the project, the sites selected for EP implementation, and also those villages that have had or are adjacent to areas where prior EbA interventions have been successful. Given that EbA benefits materialise fully over decades, the framework will need to be used by stakeholders during as well as after the completion of the project. A long-term research approach will consequently underpin the design of the framework.

Indicative activities to be implemented under Output 3.2 are detailed below.

**Activity 3.2.1.** An impact evaluation framework will be established to enable the effective quantification of project benefits and to provide information for future planning and implementation of EbA interventions.

An impact evaluation framework will be developed to monitor the impacts of project interventions. This framework will include the use of semi-randomised trials in areas with and without project interventions. In so doing, the framework will enable the effective attribution and quantification of project benefits and provide information for the future planning and implementation of EbA interventions across the country.

**Activity 3.2.2.** Data and information obtained through applying the framework will be disseminated via the knowledge platform(s).

The data and information obtained through applying the framework will be disseminated via the communication channels of the supported knowledge platform(s).

## B. Economic, social and environmental benefits

Climate variability is already reducing agricultural productivity which is directly impacting food security in Tajikistan. This situation is likely to be exacerbated by predicted climate change-induced increases in extreme climate events. These events include floods, landslides and drought. The design of the proposed project is intended to provide adaptation alternatives for vulnerable Tajik communities to improve their resilience to climate change.

Activities and outputs of the project will have several economic, social and environmental benefits which will contribute to furthering sustainable development within Tajikistan. Activities have been designed to address the barriers identified as hindering climate change adaptation (CCA) in the country, namely: i) limited capacity of institutions to include CCA into national plans; ii) limited technical capacity of public services to implement activities among communities for CCA; and iii) limited knowledge sharing on CCA in Tajikistan.

The primary, overarching benefit of the project will be a reduction in climate risks. In doing so, environmental, social and economic damages as a result of climate change will be minimised among rural Tajik communities. This benefit will be realised by: i) reducing the exposure of vulnerable communities in the KRB to climate hazards; and ii) increasing the resilience of KRB communities and ecosystems to the impacts of climate hazards. To optimise sustainable development co-benefits, project interventions aimed at building climate resilience will use an EbA approach.

Implementing EbA in agricultural systems[251,252] has been proven to improve the ability of crops and livestock to adapt to climate change and variability. These practices can be implemented at various scales to improve land-use management. For example, on-farm management of genetic biodiversity can ensure a broader source of crop resistance-capacity to uncertain occurrences and effects of extreme climate events. Genetic biodiversity is promoted through the diversification of crop varieties or inclusion of wild relatives. Other farm-level practices include the use of: i) integrated pest management strategies; ii) new cropping systems to reduce the impacts of pests and diseases; iii) the planting of windbreaks; and iv) the planting of agroforestry systems or cover crops to help reduce the evapotranspiration effect. At the landscape level, EbA helps regulate water and nutrient cycling by ensuring tree cover or natural vegetation in areas of hydrological importance. EbA also reduces the incidence or severity of crop pest and disease outbreaks related to extreme climate events. This is because enhancing the structural complexity of the agricultural landscapes through diverse cropping systems or inclusion of natural vegetation and on-farm tree cover promotes pest regulation.

EbA practices benefit smallholders in multiple ways beyond helping them adapt to climate change. For example, they help ensure the continued provision of ecosystem services on which farming

[251] Ecosystem-based Adaptation (EbA) is defined as in agricultural systems as the implementation of agricultural management practices that use or take advantage of biodiversity, ecosystem services or ecological processes (either at the plot, farm or landscape level) to help increase the ability of crops or livestock to adapt to climate variability. In contrast, practices that substitute the role of biodiversity in providing ecosystem functions and services for agricultural production such as excessive use of inorganic fertilizers or pesticides is not ecosystem-based.

[252] Vignola R, Harvey CA, Bautista-Solis P, Avelino J, Rapidel B, Donatti C & Martinez R. 2015. Ecosystem-based adaptation for smallholder farmers: Definitions, opportunities and constraints. Agriculture, Ecosystems and Environment 211:126–132.

depends such as water provision, food provision, nutrient regulation, pest control and pollination. This contrasts with other non-EbA adaptation measures, such as excessive use of agro-chemicals. Such adaptation measures can yield adaptation benefits but may negatively impact the provision of ecosystem services, whilst having additional negative environmental off-site effects including the loss of biodiversity or contamination of streams. In addition, the use of EbA practices can help diversify production systems and sources of income generation, providing more stability to smallholder farmers. For example, the use of intercropping and agroforestry in production systems can diversify farmer revenue. This revenue is generated by providing timber, fruits, fuelwood and building materials that farmers can use for additional income, especially in years when income from the main cash crop is reduced. These additional products reduce farmer vulnerability to market changes as well as their dependence on outside products which improves farmer food security both directly and indirectly. The use of agroforestry practices can also make significant contributions to biodiversity conservation efforts. In addition, many EbA practices can help mitigate climate change by either reducing the amount of GHGs emitted from agricultural systems[253], or by increasing the overall farm biomass[254].

Table 8 illustrates the social, economic and environmental benefits associated with the EbA interventions to be implemented through the proposed project.

[253] e.g. by reducing the use of inorganic fertilisers, agrochemicals, machinery and associated emissions
[254] e.g. by increasing soil carbon stocks or above-ground biomass

**Table 8.** Specific expected social, economic and environmental benefits per outcome of the proposed project.

| Outcome | Environmental benefits | Social benefits | Economic benefits |
|---|---|---|---|
| 1. Catchment management strategy to manage climate risks operationalised at Raion (district) and jamoat (sub-district) levels in Kofirnighan River Basin (KRB). | • Enhanced catchment integrity through better protection | • Increased awareness and technical capacity of policymakers and government institutions regarding climate-resilient adaptation technologies<br>• Increased capacity of professionals to present climate change adaptation information<br>• Increased gender equality at a local and national level – 30% of participants involved will be women | • Increased profit margins will be realised in the long-term as a result of training provided on climate change adaptation technologies and integrated catchment management |
| 2. An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level. | **Construction of gabions**<br>• Reduced slope instability and risk of minor mudslides and landslides<br>• Slowed water runoff, increased water infiltration and soil moisture<br>• Reduced soil loss (particularly through reduced gully erosion)<br>• Increased soil organic matter<br>• Increased above-ground biomass<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | • Increased production area<br>• Increased land productivity and crop yield | • Increased farm income<br>• Reduced loss of crops and land caused by slope instability |
| | **Stone lines and contour bunds**<br>• Slowed water runoff, increased water infiltration and soil moisture<br>• Reduced soil loss (particularly through reduced sheet erosion)<br>• Increased soil organic matter<br>• Increased above-ground biomass<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | • Increased production area<br>• Increased land productivity and crop yield | • Reduced agricultural inputs and thus production costs<br>• Increased farm income |
| | **Water-saving irrigation techniques**<br>• Reduced evaporation of soil moisture<br>• Increased water infiltration and soil moisture | • Reduced water consumption<br>• Increased crop yield | • Reduced agricultural inputs and thus production costs<br>• Increased farm income |

| Outcome | Environmental benefits | Social benefits | Economic benefits |
|---|---|---|---|
| | • Delivered constant moisture to root zone (reduced drought-stress)<br>• Reduced soil loss (particularly through reduced rain-splash erosion caused by overhead irrigation)<br>• Increased above-ground biomass of crops, reduces above-ground biomass of weeds<br>• Reduced plant pathogens e.g. fungus | | • Reduced loss of crops to drought or dry spells |
| | **Diversification of crops and use of drought-resilient crops**<br>• Increased biodiversity conservation (of genetic resources)<br><br>**Horticulture in greenhouses**<br>• Increases intensity of cultivation through consolidation of production area | • Increased diversity of production within farms<br>• Increased nutrition for local community<br>• Increased crop yield<br>• Reduced crop susceptibility to pests | • Increased farm income<br>• Reduced risk of economic failure due to diversification of production |
| | **Intercropping, agroforestry and woodlots**<br>• Protected crops and livestock from extreme climatic conditions<br>• Increased biodiversity conservation<br>• Reduced slope instability and risk of minor mudslides and landslides<br>• Slowed water runoff<br>• Increased soil moisture<br>• Reduced soil loss (through reduced sheet and gully erosion)<br>• Increased soil organic matter<br>• Increased above-ground biomass<br>• Increased climate regulation and carbon sequestration<br>Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | • Increased diversity of production on and off-farm<br>• Increased provision of food and fodder.<br>• Increased nutrition for local community<br>• Increased provision of fuelwood and timber (reduces pressure on natural forests) | • Increased farm income<br>• Reduced risk of economic failure in response to diversification of production |
| | **Rehabilitation/restoration of degraded forest ecosystems**<br>• Increased biodiversity conservation<br>• Increased water infiltration<br>• Increased above-ground biomass (increased plant survival)<br>• Protected crops and livestock from extreme climatic conditions<br>• Reduced slope instability and risk of minor mudslides and landslides<br>• Slowed water runoff | • Increased nonmaterial benefits (e.g. scenic resources, recreation, science and education, spiritual and religious) derived from increased conservation value of landscape | • Reduced inputs and thus production costs<br>• Increased farm income<br>• Reduced loss of trees to drought or dry spells<br>• Increased ecosystem services such as tourism (e.g. hiking) and recreation |

| Outcome | Environmental benefits | Social benefits | Economic benefits |
|---|---|---|---|
| | • Increased soil moisture<br>• Reduced soil loss (through reduced sheet and gully erosion)<br>• Increased soil organic matter<br>• Increased climate regulation and carbon sequestration<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | | |
| | **Sustainable harvesting from 'healthy' forest ecosystems**<br>• Protected crops and livestock from extreme climatic conditions<br>• Increased biodiversity conservation<br>• Reduced slope instability and risk of minor mudslides and landslides<br>• Slowed water runoff<br>• Increased soil moisture<br>• Reduced soil loss (through reduced sheet and gully erosion)<br>• Increased soil organic matter<br>• Increased above-ground biomass<br>• Increased climate regulation and carbon sequestration<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o increased groundwater and river water quality | • Increased provision of food and fodder<br>• Increased nutrition for local community | • Increased farm income |
| | **Livestock exclusion zones**<br>• Increased above-ground biomass<br>• Increased biodiversity conservation<br>• Slowed water runoff<br>• Increased soil moisture<br>• Reduced soil loss (particularly through reduced sheet erosion)<br>• Increased soil organic matter<br>• Increased climate regulation and carbon sequestration<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o reduced groundwater river pollution | • Increased nonmaterial benefits (e.g. scenic resources, recreation, science and education, spiritual and religious) derived from increased conservation value of landscape | • Increased ecosystem services such as tourism (e.g. trekking) and recreation |
| | **Sowing of palatable and indigenous grass seeds in degraded rangelands and introducing rotational grazing** | • Increased pasture productivity and carry capacity | • Increased farm income through increased carrying capacity |

| Outcome | Environmental benefits | Social benefits | Economic benefits |
|---|---|---|---|
| | • Increased above-ground biomass<br>• Increased biodiversity conservation<br>• Slowed water runoff<br>• Increased soil moisture<br>• Reduced soil loss (particularly through reduced sheet erosion)<br>• Increased soil organic matter<br>• Increased climate regulation and carbon sequestration<br>• Off-site benefits:<br>o reduced downstream siltation<br>o reduced downstream flooding<br>o reduced groundwater river pollution | | |
| 3. Existing knowledge management platforms supported for integrated catchment management and EbA. | • Involving communities in developing the approaches allows more flexible adaptation efforts, i.e. catering specifically for reduced soil nutrients through soil erosion etc. | • Improved livelihoods through adoption of climate-resilient adaptation technologies and innovative climate information technologies within and surrounding vulnerable communities<br>• Increased knowledge through training provided to relevant local-level government and NGO officials<br>• Increased community-uplift in response to developing their own project proposals for on-the-ground implementation within their communities | • Facilitation of microfinance to successful community-led small-scale projects focusing on community-based adaptation |

## C. Cost-effectiveness

Alternatives to the baseline context in Tajikistan include the null alternative, the traditional alternative and the proposed alternative. These three scenarios are presented below.

**Scenario 1. 'Do nothing' approach**
The first scenario assumes that no interventions will be implemented. This means that the baseline scenario will remain, and the negative impacts of climate change will continue to cause significant losses to the economy. Climate change impacts such as rising temperatures and increases in intense rainfall events will be exacerbated by business-as-usual practices. Rural Tajik communities will continue to lack the required technical capacity to climate-proof their livelihoods and will continue to be impacted disproportionately by the negative impacts of climate change. Predicted declines in the agricultural yield under climate change conditions will further reduce the food security in the country, while an increasing number of climate change migrants will be exposed to hydrometeorological risks.

**Scenario 2. Use of a non-EbA approach**
Traditional approaches to managing the impacts of climate change may include engineered structures that protect infrastructure, agricultural fields and communities from floods and landslides. Such approaches may also result in an increase of agricultural inputs to offset a loss in soil productivity. These types of approaches are likely to yield adaptation benefits to local communities but have a number of undesirable shortfalls. Firstly, traditional approaches generally do not generate significant co-benefits. These approaches are inflexible in that each intervention generally only serves one purpose. Secondly, traditional approaches are frequently technology-oriented and require technical capacity to implement. This capacity is often lacking among local communities in Tajikistan. Lastly, traditional approaches are frequently costly, with significant associated capital and operational costs. Neither the GoT or local communities currently have the financial capacity to construct and maintain technological solutions – particularly as maintenance costs are likely to increase with the increasing impacts of climate change.

**Scenario 3. Integrated catchment management, including EbA solutions**
Under this scenario, the target communities in Tajikistan will be introduced to EbA practices that include CSA and SLM interventions. Community members will be trained on how to adopt these EbA solutions to manage the landscape through an integrated cross-cutting strategy rather than by each sector. This integrated catchment management strategy will be focused on increasing the resilience of small-scale farmers and pastoralists in Tajikistan to the impacts of climate change. Such EbA interventions are inherently multi-use, providing several social, economic and environmental co-benefits. EbA interventions are also frequently cheaper and easier to maintain than their traditional counterparts. As a result, community members are more likely to continue maintaining EbA interventions in the long term.

**Preferred solution**
The preferred solution for the proposed project is Scenario 3, which encompasses an integrated approach to catchment management for vulnerable Tajik communities. Although Scenario 2 is a technically viable alternative, the preferred solution has been chosen because: i) EbA is likely to be cost-effective; and ii) EbA interventions are likely to be more sustainable than a traditional approach. The overall objective of the proposed project is cost-effective in that a proactive approach to climate-risk management will be promoted throughout Tajikistan. Climate impacts are predicted to cost the country more than US$132 million annually by 2050. Preventative

measures, such as climate-informed planning and development, will avoid some of these costs. Such a preventative approach to climate risks is more cost-effective than reactionary measures.

Project outputs will focus on improving catchment management, including landscape management and planning processes, in rural areas of Tajikistan. In so doing, the project will create an enabling environment for climate change adaptation to occur in vulnerable catchments. These processes are inherently replicable across the country, thereby strengthening the sustainability, reach and impact of the project objectives. The strengthened knowledge management provided through Outcome 3 will further promote adaptive management of EbA and climate risk management in Tajikistan. This will ensure that future activities in the country benefit from a strengthened local knowledge base for EbA and catchment management.

At a local level, the project will promote the use of EbA interventions, which have been demonstrated to have favourable cost-benefit ratios while providing significant sustainable development co-benefits[255,256]. For example, soil conservation measures have been shown to increase crop productivity by between 15–25%[257]. Project activities will support EbA interventions in target districts and sites[258], providing improved livelihoods and value addition for agricultural and pastoral products. This has been shown to be more cost-effective for increasing income and reducing poverty than support for other sectors[259]. Introducing agrobiodiversity and ecosystem service improvement practices to smallholder farmers ensures that farm-based livelihoods will be resilient to climate change and variability[260].

The cost-effectiveness of the project's on-the-ground adaptation interventions [under Outcome 2] will be greatly enhanced by the EbA approach. A growing scientific literature library highlights that EbA measures result in a greater ratio of cost-benefit compared to the implementation of hard infrastructure. For example, an economic analysis of the restoration and rehabilitation of degraded woodlands[261] estimates internal rates of return of 20–60% and cost-benefit ratios of up to 35:1 for grasslands[262]. An example of the cost-effectiveness of EbA approaches also recently emerged from an economic analysis undertaken in Lami, Fiji[263]. This analysis included assessments of the costs and benefits of three approaches to watershed management, namely: i) EbA measures only; ii) hard infrastructure interventions only; and iii) a hybrid approach applying both EbA measures and hard infrastructure interventions. Results of the analysis demonstrated that EbA options for watershed management are at least twice as cost-effective as hard infrastructure engineering options – i.e. a cost-benefit ratio of US$19.50:1 for EbA compared to US$9:1 for hard infrastructure. The cost-effectiveness of EbA approaches is expected to benefit the project through the implementation of EbA activities in target project sites.

[255] Jones HP, Hole DG & Zavaleta ES. 2012. Harnessing nature to help people adapt to climate change. Nature Climate Change 2:504–509.
[256] UNEP/STREP. 2012. A comparative analysis of ecosystem-based adaptation and engineering options for Lami Town, Fiji: Synthesis Report.
[257] Tesfaye A, Brouwer R, van der Zaag P & Negatu W. 2016. Assessing the costs and benefits of improved land management practices in three watershed areas in Ethiopia. International Soil and Water Conservation Research 4:20–29.
[258] Target sites will be identified during project inception.
[259] Ligon E & Sadoulet E. 2007. Estimating the effects of aggregate agricultural growth on the distribution of expenditures. Background Paper for the World Development Report.
[260] van Noordwijk M, Tata HL, Xu J, Dewi S & Minang PA. 2011. Segregate or integrate for multifunctionality and sustained change through rubber-based agroforestry in Indonesia and China. In Nair PKR & Garrity DP (eds) "Agroforestry: The Future of Global Land Use", Springer, The Netherlands pp 69–104.
[261] from several studies occurring across different sites
[262] De Groot RS, Blignaut J, van der Ploeg S, Aronson J, Elmqvist T & Farley J. 2013. Benefits of investing in ecosystem restoration. *Conservation Biology* 27:1286–1293.
[263] Rao NS, Carruthers TJB, Anderson P, Sivo L, Saxby TA, Durbin T, Jungblut V, Hills T & Chape S. 2013. An economic analysis of ecosystem-based adaptation and engineering options for climate change adaptation in Lami Town, Republic of the Fiji Islands. A technical report by the Secretariat of the Pacific Regional Environment Programme. Apia, Samoa.

## D. Consistency with national priorities

As a country, Tajikistan only recently started modifying their national policies and institutional frameworks to integrate the need for adaptation. Although the country has a relatively strong legislative framework regarding environmental protection, very few strategies or policies developed prior to 2010 acknowledge climate change as a cross-sector threat.

While climate change has not previously been acknowledged as a discrete threat, the importance of agriculture and water resources to the economy and to the country as a whole has been recognised. There are, therefore, numerous older policies, strategies and programmes that are synergistic with the outcomes of the project. The most significant of these is the 2003 National Action Plan for Climate Change Mitigation (NAPCC)[264,265]. This is the only strategic framework specifically addressing the implications of climate change and is also strongly aligned to all three project outcomes. Other significant plans that align to project outcomes include the National Environmental Action Plan (NEAP)[266,267] and the National Programme of Actions to Combat Desertification (NPACD)[268].

More recently, policies and strategies have moved to incorporating specific climate change terminology. These include the latest poverty reduction strategy, 'Living Standards Improvement Strategy of Tajikistan for 2013–2015' (LSIS)[269], which links water resource management and agricultural reform to a wider reduction in poverty. The 2011 'Strategic Program for Climate Resilience'[270] is another synergistic programme that includes agriculture and SLM as one of its six focal components. The most recent National Development Strategy (NDS)[271] reiterates the vulnerability of Tajikistan to climate change and advocates for the reduction and mitigation of the negative effects of climate change across multiple sectors. This strategy also identifies the centrality of agricultural productivity, water resources and capacity building to realise the targeted socio-economic growth by 2030.

Several of the more recent national strategies and policies in Tajikistan have already expired without renewal, for example NEAP 2011–2015. Other national strategies have been planned and approved but never implemented because of financial constraints, for example the State Programme on the Protection of River Banks[272].

The GoT has made significant progress within its water sector by developing the Water Sector Reforms Programme for 2016–2025 (Water Reform Programme)[273]. While the programme is likely to modernise water management in Tajikistan, it does not adequately consider the impacts of climate change on the water sector. Furthermore, the focus of the Water Reform Programme is restricted largely to water resources management and does not adequately consider the impacts of multiple hazards at the river basin and watershed level. While flood management will

[264] also referred to as 'The National Action Plan on Climate Resilience'
[265] NAPCC 2003.
[266] also referred to as 'The National Action Plan for Environmental Protection'
[267] National Environmental Action Plan (NEAP). 2006. Government of Tajikistan.
[268] National Program of Actions to Combat Desertification (NPACD). 2001. Government of Tajikistan.
[269] LSIS 2013.
[270] Strategic Program for Climate Resilience (SPCR). 2011. Government of Tajikistan.
[271] NDS 2016.
[272] The State Programme on the Protection of River Banks is detailed in the Intended Nationally Determined Contribution (INDC) towards the achievement of the global goal of the UN Framework Convention on Climate Change (UNFCCC) by the Republic of Tajikistan.
[273] Water Reform Programme 2015.

be the responsibility of the RBOs established under the programme, other climate-linked hazards such as erosion and landslides are not addressed through its implementation[274].

Table 9 outlines the relevant national and sub-national strategies, plans and programmes that relate to project activities. For each, alignment to project outcome level is indicated.

[274] Water Reform Programme 2015.

**Table 9.** Consistency of project outcomes with national policies, plans, strategies and development goals.

| Strategy | Year enforced | Alignment |
|---|---|---|
| **National strategies** | | |
| National Development Strategy 2016–2030 (NDS)[275] | 2016 | The primary focus of the NDS is on the long-term development of Tajikistan to improve living standards for the population. NDS objectives to achieving this include: i) poverty eradication; ii) sustainable economic growth; iii) promotion of sustainable consumption and production patterns; and iv) sustainable use of natural resources.<br><br>The vulnerability of the Tajik population to climate change is acknowledged throughout the NDS, with the importance of agriculture and water management to alleviating this highlighted.<br><br>Outcome 1 and 2 of the project therefore align with achieving the ultimate goal of the NDS in the country. |
| National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity (CBD Strategy)[276] | 2003 | Several interconnected components contribute to the primary objective of the CBD Strategy.<br><br>A priority element of the 'geo-system-level approach' outlined in the CBD Strategy is the restoration and reforestation of degraded landscapes to reduce soil erosion, particularly in landslide and already eroded areas.<br><br>Outcome 2 is aligned with this strategic component through implementing EbA activities that contribute to restoration and reforestation in degraded landscapes. |
| National Strategy on Disaster Risk Management for 2010–2015 (NDRMS)[277] | 2010 | The NDRMS identifies the significance of climate change-related disasters in the country such as droughts and high-water events. It is also acknowledged in the strategy that mitigation for these types of events needs to be incorporated into the design phase of new development projects.<br><br>The project is therefore aligned with the NDRMS under Outcome 1, relating to integrated catchment management which includes the improvement of water monitoring systems. |
| The National Climate Change Adaptation Strategy (NCCAS)[278] | 2016 | Within the NCCAS there are guidelines provided for priority adaptation actions to be undertaken in Tajikistan. The proposed project is well-aligned with the NCCAS because they both recognise that climate change effects on the agricultural sector result in significant negative impacts for the population. The NCCAS also recognises the potential of EbA as an effective adaptation approach.<br><br>The NCCAS is currently in draft format and has not yet been accepted by the government. Notwithstanding this information, the proposed project is aligned with the NCCAS through both Outcome 1 and 2. |
| Living Standards Improvement Strategy for the Republic of Tajikistan for | 2013 | LSIS recognises the cross-cutting nature of climate change adaptation in relation to environmental sustainability, economic growth and reducing poverty. The importance of water, soil quality and improving the capacity to collate and disseminate climate change information are also identified as important fields for poverty reduction.<br><br>In this regard, all three outcomes of the project align with LSIS objectives. |

[275] NDS 2016.
[276] CBD Strategy 2003.
[277] National Strategy on Disaster Risk Management for 2010–2015 (NDRMS). 2010. Republic of Tajikistan, Dushanbe.
[278] NCCAS 2016.

| Strategy | Year enforced | Alignment |
|---|---|---|
| 2013–2015 (LSIS)[279] | | |
| **National programmes and plans** | | |
| National Program of Actions to Combat Desertification (NPACD)[280] | 2001 | Outcome 2 of the project aligns with the NPACD focus on 'rational land tenure' and 'measure on rational nature using'. These focal points refer to the sustainable use of natural resources, with clear guidelines on reforestation and mitigating the effects of water erosion.<br><br>Outcome 3 aligns with two further objectives of the NPACD, namely: i) the development of better platforms to disseminate climate change information; and ii) increasing the role of the local population in collecting and collating data. |
| Strategic Program for Climate Resilience (SPCR)[281] | 2011 | The SPCR was developed in response to the specific vulnerability of Tajikistan to climate change and the associated economic, environmental and social impacts. It is the strategic overview of the Pilot Programme for Climate Resilience (PPCR), which consists of six core components. One of these core components is 'Agriculture and sustainable land management', which focusses on incorporating climate resilience into all sectors of land management.<br><br>Outcome 2 of the proposed project has a strong alignment with this component. |
| National Action Plan for Climate Change Mitigation (NAPCC)[282,283] | 2003 | The NAPCC is the only strategic framework in the country that specifically addresses the implications of climate change. All outcomes of the project are strongly aligned with the NAPCC. |
| National Environmental Action Plan (NEAP)[284,285] | 2006 | The NEAP focusses on a broad spectrum of current environmental concerns, many of which are likely to be exacerbated by climate change. Amongst the most prevalent concerns included in the NEAP include: i) soil erosion; ii) deforestation and land degradation; iii) high water events; and iv) water scarcity.<br><br>Outcome 1 and 2 of the project align with these concerns. The NEAP also recognises the need to improve environmental knowledge in Tajikistan at both institutional and local levels, which is complemented in Outcome 3 of the project. |
| Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme)[286] | 2015 | Under the Water Reform Programme, the GoT is initiating a shift towards managing water resources according to hydrographic rather than administrative boundaries. Further to this, the programme aims to promote the implementation of Integrated Water Resources Management (IWRM) at the basin level. IWRM was specifically defined for Tajikistan as being:<br><br>*"based on the interaction of various sub-sectors with the objective good accessibility to high quality water and sanitation services for the population, ensuring water availability for irrigation, hydropower, environment and other users in river basins defined by hydrographic boundaries. IWRM promotes the protection of water resources from over-exploitation and pollution; provides protection of vulnerable mountain environments including river banks and floodplains from flooding and erosion, and facilitates public participation in decision-* |

[279] LSIS 2013.
[280] NPACD 2001.
[281] SPCR 2011.
[282] NAPCC 2003.
[283] also referred to as 'The National Action Plan on Climate Resilience'
[284] NEAP 2006.
[285] also referred to as 'The National Action Plan for Environmental Protection'
[286] Water Reform Programme 2015.

| Strategy | Year enforced | Alignment |
|---|---|---|
| | | *making, planning, financing and development of water resources in the interests of economic growth, sustainable development of the society and preservation of the environment."* [287]<br><br>River Basin Organisations (RBOs) and River Basin Councils (RBCs) will be established in each of the six identified basins, as well as in sub-basins as required. RBOs will mainly be responsible for: i) planning the use and protection of water resources annually and in the long-term; and ii) monitoring the distribution of water as well as the state of rivers. RBCs will mainly be responsible for reviewing the plans developed by the RBOs and managing interactions with stakeholders such as water users and Water User Associations (WUAs).<br><br>RBOs are expected to become operational in 2019, with the GoT being expected to allocate ~US$160,000 annually towards the operation of RBOs and RBCs.<br><br>Outcome 1 aligns with the Water Reform Programme in involving RBOs and RBCs in developing an integrated catchment management strategy for the KRB. |
| Agricultural Reform Programme of the Republic of Tajikistan for 2012–2020[288] | 2012 | The Agricultural Reform Programme includes a direct focus on mitigating the negative impacts of climate change for agricultural production. This includes the primary activity of 'systematic reduction of soil erosion, land degradation and deforestation by improving natural resources management'. The programme includes a focus on EbA strategies with emphasis on soil erosion activities.<br><br>Both Outcome 1 and 2 of the project align with these focal points of the Agricultural Reform Programme.<br><br>Another important component of the programme is the 'development and establishment of information management systems that would enable communities, local and national authorities to effectively collect, record and analyse reliable information on the impact of natural disasters and climate change'. Outcome 3 of the project is strongly aligned with this component. |
| **Strategies with a focus on climate change** | | |
| Greenhouse Gas Abatement Strategy (GHG Strategy) included in the NAPCC[289] | 2003 | In order to meet the UNFCCC commitments for Tajikistan, the GHG Strategy was developed with the focus to address the problem of source-based anthropogenic emissions.<br><br>Outcome 2 of the proposed project aligns with the objective of promoting sustainable forms of agriculture in light of climate change considerations.<br><br>Additionally, Outcome 2 aligns the priority of enhancing natural sinks of carbon including forests and soils. |
| Strategy of Adaptation to Climate Change, Prevention and Minimization of its Adverse Effects | 2003 | In order to meet the UNFCCC commitments for Tajikistan, the Adaptation Strategy was included within the NAPCC to ensure that climate change adaptation remained a focal point for development in the country.<br><br>Outcome 2 and 3 of the project align with the following components of the strategy:<br>• improvement of systematic observation and monitoring network for ensuring timely adjustment of adaptation measures; and |

[287] Water Reform Programme 2015.
[288] Agricultural Reform Programme for 2012–2020 of the Republic of Tajikistan. 2012. Ministry of Agriculture, Government of Tajikistan.
[289] NAPCC 2003, Section 8: Greenhouse Gas Abatement Strategy.

| Strategy | Year enforced | Alignment |
|---|---|---|
| (Adaptation Strategy) included in the NAPCC[290] | | • improvement of the data collection system and analysis, interpretation and dissemination of the results among the end users.<br><br>Outcome 1 of the project is aligned with two of the priorities relating to water resources:<br>• development of measures in the field of water resources protection, water and energy saving in the conditions of climate change; and<br>• development of new, and improvement of existing technical and economical tools on water use at national and regional levels.<br><br>In addition, Outcome 2 of the project aligns with four of the five 'measures of adaptation and minimisation of adverse impacts of climate change' relating to land use. These are listed below.<br>• Zoning of territory depending on the extent and type of influence of climatic factors on the condition of lands taking into account its vulnerability to the different forms of erosion.<br>• Setting a selection of soil protection measures for specific landscapes according to the influence of climatic and anthropogenic factors.<br>• Conducting land-reclamation measures, which include crop rotation, soil protection and limiting the ploughing of steep lands that will help to conserve the humus in the soils under the expected conditions of climate change.<br>• Forest rehabilitation measures in the regions prone to drought and wind erosion. |
| **Laws** | | |
| Land Code of The Republic of Tajikistan (Land Code)[291] | 1996 | The Land Code regulates all land relations and is directed at the rational use and protection of land. This focus is targeted to improve the fertility of soil, and to maintain and improve the natural environment. In this way, opportunities for equal development of all forms of economic activity will be promoted in Tajikistan. |
| Water Code of The Republic of Tajikistan (Water Code)[292] | 2000 | The Water Code is aimed at regulating water relations to ensure rational use. This is so that there is adequate supply for the needs of the population and the natural environment. |
| Law of the Republic of Tajikistan on Land Reform (Land Reform Law)[293] | 1994 | The Land Reform Law includes tasks listed by the GoT specifically for further developing land management. These tasks are all designed with the purpose to increase the agricultural production of the country and include the: i) creation of optimal conditions for equal rights; ii) development of various forms of land management; iii) formation of a multi-structural economy; iv) rational use; and v) the protection of land. |
| Law of the Republic of Tajikistan on Land Management (Land | 2001 | The objective of the Land Management Law in Tajikistan is to create conditions for equal development for all sector in the country. |

[290] NAPCC 2003, Section 9: Strategy of Adaptation to Climate Change, Prevention and Minimization of its Adverse Effects.
[291] Land Code of the Republic of Tajikistan (Land Code). No. 498 of 1997. Republic of Tajikistan.
[292] Water Code: Law of the Republic of Tajikistan (Water Code). 2001. Government of Tajikistan, Dushanbe.
[293] Republic of Tajikistan Law on Land Reform (Land Reform Law). 1994. Republic of Tajikistan.

| Strategy | Year enforced | Alignment |
|---|---|---|
| Management Law)[294] | | |
| Law About Environmental Protection | 2011 | This law provides the legal base for developing the state policy on environmental protection. Further to this, it aims to conserve the natural resources of the country and ensure the environmental sustainability for socio-economic development. Therefore, the law ensures that the human right to a healthy environment is guaranteed. |
| Law on Ecological Expertise | 2012 | The law defines principles and norms for environmental experts to adhere to and provides for the prevention of negative impacts on planned economic interventions on environment. |
| Law on the Republic of Tajikistan on *Dehkan* Farms (*Dehkan* Law)[295] | 2016 | This law defines the legal base for establishing and maintain the efficient functioning of *dehkan* enterprises. In addition, the law aims to create an enabling environment for the development of farming in the country. |

[294] Law of the Republic of Tajikistan "on Land Management" (Land Management Law). 2001. Republic of Tajikistan.
[295] Republic of Tajikistan Law "on *Dehkan* Farms" (*Dehkan* Law). 2002. Republic of Tajikistan.

## E. Consistency with national technical standards

The proposed project is aligned with the requirements of the March 2016 Revision of the Environmental and Social Policy (ESP) of the Adaptation Fund (see Part II: K)[296]. Prior to project approval, the Full Proposal will be screened according to the UNDP Social and Environmental Safeguards Procedure[297]. This is to ensure that the necessary safeguards have been addressed and incorporated into the project design.

In addition to complementing the efforts of the CEP and the GoT to improve catchment management in the KRB, project activities will increase rural Tajik resilience to climate change in throughout the country. The Adaptation Fund-accredited Implementing Agency, UNDP, together with CEP and relevant national partners, will ensure that the project follows procedures outlined in the ESP. This includes the requirement that project activities funded by the Adaptation Fund reflect local circumstances and needs and draw upon national actors and capabilities.

The project will also adhere to all relevant national technical standards. At the Full Proposal development stage, the following legislation has been identified with relevance to the proposed activities:

- the 1996 Land Code of The Republic of Tajikistan[298];
- the 2000 Water Code of The Republic of Tajikistan[299];
- the 2001 Law of the Republic of Tajikistan on Land Management[300];
- the 2001 Law About Environmental Protection; and
- the 2012 Law on Ecological Expertise.

Given the small scale of the project's EbA interventions in the target sites and communities, as well as their focus on environmental protection, Environmental Impact Assessments (EIAs) are not expected to be necessary for any of the planned interventions. In addition, the proposed projects activities are in line with national social norms, including gender equality and equal access.

## F. Duplication in project design

There are a number of adaptation projects being implemented in Tajikistan with varying but similar objectives, including livelihood improvement, disaster risk reduction (DRR) and building climate resilience. The proposed project will complement these existing projects. In particular, there are three ongoing initiatives in the country that project activities will complement. These ongoing projects include: i) 'Livelihood Improvement in Tajik-Afghan Cross-border Areas' (LITACA); ii) 'Strengthening Disaster Risk Reduction and Response Capacities'; and iii) 'Facilitating Climate Resilience in Tajikistan'. Brief outlines of these projects are provided below. In addition to an overview of each project, justification is provided for why the project will not be a duplication of the respective projects' efforts.

During implementation of project activities, a team will work closely with the project representatives – as well as other relevant initiatives – to identify the best possible opportunities

[296] Refer to Part II: K on the environmental social impacts and risks of the project.
[297] UNDP Social and Environmental Safeguards Procedure.
[298] Land Code 1997.
[299] Water Code 2001.
[300] Land Management Law 2001.

for enhancing complementarity. Table 10 outlines the alignment between ongoing projects and proposed project activities in Tajikistan.

**Table 10.** Alignment of current and ongoing initiatives in Tajikistan with the proposed project.

| Project title | Fund, grant amount(s) and timeline | Objective | Alignment with proposed project |
|---|---|---|---|
| Livelihood improvement in Tajik-Afghan cross-border areas (LITACA) | **Fund:** Government of Japan (GoJ)<br><br>**Fund grant:** US$10,559,227<br><br>**Timeline:** 2018–2020 | The LITACA project is the logical continuation of the successes and lessons of the LITACA Phase I Project which took place between 2014 and 2017. Phase II aims to build on the results of Phase I by further strengthening the living standards of selected rural communities in the bordering areas of Tajikistan and Afghanistan. | • Best practices and lessons learned on capacity-building of people in rural settings, particularly women, can contribute to knowledge sharing. |
| Strengthening disaster risk reduction and response capacities | **Fund:** Government of Japan (GoJ)<br><br>**Grant:** US$10,600,000<br><br>**Timeline:** 2016–2020 | Through four interlinked outcomes, this project will support the Government of Tajikistan (GoT) to enhance the population's resilience to natural and man-made disasters. It will achieve this by improving policy and operational frameworks for environmental protection and sustainable management of natural resources. | • Best practices and lessons learned on climate risk-reduction interventions can contribute to knowledge sharing. |
| Facilitating climate resilience in Tajikistan | **Fund:** Government of Russian Federation (GoRF)<br><br>**Grant:** US$950,130<br><br>**Timeline:** 2018–2020 | Through the effective use of climate and disaster risk information, this project aims to facilitate access to climate finance for communities in disaster-prone mountainous regions of Tajikistan. The climate-resilience of these communities will therefore be enhanced. | • Information from community consultations will contribute to existing understanding of community preferences for risk management options.<br>• Best practices and lessons learned on climate risk-reduction interventions can contribute to knowledge sharing. |
| Kofirnighan River Basin Plan and Management (KRBMP)[301] | Unpublished March 2018 draft authorised by the Fergana Valley Water Resources Management<br><br>**Timeline:** 2018–2019 | The KRBMP will support the GoT in implementing the Water Sector Reform Programme for 2016–2025 by developing institutional mechanisms to improve water resources management at the basin- and local-level in the KRB. It also aims to develop a long-term basin plan for the use, protection and development of water resources, as well as annual or seasonal plans for the distribution and management of KRB water resources. | • Focused information on sustainable water resources management in the KRB can contribute to the development of basin-specific catchment management strategies. |
| Building climate resilience of vulnerable and food insecure communities through capacity strengthening and livelihood | **Fund:** Green Climate Fund (GCF)<br><br>**Fund grant:** US$9,300,000<br><br>**Partner:** World Food Programme (WFP)<br><br>**Partner grant:** US$346,000 | This initiative will introduce adaption measures to address climate change effects leading to declines in agricultural yields, increases in food prices and reduced agricultural wages. It will focus on the most vulnerable and food insecure communities in the Rasht valley, Khatlon and Gorno-Badakhshan Autonomous Region (GBAO) regions. | • Possibility for using data, methodologies and practices related to SLM. |

[301] Fergana Valley WRM 2018 KRBMP Unpublished.

| Project title | Fund, grant amount(s) and timeline | Objective | Alignment with proposed project |
|---|---|---|---|
| diversification in mountainous regions of Tajikistan[302] | **Timeline:** 2018–2022 | | |
| Tajikistan: building climate resilience in the Pyanji River Basin[303] | **Fund:** Strategic Climate Fund<br><br>**Grant:** US$21,550,000<br><br>**Timeline:** 2013–2020 | The project aims to increase resilience to climate vulnerability and change of communities in the Pyanj River Basin. The project's impact will be improved livelihoods of Pyanj River Basin communities vulnerable to climate variability and change. | • Useful information and practices on diversified livelihoods to contribute to knowledge sharing. |
| Climate adaptation through sustainable forestry in important river catchment areas in Tajikistan (CAFT) | **Fund:** KfW Development Bank<br><br>**Grant:** US$9,884,880<br><br>**Timeline:** 2015–2018 | Rehabilitation, conservation and sustainable use of forests contribute to the adaptation of the country to climate change and the conservation of biodiversity, as well as to the improvement of livelihoods of the local population in the project areas. | • Useful information and practices on the use and management of agro-biodiversity conservation.<br>• Information and best practices for conservation and adaptation management for replication in other areas of the country. |
| Climate change adaptation in Panj River Basin[304] | **Fund:** Asian Development Bank (ADB)<br><br>**Timeline:** 2015–2020 | The project aims to rehabilitate water supply systems in seven rural settlements adjacent to the town of Kulob located in Vose and Panj districts. | • Best practices and lessons learned on rehabilitation in rural settings can contribute to knowledge sharing. |
| Tajikistan: Water Resources Management in Pyanj River Basin Project[305] | **Fund:** ADB<br><br>**Grant:** US$25,000,000<br><br>**Partner:** Japan Fund for Poverty Reduction<br><br>**Partner grant:** US$5,000,000<br><br>**Timeline:** 2016–2022 | To improve institutional and physical capacities of water resources management (WRM) system in PRB of southern Tajikistan. | • Information on WRM can contribute to the development of water catchment strategies. |

[302] Green Climate Fund (GCF). 2018. Project FP067: Building climate resilience of vulnerable and food insecure communities through capacity strengthening and livelihood diversification in mountainous regions of Tajikistan. Projects and programmes. Available at: https://www.greenclimate.fund/-/building-climate-resilience-of-vulnerable-and-food-insecure-communities-through-capacity-strengthening-and-livelihood-diversification-in-mountainous-r?inheritRedirect=true&redirect=%2Fwhat-we-do%2Fprojects-programmes%3Fp_p_id%3D122_INSTANCE_VKj2s9qVF7MH%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3D_118_INSTANCE_4ZRnUzRWpEqO__column-2%26p_p_col_count%3D2%26p_r_p_564233524_resetCur%3Dtrue%26p_r_p_564233524_categoryId%3D846529 [accessed 11.07.2018].
[303] Asian Development Bank (ADB). 2018. Tajikistan: Building Climate Resilience in the Pyanj River Basin. Sovereign (Public) Project 45354–002. Available at: https://www.adb.org/projects/45354-002/main#project-pds [accessed 11.07.2018].
[304] UNECE 2017 Environmental Performance Review.
[305] ADB. 2018. Tajikistan: Water Resource Management in Pyanj River Basin Project. Sovereign (Public) Project 47181–002. Available at: https://www.adb.org/projects/47181-002/main [accessed 11.07.2018].

| Project title | Fund, grant amount(s) and timeline | Objective | Alignment with proposed project |
|---|---|---|---|
| Conservation and sustainable use of Pamir Alay and Tein Shan ecosystems for snow leopard protection and sustainable community livelihoods[306] | **Fund:** Global Environment Facility (GEF)<br><br>**Fund grant:** US$4,181,370<br><br>**Partner:** UNDP<br><br>**Partner grant:** US$6,410,000<br><br>**Timeline:** 2016–2021 | Improved environmental protection, sustainable natural resource management, and increased access to alternative energy. | • Useful information and practices on the use and management of sustainable natural resource management. |
| Strengthening Critical Infrastructure against Natural Hazards[307] | **Fund:** International Development Association (IDA) Grant<br><br>**Fund grant:** US$25,000,000<br><br>**Partner:** IDA<br><br>**Partner grant:** US$25,000,000<br><br>**Timeline:** 2017–2023 | The objectives of the Strengthening Critical Infrastructure Against Natural Hazards Project for Tajikistan are to strengthen the recipient's disaster risk management capacities, enhance the resilience of its critical infrastructure against natural hazards, and improve its capacity to respond to disasters. | • Potential for information and best practices to be shared. |

[306] UNDP. 2016. GEF Project Document: Conservation and sustainable use of Pamir Alay and Tien Shan ecosystems for snow leopard protection and sustainable community livelihoods. National Biodiversity and Biosafety Centre (NBBC). ATLAS Award ID: 00085264; Project ID: 00092973; PIMS: 5437.
[307] The Word Bank. 2018. Available at: http://projects.worldbank.org/P158298?lang=en [accessed 23.07.2018].

## G. Knowledge management

For details on knowledge management within the proposed project, refer to Component 3 outlined in Part II: A. Component 3 includes activity-specific details on how information-sharing and knowledge management are included in the project design.

Specifically, knowledge-sharing and management has been integrated into the project design through three outputs. These are summarised below.

Under Output 3.1, existing knowledge management centres will be supported through project activities. These existing centres have been selected based on their focus on development work and/or adaptation within Tajikistan. The UCA is a regional academic institution that is focusing its efforts in rural Tajik communities to improve their resilience to climate change. All data collected by the UCA is accessible by the Open Centre under the DoG. The Open Centre is a housing platform for data and information and is available to the public for viewing and use. By supporting both UCA and the Open Centre, the project activities will encourage researchers to access previous and ongoing work to inform future developments. In addition, awareness will be raised among both government, private institutions and communities through providing support to the knowledge centres.

Under Output 3.2, an impact evaluation framework will be conducted that will enable management that is adaptive and integrated.

Both Output 3.1 and 3.2 will then contribute towards the strengthened knowledge exchange practices between communities and government under Output 3.3. Awareness will also be raised through the strengthened interactions between communities and government.

## H. Consultation process

A wide range of stakeholders were consulted with during the scoping and validation phase of proposed project development. A consolidated mission and stakeholder consultation report is attached as Annex 1.

Importantly, the project's Executing Entity, the CEP, was consulted through the iterative process of refining the project design. As the national organisation responsible for implementing adaptation projects in the country, CEP is comprised of numerous technical experts. Therefore, CEP is well-positioned to ensure that the project design is tailored to local requirements, that it benefits vulnerable groups and includes necessary gender considerations.

A Validation Workshop was held in Dushanbe on 22 June 2018 that included representatives from relevant KRB districts, international organisations, academia and partner projects. Primary stakeholders that will be involved in the implementation of the project are detailed in Table 11, while a complete list of all participants present at the workshop is included in Annex 1.

A complete list of all stakeholders consulted with during the development of the Concept and Full Proposal is included in Table 12.

**Table 11.** Primary stakeholders to be involved in project implementation.

| Stakeholder | Brief description |
|---|---|
| **Committee of Environmental Protection (CEP)** | The CEP is the main specialised governmental body responsible for implementation of the state policy on environmental protection in Tajikistan. Responsibilities of the CEP include the following:<br>• developing drafts of governmental policies, strategies and action plans for environmental protection as well as implementation;<br>• drafts laws, by-laws and decisions for the protection of the environment;<br>• performs monitoring of the implementation of laws, by-laws, state policies and measures on environmental protection;<br>• oversees the implementation process of all environmental conventions where Tajikistan is a member;<br>• acts as the GEF Focal Point;<br>• acts as the GCF National Designated Authority; and<br>• acts as the Adaptation Fund Focal Point. |
| **State Agency on Hydrometeorology (Hydromet) of the CEP** | The Hydromet is responsible for environment-, climate- and hydro-meteorological-related monitoring. It is the agency responsible to formulate and inform the GoT and local authorities on short-term weather forecasts. The scope of activities of the Hydromet are broad and include:<br>• observation and data collection on hydro-, meteorological- and climate-related regimes in Tajikistan;<br>• observation over the extreme weather events and other hydrometeorological disasters in the country;<br>• archiving historic and present data and analyses of the patterns tendencies; and<br>• serving as a National Focal Point under the UNFCCC and provides technical support and policy advice to the CEP for its implementation process; as well as representing the GoT in UNFCCC negotiations. |
| **Ministry of Energy and Water Resources (MEWR)** | The MEWR is tasked with the formulation and implementation of national energy- and water-related policies. Particular climate-related activities of the MEWR include:<br>• the design, revision and regular update of national strategies for energy and water development;<br>• drafting respective legal documents for the improvement and development of energy and water sector-based projects;<br>• monitoring the implementation of National Development Programs and Action Plans on renewable energy sources; and<br>• participating in the strategic development projects on hydropower plants construction. |
| **Open Centre under the Department of Geology (DoG)** | The Central Asian Countries Geoportal is an outcome of cooperation between Geological Survey of Finland and the national geo-institutions in Kazakhstan, Kyrgyzstan and Tajikistan. The geo-sector in Tajikistan is managed by the Head Department of Geology under the GoT as a public property to be the central organ of executive power, state policy management and coordination of work. This falls within the sector of: i) mineral exploration; ii) reproduction of mineral resources; and iii) provision of geological information about natural resources of the Republic of Tajikistan.[308,309]<br><br>Representatives from the Open Centre will be involved in capacity building processes and all training workshops. They will be expected to work together with the UCA in managing all collected information to collate and disseminate it to the public. |
| **University of Central Asia (UCA)** | The UCA is an internationally chartered, not-for-profit secular institution. It was formed as a partnership between the governments of Kazakhstan, the Kyrgyz Republic and Tajikistan under the sponsorship of the Aga Khan Development Network (AKDN). Founded in 2000, |

[308] The Committee of Geology and Resources Exploitation, Ministry of Industry and New Technology of the Republic of Kazakhstan carries out of special executive and regulatory functions in the area of geological studies, rational and complex usage of natural resources and state administration of subsoil use. The State Agency of Geology and Mineral Resources of the Kyrgyz Republic is a central institution working under the government of Kyrgyzstan for collecting, storing and distributing of geo-scientific information and providing authorized policy to the legal exploitation of mineral resources.
[309] Central Asian Counties: Geoportal. 2018. Available at: http://www.cac-geoportal.org/en/index.php/about-us [accessed 23.07.2018].

| | |
|---|---|
| | its first campus opened in 2016 in Naryn, Kyrgyzstan, offering five-year undergraduate programmes in Computer Science (BSc) and Communications and Media (BA). In 2017 the Khorog Campus in Tajikistan was opened, offering five-year undergraduate programmes in Earth and Environmental Sciences (BSc) and Economics (BA).<br><br>The primary role of UCA will be the integration of all information and data made available through the project into education and courses going forward. UCA will also be expected to work with the DoG in collecting, collating and making information publicly accessible and available. |

A list of the stakeholders consulted to date and those that will continue to be consulted with during project inception and implementation are listed below.

**Table 12.** A list of all stakeholders consulted with during development of the proposed project.

| Stakeholder | Stakeholder type |
|---|---|
| Aga Khan Development Foundation | Regional development agency |
| Agency of Statistics | Government agency |
| Asian Development Bank | International development agency |
| ClimAdapt | International organisation |
| Committee for Emergency and Civil Defence | Government agency |
| Committee of Environmental Protection (CEP) | Government agency |
| *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) | International development agency |
| European Union | International organisation |
| Food and Agriculture Organisation of the United Nations (FAO) | International development agency |
| Forestry Agency | Government agency |
| KFW Development Bank | International development bank |
| Ministry of Economic Development and Trade (MEDT) | Government agency |
| Ministry of Energy and Water Resources (MEWR) | Government agency |
| Ministry of Transport | Government agency |
| National Agency on Hydrometeorology (Hydromet) | Government agency |
| Swiss Agency for Development and Cooperation (SDC) | International development agency |
| UNDP Disaster Risk Management Programme (DRMP) | UNDP programme |
| United Nations Children's Fund | International development agency |
| United States Agency for International Development (USAID) | International development agency |
| University of Central Asia | Regional academic institution |
| World Bank | International development bank |

## I. Funding justification

### Component 1. Integrated catchment management to build climate resilience.

*Baseline scenario (without AF resources)*

The **baseline scenario** is that rural development in Tajikistan is not informed by an integrated catchment management strategy. Agricultural productivity will continue to decline as increasing climate change impacts accelerate erosion at a landscape scale. Local communities will continue to be exposed to climate hazards because climate risks are not accounted for in district and sub-district planning and development. Climate information and advisories will not be

disseminated to local farmers in vulnerable catchments because of a lack of adequate climate information services in Tajikistan.

*Additionality (with AF resources)*

The **preferred solution** is that a climate-resilient catchment management strategy is developed and operationalised at the district and sub-district level. This strategy will be informed by multi-hazard climate risk models (MHCRMs) and by detailed climate data from automated weather stations. The strategy will detail appropriate risk management approaches for improving resilience to climate risks and identify mechanisms for disseminating advisories tailored to local communities. Local authorities will be capacitated to implement catchment management strategies. The overall climate resilience of rural communities will be increased because of: i) reduced exposure to climate risk as a result of a climate risk management approach to rural development and land management; and ii) increased adaptive capacity as a result of strengthened local government capacity.

**Component 2. Ecosystem-based Adaptation, including Climate-smart Agriculture and Sustainable Land Management, in agro-ecological landscapes.**

*Baseline scenario (without AF resources)*

The **baseline scenario** is that ecosystems in rural Tajikistan continue to be degraded as a result of a combined effect of unsustainable land management practices and the impacts of climate change. Ecosystems goods and services will be further compromised by rapid erosion, resulting in declines of agricultural productivity and hydropower generation. Hydrometeorological disasters will continue to increase, as ecosystem services such as soil stabilisation and flood attenuation are further compromised. This will result in increasingly negative impacts on Tajikistan's economy and the health and well-being of its population.

*Additionality (with AF resources)*

The **preferred solution** is that EbA is implemented by local communities in rural Tajikistan. EbA interventions will provide goods and services that reduce climate change impacts[310] and strengthen rural livelihoods. Agro-ecological extension centres will be supported to ensure they provide relevant technical support to communities on EbA. This support will also ensure that the implementation of interventions will be informed by fine-scale land-use plans.

The sustainability and replicability of EbA interventions will be ensured through the development of a market environment for EbA. Enterprise Plans (EP) will be developed by communities to implement EbA activities that promote climate resilience.

**Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the KRB.**

*Baseline scenario (without AF resources)*

The **baseline scenario** is that lessons learned and best practices on EbA are not systematically collated. Information on climate risks and EbA will continue to be fragmented. This will hinder the

[310] such as soil stabilisation, flood attenuation and groundwater recharge

effective implementation of EbA interventions as uncertainty around the effectiveness of EbA interventions will remain. Without an appropriate evaluation framework, decision-makers will lack reliable information on the benefits of EbA as well as the effectiveness of different interventions within the local context. Local communities will continue to lack access to comprehensive and reliable information on climate risks and adaptation best practices.

*Additionality (with AF resources)*

By providing support to existing knowledge management centres, these entities will be responsible for collating, analysing and disseminating information on climate risks and EbA. Providing this support thereby ensures that up-to-date information is accessible in a coherent manner. This information will be disseminated to decision-makers and local communities via appropriate communication channels, to ensure that all stakeholders benefit from information on climate risk and adaptation measures. The knowledge centre(s) will share information with local communities through mass media channels such as mobile applications, websites, brochures and radio broadcasts. They will also engage with existing local knowledge exchange structures. In this way, knowledge on climate risks and EbA will be disseminated broadly and in a locally-appropriate manner.

An impact evaluation framework will be developed under Component 3 that will enable the evaluation of the benefits of EbA interventions. This framework will promote the use of sampling methodologies to ensure the accurate attribution of social, economic and environmental benefits to EbA interventions. The knowledge centre will continue to manage and apply the framework beyond the project lifespan, ensuring that future EbA interventions in Tajikistan are monitored adequately.

## J. Sustainability of the project

Project components have been designed to ensure the sustainability and replicability of project benefits in the long term. Specifically, project sustainability will be supported through: i) promoting the active participation of relevant regional[311], national and district level stakeholders in decision-making and implementation of project activities; ii) strengthening institutional and technical capacity at *raion* and *jamoat* levels to ensure that stakeholders have adequate knowledge and skills to maintain the benefits of the project EbA interventions; and iii) raising the awareness of the benefits of integrated catchment management practices, including EbA, CSA and SLM activities, at the village level.

Particular aspects of project sustainability per component are described below.

**Component 1** will develop the capacity for catchment management informed by climate risks. Multi-hazard climate risk models (MHCRMs) developed for the KRB in Output 1.1 will inform future planning to develop climate resilience. Such models will then be readily replicable for other catchments across the country. The PES models developed in Output 1.5 will strengthen the sustainability of project interventions by ensuring sustainable financing for climate-resilient management and EbA.

Agro-ecological extensions centres supported and trained under **Component 2** will also contribute to project sustainability. This is because the impacts of the training will continue beyond the lifespan of the project, continuing to provide extension services to local communities. These

[311] such as representatives from international UCA campuses

communities will use these services to inform the implementation and maintenance of EbA interventions, thereby ensuring the sustainability of such interventions. Moreover, EbA interventions are inherently more sustainable than traditional infrastructure, as ecological infrastructure is multi-purpose and flexible. Generally, EbA interventions require less maintenance than non-EbA alternatives and such maintenance can usually be conducted by unskilled labourers. As a result, the proposed interventions will be more likely to be maintained than non-EbA alternatives.

By supporting the knowledge management centre(s) under **Component 3**, it is ensured that's climate information, as well as lessons learned, are accessible for decision-makers and local communities. The impact evaluation framework [under Output 3.2] will enable adaptive management on project interventions and will also allow for accurate attribution of EbA benefits. This will help to demonstrate the cost-effectiveness of EbA, thereby promoting its use to develop climate resilience in communities across Tajikistan.

## K. Environmental and social impacts and risks

The proposed project activities were evaluated against the Adaptation Fund (AF) Environmental and Social (E&S) Principles to identify potential negative impacts. Results of the preliminary assessment of the project according to the UNDP Social Environmental Screening Policy (SESP) and the AF E&S Principles are listed below.

- Risk assessment: Tentative Low.
- Categorisation: Tentative C (no expected adverse social or environmental impacts).
- Result: Requirement for a thorough social and environmental screening process during the project formulation phase.

The proposed project is not expected to cause any significant environmental or social impacts. An overview of the preliminary analysis of potential environmental and social impacts is provided in the following table.

Despite the positive impacts that will enhance the project results, some environmental and social principles of the AF could be triggered by project activities in terms of the E&S impacts and risks. An evaluation of the project against each of the AF E&S principles is detailed in Table 13. A full SESP

The mitigation measures that will be put in place for each identified risk is detailed in Part III: C on environmental and social risk management for project activities.

**Table 13.** Checklist for environmental and social principles for the proposed project.

| Principle | If further assessment required for compliance, outline potential impacts and risks | No further assessment required for compliance |
|---|---|---|
| *Compliance with the Law* | *No further assessment required* | Project activities will be undertaken in compliance with the domestic laws of Tajikistan and with all relevant international laws. |
| *Access and Equity* | Project activities could restrict availability and/or quality of, and access to, resources or basic services – in particular, to marginalised individuals or groups. | Project activities will be designed to provide fair and equitable access to benefits in a manner that is inclusive. Activities will not exacerbate existing inequities, particularly with respect to marginalised or vulnerable groups. |
| *Marginalized and Vulnerable Groups* | Marginalised groups could potentially be excluded from fully participating in decisions that may affect them. | Project activities have taken into account marginalised and vulnerable groups – including children, women and girls, the elderly, indigenous people, displaced people, people living with disabilities, and people living with HIV/AIDS. |
| *Human Rights* | *No further assessment required* | Project activities will respect and, where applicable, promote international human rights. |
| *Gender Equity and Women's Empowerment* | Women may not be adequately represented with regards to decision-making or participation in the design/implementation of the project's activities. As a result, they may have limited access to resources, opportunities and benefits. | Project activities will be designed and implemented so that all genders are: i) able to participate fully and equitably; ii) receive comparable social and economic benefits; and iii) do not suffer disproportionate adverse effects as per UNDP Gender Mainstreaming Strategy. A gender analysis will be carried out during the Full Proposal development phase to ensure this. |
| *Core Labour Rights* | *No further assessment required* | Project activities will observe the core labour standards of Tajikistan as well as those identified by the International Labour Organisation. |
| *Indigenous Peoples* | *No further assessment required* | Project activities will be designed in accordance with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable national and international instruments relating to indigenous people. |
| *Involuntary Resettlement* | *No further assessment required* | Project activities will not cause any involuntary resettlement of communities. |
| *Protection of Natural Habitats* | *No further assessment required* | Project activities will not involve any conversion or degradation of critical natural habitats, including those that are: i) legally protected; ii) officially proposed for protection; iii) recognised by authoritative sources for high conservation value, including as critical habitats; or iv) recognised as protected by traditional or indigenous local communities. |
| *Conservation of Biological Diversity* | There is a risk that alien and/or invasive alien species are used in reforestation activities. | Project activities will be designed and implemented in a way that avoids any significant or unjustified reduction or loss of biological diversity or the introduction of known invasive species. |

| | | |
|---|---|---|
| *Climate Change* | *No further assessment required* | Project activities will not result in any significant or unjustified increase in GHG emissions or other drivers of climate change. |
| *Pollution Prevention and Resource Efficiency* | The application of pesticides may have a negative effect on the environment or on human health. | Project activities will be designed and implemented in a way that meets applicable international standards for maximising energy efficiency and minimising material resource use, the production of wastes, and the release of pollutants.<br><br>Project interventions are not expected to produce any significant amounts of waste or other pollutants.<br><br>Any potential opportunities identified for improved resource efficiency and pollution reduction during the project development phase will be captured in the project design. |
| *Public Health* | Small-scale construction activities under the proposed project may pose safety risks to community members implementing them. | No negative impacts on population health and well-being have been identified during project design. During Full Proposal development and project implementation, care will be taken to prevent any such risks. |
| *Physical and Cultural Heritage* | During project implementation, there is a risk that physical or cultural heritage sites are disturbed. | Project activities will be designed and implemented in a way that avoids the alteration, damage or removal of any physical cultural resources, cultural sites, and sites with unique natural values recognized as such at the community, national or international level. |
| *Lands and Soil Conservation* | *No further assessment required* | Project activities will be designed and implemented in a way that promotes soil conservation and avoids degradation or conversion of productive lands or land that provides valuable ecosystem services. |

# PART III: IMPLEMENTATION ARRANGEMENTS

## A. Implementation arrangements

### Implementing entity

The Committee for Environmental Protection (CEP) under the Government of the Republic of Tajikistan is the government institution responsible for the implementation of the project and will act as the Executing Agency (EA). The Ministry of Agriculture, Ministry of Energy and Water Resources, Agency for Land Reclamation and Irrigation along with other relevant national entities will act as project partners and will become part of Project Steering Committee.

The Committee for Environmental Protection will be responsible for executing this five-year project with the support of the UNDP under UNDP's National Implementation Modality (NIM). At the request of the Government of Tajikistan, UNDP is the Multilateral Implementing Entity (MIE). The project is nationally implemented (NIM), in line with the Standard Basic Assistance Agreement (SBAA, 1993) and the UN Development Assistance Framework (UNDAF) 2016-2020 between the UN and the Government of Tajikistan, as well as Country Programme Document 2016-2020 between UNDP and the Government of Tajikistan.

As a Multilateral Implementing Entity, UNDP is responsible for providing a number of key general management and specialized technical support services. These services are provided through UNDP's global network of country, regional and headquarters offices and units and include assistance in: project formulation and appraisal; determination of execution modality and local capacity assessment; briefing and de-briefing of staff and consultants; general oversight and monitoring, including participation in reviews; receipt, allocation and reporting to the donor of financial resources; thematic and technical backstopping; provision of systems, IT infrastructure, branding, and knowledge transfer; research and development; participation in policy negotiations; policy advisory services; programme identification and development; identifying, accessing, combining and sequencing financing; troubleshooting; identification and consolidation of learning; and training and capacity building.

As outlined in UNDP's application to the Adaptation Fund Board for accreditation as a Multilateral Implementing Entity, UNDP employs a number of execution modalities determined on country demand, the specificities of an intervention, and a country context. Under the national execution modality proposed, UNDP selects a government entity as the Executing Entity based on relevant capacity assessments performed by UNDP. Please note that UNDP uses slightly different terminology to that used by the operational policies and guidelines of the Adaptation Fund. In UNDP terminology, the "executing entity" is referred to as the "Implementing Partner" in countries which have adopted harmonized operational modalities and the "Executing Entity" in countries which have not yet done so. The Executing Entity is the institutional entity entrusted with and fully accountable to UNDP for successfully managing and delivering project outputs. It is responsible to UNDP for activities including: the preparation and implementation of work plans and annual audit plans; preparation and operation of budgets and budget revisions; disbursement and administration of funds; recruitment of national and international consultants and personnel; financial and progress reporting; and monitoring and evaluation. As stated above, however, UNDP retains ultimate accountability for the effective implementation of the project.

The CEP will assume responsibility for the implementation, and the timely and verifiable attainment of project objectives and outcomes. It will provide support to the management unit, and inputs for, the implementation of all activities. The CEP will nominate a high-level official who will serve as the National Project Director (NPD) for project implementation. The NPD will chair the Project Steering Committee and be responsible for providing government oversight and guidance to the implementation. The NPD will not be paid from project funds but will represent a Government in kind contribution.

UNDP has the technical and administrative capacity to support the Committee for Environmental Protection and assume the responsibility for mobilising and effectively applying the required inputs to reach the expected outputs.

The financial arrangements and procedures for the project are governed by the UNDP rules and regulations for National Implementation Modality (NIM). All procurement and financial transactions will be governed by applicable UNDP regulations under NIM.

**UNDP Direct Project Services** as requested by Government: The UNDP, as the Multilateral Implementing Entity for this project, will provide project management cycle services for the project as defined by the Adaptation Fund Board. In addition, the Government of Tajikistan may request UNDP direct services for specific projects, according to its policies and convenience. If requested the services would follow the UNDP policies on the recovery of direct costs. These services (and their costs) are specified in the Letter of Agreement (Annex 8). As is determined by the AF Board requirements, these service costs will be assigned as Project Management Cost, duly identified in the project budget as Direct Project Costs.

## *Comparative advantage*

UNDP's comparative advantage in supporting the implementation of development programmes in Tajikistan is its presence both at the policy and operational levels. This set-up enables UNDP to obtain and use the evidence from the ground to influence policy formulation and discussions. Because of the specific nature of most development projects requiring physical presence on the ground, additional comparative advantages of UNDP include, but are not limited to, its: i) physical presence on the ground; and ii) continuous partnerships maintained with the development actors, local authorities and beneficiary communities. Because of this on-the-ground presence and experience with work in different sectors and communities – including the water sector – UNDP is in a prime position to be the IE for the proposed project.

**Presence on the ground**

UNDP has five Area Offices (Figure 15) located in:

- Gharm in the north-east of Rasht Valley;
- Khujand and Ayni in the north of Soughd Region; and
- Kulyab to the south-east and Shaartuz to the south-west of Khatlon Region.

Kulyab and Shaartuz Area Offices cover all districts of Khatlon Region, including the eight districts bordering Afghanistan, namely Qumsangir, Kabodiyon, Jilikul, Shaartuz, Pyanj, Farkhor, Hamadoni and Shurobod. Figure 15 illustrates the regions covered by each Area Office.

Through these offices, UNDP has implemented over 100 community development, poverty alleviation, disaster risk reduction, energy and environment, conflict management and other development programmes and projects totalling US$52 million. These programmes and projects have benefited over 3,000,000 people living in 46 rural districts, which is ~1,228 rural Tajik communities.

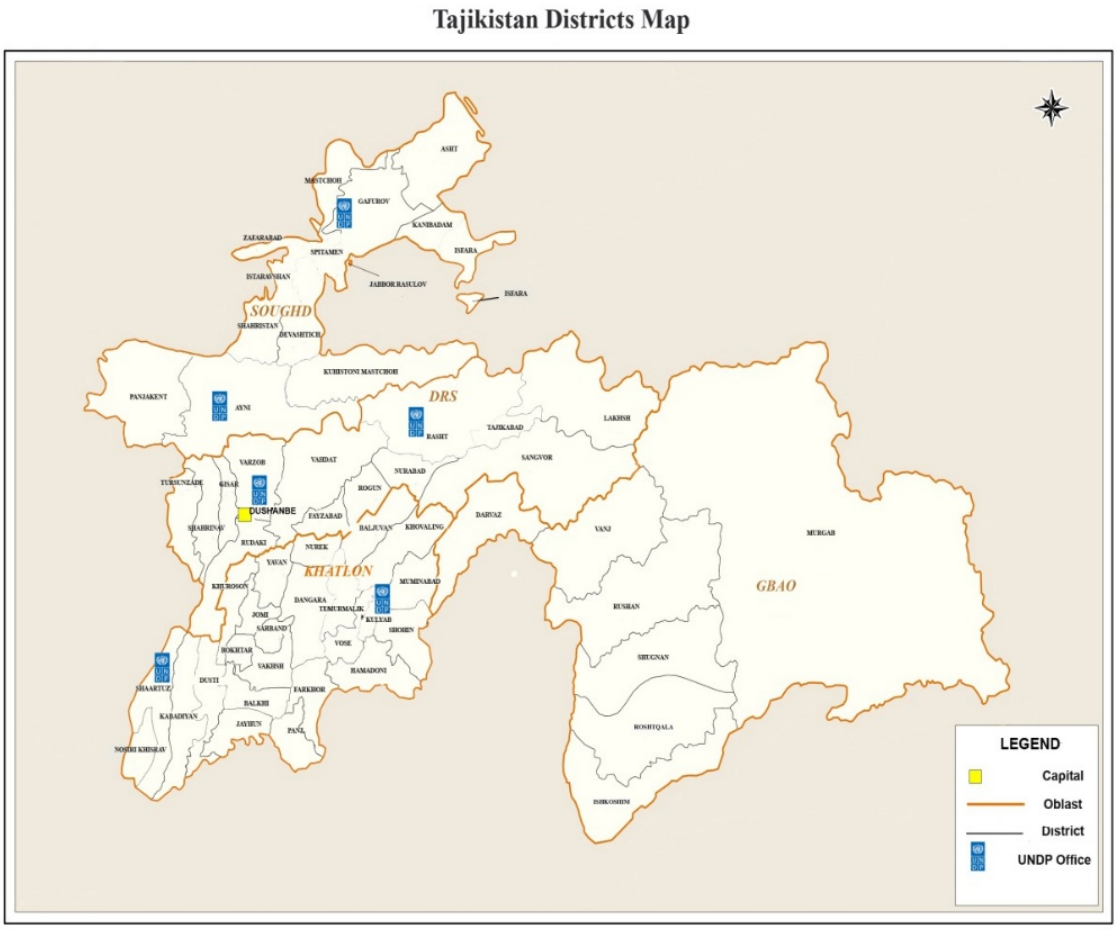



**Figure 15.** Map of Tajikistan indicating the six UNDP Area Offices.

**Experience in the water sector**

UNDP and the GoT have effectively collaborated in the past and because of this, GoT has considerable trust in UNDP's capability. This enables UNDP to facilitate the formation and convening of high-level policy dialogue. As a UN coordinating agency, UNDP is also able to ensure synergies and has access to resources from other UN system agencies, including FAO, UNECE and UN-Water.

UNDP's leadership in and support for the water sector over recent years has grown, presently focusing on policy and governance with pilot interventions in the Ferghana Valley[312]. UNDP's support to the Water Sector Reforms Programme of the Republic of Tajikistan for 2016–2025 (Water Reform Programme)[313] is evident through the implementation of several projects:

- EU-funded project titled, 'Promoting integrated water resources management and fostering transboundary dialogue in Central Asia';
- UNDP-funded project titled, 'Enabling activities to promote the national consultations on post-Rio agenda and demonstrate IWRM approaches in Tajikistan';
- UNDP/Bureau for Crisis Prevention and Recovery (BCPR) project titled, 'Strengthening conflict management capacities (including transparent resource allocation and sound water management principles) for dialogue in conflict-prone areas of Tajikistan';

[312] particularly with the Isfara Transboundary River Basin
[313] Water Reform Programme 2015.

- Eurasian Development Bank (EDB) project titled, 'Feasibility study to construct and operate small hydro-power stations on irrigation facilities in Tajikistan', Phases I and II;
- Swiss Development Cooperation (SDC) funded project titled, 'Tajikistan Water Supply and Sanitation'; and
- Swedish International Development Cooperation Agency (SIDA) project funded through the Stockholm International Water Institute (SIWI) titled, 'Applying human rights-based approach to water governance in Tajikistan'.

The above projects were included under the umbrella of Integrated Water Resources Management (IWRM) which is a central principle of the GoT-adopted Water Reform Programme. In doing so, UNDP adopted a strategic approach of linking policy work at the national level with practice in the field, ensuring top-down and bottom-up feedback informing both policy-makers and practitioners on effective mechanisms for reform implementation. The UNDP IWRM programming is principally aimed at developing and implementing national IWRM and water efficiency strategies at national and basin level. Because of this, the intervention strategy is supported by both IWRM governance and institutional reform, as well as concrete projects implemented to improve: i) irrigated agriculture; ii) rural water supply and sanitation; and iii) small-scale hydropower service delivery. At the regional level, UNDP contributes to transboundary trust building and conflict prevention through strengthening water cooperation mechanisms in the Fergana Valley.

UNDP has been involved in most policy initiatives for the water sector. Involvement at the national level was aimed towards developing an enabling environment for coordination and establishing a unified approach to policy development. This involvement has resulted in a harmonised reform process towards developing improved water cooperation and conflict mitigation at a regional level. A list of UNDP's actions, roles and responsibilities under the umbrella of IWRM programming is included below.

- UNDP played an active role in elaborating policy proposals for water sector reform, specifically providing designs to principal resolution and introducing IWRM principles into the Water Code[314].
- The development of an analytical review, titled 'Current conditions and perspectives on integrated water resources management in the RT', provided reflections on existing challenges and recommendations in the water resource management field. This review described the legal, institutional, technical and financial (economic) aspects of IWRM as well as detailed perspectives for the country's transition to basin management approach.
- UNDP supported GoT institutions in improving the legal and institutional framework for the country, developing by-laws and implementation mechanisms for the Water Code[315] and the Law on Drinking Water[316].
- UNDP was responsible for facilitating the establishment and support of the Inter-Ministerial Coordination Council (IMCC) on drinking water supply[317]. The IMCC was primarily formed to assist in design and implementation of the state policy on development of the drinking water and water supply sector.
- Because of UNDPs support to the IMCC, significant progress was made on policy proposals and implementation mechanisms for the drinking water and supply sector. The following issues were focused on through UNDPs support:

[314] Water Code 2001.
[315] Ibid.
[316] Law of the Republic of Tajikistan on Drinking Water and Water Supply (Law on Drinking Water). 2010. Government of Tajikistan, Dushanbe.
[317] Swiss Agency for Development and Cooperation (SDC). 2012. The Fourth Meeting of the Inter-Ministerial Coordination Council on drinking water supply discussed realization of human right to water and sanitation in Tajikistan (IMCC). SDC, UNDP and Oxfam.

- practising ownership and operational management rights;
- modelling institutional structures at the district and sub-district levels;
- simplifying procedures for obtaining permits for project implementation;
- modelling effective tariff scheme and scheme implementation; and
- improving governance, transparency, accountability and consumer participation in water systems management.

- UNDP's contribution to transboundary water cooperation has been significant over recent years. Specifically, UNDP assisted with improving water management in the transboundary basin of Syr Darya in the Fergana Valley[318]. This programme benefited border communities of Tajikistan and Kyrgyzstan. UNDP conducted a review, titled 'Consolidated review of water resources management in transboundary Isfara River Basin', for both countries to identify main barriers to water distribution. The review identified the challenges for overcoming the barriers to water distribution between border communities. In addition, the review included recommendations for efficient water management, conflict management and the development of proposals for further interventions to improve transboundary water cooperation between the two countries.
- UNDP has also undertaken a series of ground-level interventions to implement specific elements of the IWRM approach. The range of these interventions are listed below.
  - Rehabilitation of hydrological posts in Matpari, Tangi, Vorukh and Rabot to ensure more accurate and transparent record of hydrological events. The rehabilitation process also included monitoring water resource flows in the Isfara River Basin. Results of this monitoring had an effect on fair regional water distribution between Kyrgyzstan and Tajikistan at both upstream and midstream levels, and between Tajikistan and Uzbekistan at the downstream level.
  - Rehabilitation of water supply facilities project, titled 'Inter-state irrigation canal 'Druzhba' and drinking water supply system in cross-border Chorku Jamoat'. The rehabilitation was accompanied by the application of good governance and sound water management principles. These principles highlighted the importance of transparency for water distribution as a main criterion for sustainability.
  - Providing support for water management through a project titled 'Support to inter-stream water cooperation in Isfara River Basin'. The outcomes of this project ensured sound water management and distribution at the basin level among farming communities at upstream, midstream and downstream levels. This resulted in the reducing the risk of conflicts over resource distribution. Reducing water demand through a demand-driven approach at all stream levels by providing improved maintenance of irrigation canals and management support based on transparency and participation have been central in achieving this result. This is being implemented by providing significant support to previously established Water Users Associations and their federation in Isfara River Basin.

**Project Steering Committee (PSC**) will be convened by CEP and will serve as the project's coordination and decision-making body. The PSC meetings will be chaired by the NPD. It will meet according to necessity, but not less than once in 6 months, to review progress, approve work plans and approve major deliverables. The PSC is responsible for ensuring that the project remains on course to deliver products of the required quality to meet the outcomes defined. The PSC's role will include: (i) overseeing project implementation; (ii) approving all work plans and budgets, at the proposal of the Project Manager (PM), for submission to Istanbul Regional Hub; (iii) approving any major changes in plans or programmes; (iv) providing technical input and

[318] Soughd Region, Isfara River Basin

advice; (v) arbitrating any conflicts within the project and/or negotiating solutions between the project and any other stakeholders and (vi) overall evaluation.

**Project Assurance:** UNDP Tajikistan will support project implementation by assisting in monitoring project budgets and expenditures, recruiting and contracting project personnel and consultant services, subcontracting and procuring equipment. UNDP Tajikistan will also monitor the project implementation and achievement of the project outcomes/outputs and ensure the efficient use of donor funds through an assigned UNDP Team Leader. UNDP will act as the Senior Supplier and Project Assurance.

**National Project Director** (NPD): The NPD will be a member of CEP, assigned to the project for its period of duration. The NPD's prime responsibility is to ensure that the project produces the results specified in the project document to the required standard of quality and within the specified constraints of time and cost.

**Mechanisms for local participation:** the project will use the existing locally established mechanisms for local consultation and participation.

An organogram of the project organisation structure is illustrated in Figure 16.

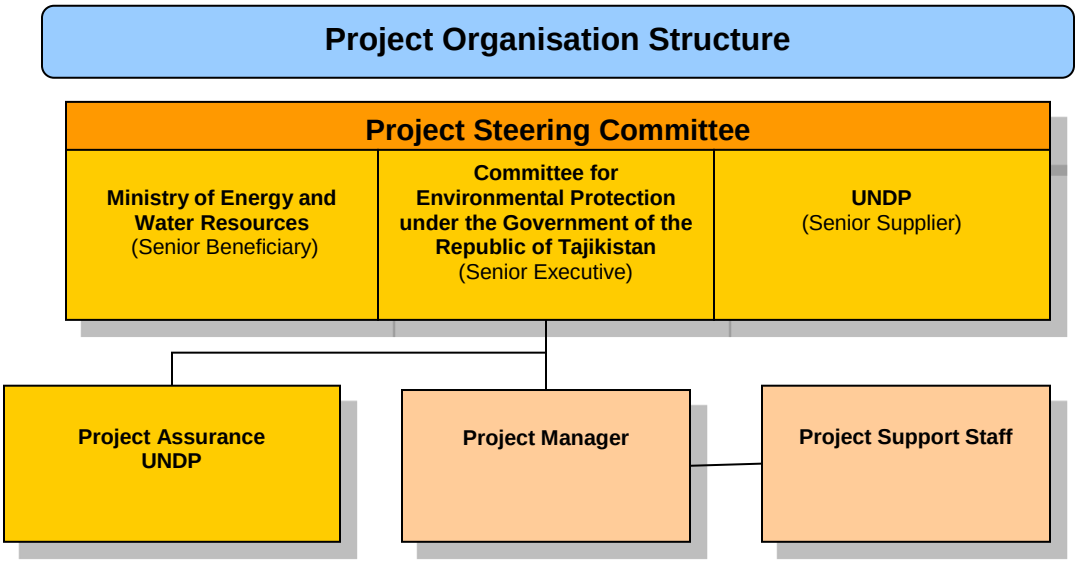



**Figure 16.** Organogram of project organisation structure.

A specially formed **Project Steering Committee** (PSC) will be responsible for the implementation of the project. The PSC will include representative of UNDP in Tajikistan, as well as representatives from relevant stakeholders including CEP and MEWR. In addition, the PSC will be responsible for ensuring the effective coordination of this project with other relevant initiatives in Tajikistan.

In addition, consultative committees will be formed, consisting of representatives from local government in the project areas, community representatives, and individuals with technical expertise. The consultative committees will provide technical guidance and feedback to the PSC.

The day-to-day administration will be carried out by a Project Manager (PM), Project Analyst (PA), Admin. Finance Assistant (AFA), and Project Assistant (PA), who will be located at UNDP premises. As per Government requests, the staff will be recruited using standard UNDP recruitment procedures. The PM will, with the support of the AFA and PA, manage the implementation of all activities, including: preparation/updates of work and budget plans, record keeping, accounting and reporting; drafting of terms of reference, technical specifications and other documents as necessary; identification, proposal of consultants, coordination and supervision of consultants and suppliers; organization of duty travel, seminars, public outreach activities and other events; and maintaining working contacts with partners at the central and local levels. The Project Manager will liaise and work closely with all partner institutions to link the project with complementary national programmes and initiatives.

The PM is accountable to UNDP for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. The PM will produce Annual Work and Procurement Plans (AWP&PP) The PM will further produce quarterly operational reports and Project Performance Reports (PPR). These reports will summarize the progress made versus the expected results, explain any significant variances, detail the necessary adjustments and be the main reporting mechanism for monitoring activities. The PM will be technically supported by contracted national and international service providers, based on need as determined by the PM and approved by the PSC, as needed. Recruitment of specialist services will be done by the PM, in accordance with UNDP's rules and regulations.

## B. Financial risk management

Financial and project management has been conducted according to UNDP's Programme and Operations Policies and Procedures to ensure that financial and project risks are mitigated against. Detailed financial and project risks as well as the associated mitigation strategies identified have been outlined in Table 14.

**Table 14.** Financial and project risk management measures for the proposed project, including risk ratings.

| Risk no. | Identified risk | Risk rating | Mitigation measure |
|---|---|---|---|
| 1. | Disagreement amongst stakeholders regarding demonstration of site selection. | Low | • Intervention sites will be selected using an agreed upon list of criteria and the developed shortlist of EbA interventions to ensure the selection is transparent and equitable.<br>• There will be a participatory approach to project activities, particularly with intervention site selection. |
| 2. | High turnover of staff members in executing and implementing agencies may negatively impact on project deliverables. | Low–medium | • Proposed project will build partnerships between government and non-government agencies to ensure continuity. |
| 3. | Loss of government support may result in lack of prioritisation of proposed project activities. | Low | • Regular stakeholder consultation and involvement will be undertaken to ensure that government maintains its commitment and considers the project as a support mechanism to its existing climate change adaptation programmes. |
| 4. | Institutional capacities and relationships are not sufficient to provide effective solutions to climate problems that are complex and multi-sectoral. | Medium | • The project design has a focus on building institutional capacity. This will ultimately lead to the development of an appropriate institutional framework for analysing climate change impacts on the management of *inter alia* water, land use, natural resources and pastures. |

| | | | |
|---|---|---|---|
| 5. | Capacity constraints of local institutions may limit the ability to undertake the interventions implementation. | Medium | • Human resource capacity will be developed in all targeted regions and villages.<br>• Collaboration and exchange between local institutions and regional/international research institutes will be initiated.<br>• An Integrated Catchment Management Specialist will work closely with the Programme Manager to ensure timely delivery of project outputs. |
| 6. | Priority interventions implemented are not found to be cost-effective. | Low | • Cost-effectiveness is a core principle in the implementation of adaptation measures. Detailed information will be recorded regarding cost-effectiveness. This will be disseminated through the knowledge centres supported by the project and will be of use to future adaptation initiatives for the Kofirnighan River Basin and Tajikistan as a whole.<br>• Interventions to be selected for the EbA shortlist will be chosen based on their previous success and results in the country. |
| 7. | Lack of commitment/buy-in from local communities may result in failure of intervention sites. | Medium | • A stakeholder engagement plan will be developed during the inception phase.<br>• Community stakeholders will continue to be consulted with throughout the project inception and implementation phase. |
| 8. | Current and predicted climate variability and/or extreme climate events result in poor results for EbA interventions. | Medium | • Current and predicted climatic variability has been taken into account in project design. Throughout the inception and implementation phase, any changes in the climate will be considered in planning for the implementation of EbA activities.<br>• Drought- and flood-resilient species will be used, as well as indigenous species wherever possible.<br>• Techniques to assist plant growth particularly in the seedling/sapling phases and to reduce risk of damage from extreme climate events will be used.<br>• Species will be planted in appropriate seasons to reduce risk of hazard impact.<br>• Ensuring diversity in selected seeds and crops will reduce this risk. |
| 9. | Trees and other species planted by the project are cut down by the communities for fuelwood. | Medium | • Community involvement and awareness raising will be undertaken to avoid this risk.<br>• Species chosen for planting will be beneficial as fruiting trees rather than as fuelwood. |

## **C.** Environmental and social risk management

As outlined in Part II: K on the environmental and social principles included in project design, the proposed project activities are unlikely to result in significant negative social and environmental impacts. Most impacts are likely to occur during the construction phase of EbA interventions. These impacts are likely to be minor and without long-term adverse effects.

Despite the positive impacts that project activities will bring into effect for communities and ecosystems within the KRB, some environmental and social risks could be triggered according to the AF E&S and the UNDP SESP. An evaluation of the project against each of the AF principles was conducted in preparation of the SESP Report and is illustrated in Table 13 under Part II: K[319].

The SESP Report will serve to guide all aspects of project implementation. It will be the responsibility of the PSC to ensure that the appropriate risk mitigation measures are implemented during project implementation. Based on the results of the SESP, risk mitigation strategies for the relevant AF E&S Principles have been developed. These are detailed below. For details on the grievance mechanism outlined for the project, refer to Annex 5.

[319] Part II: K includes a checklist for environmental and social principles for project design.

**Principle 1. Compliance with the Law.**
During the development of the Full Proposal, all relevant stakeholders were consulted to ensure that the all legal requirements were met. The project is therefore well-aligned and complies with national and sub-national policies, laws, plans and priorities for sustainable development and climate change adaptation in the KRB. See Part II: D and E for a full description of this alignment and compliance.

**Principle 2. Access and Equity.**
To ensure full implementation and adherence to this principle, project activities are designed to provide equal and accessible benefits to communities in the most vulnerable areas of the KRB. The identification of vulnerable districts was done through a fair and transparent process using the ongoing studies and assessments being conducted across the country as well as in the KRB.

During the implementation of EbA interventions under Component 2, local government authorities at each selected site will ensure that all project activities will not reduce or prevent communities from accessing basic rights. These rights include health services, clean water and sanitation, energy, education, housing, safe and decent working conditions and land rights. All community institutions and individuals will be sensitised towards the approach of prioritising support to most vulnerable communities while ensuring benefits reach further communities. This will mitigate any inter-community conflicts that might arise as a result of focusing on the most vulnerable villages.

**Principle 3. Marginalised and Vulnerable Groups**.
To avoid social exclusion of marginalised communities, orientation/sensitisation will be conducted at both the *jamoat* and village level to ensure equal participation within project activities. Additional social impacts that may be realised will therefore not unjustly impact on marginalised and vulnerable groups.

However, a small risk remains that vulnerable and marginalised groups will have insufficient access to project activities, particularly the climate-smart agricultural techniques and EbA interventions under Component 2.

**Principle 4. Human Rights.**
Project preparation and implementation phases will follow a human-rights based approach. No activities are included in project design that are not in line with established international human rights. Moreover, the project will promote the basic human rights of access to food, water and information.

The project seeks to ensure that benefits of all activities are shared broadly in a non-discriminatory, equitable manner through participatory processes and transparent selection criteria. Extensive stakeholder consultations were held during project preparation[320]. These consultations will continue throughout project implementation. Potential project-related concerns and/or grievances of local communities will be addressed through a grievance mechanism[321].

**Principle 5. Gender Equality and Women's Empowerment.**
The project recognises the importance of gender equality, particularly equal rights, responsibilities, opportunities and access of women and youth in the climate change adaptation. Project activities include 50% proportionate gender consideration in all project interventions, with

[320] See Annex 1 for a consolidated mission and stakeholder consultation report.
[321] See Annex 5 which details the grievance mechanism outlined for the project.

a specific focus on on-the-ground activities under Component 2. Therefore, the project is designed to promote gender equity.

Gender equality and women empowerment civil society organisations will be involved to support the project. This will ensure adherence of all project activities to the gender equality and women empowerment. Despite the inclusion of gender considerations in the design of the project, there remains the low risk that project interventions will not benefit men and women equally.

**Principle 6. Core Labour Rights.**
The Government of Tajikistan (GoT) has ratified the eight core International Labour Organisation (ILO) Conventions. National and regional stakeholders were involved during the design stage of the project to ensure core labour rights have been respected and considered during the design stage. Compliance with all labour rights will be ensured in all project activities through the involvement of labour officers in target villages.

Component 2 will involve labour for the implementation of EbA interventions, where community members will provide the labour. All of the labour involved will be on daily wages where the wages will be determined according to tasks. Wage rate will be calculated on the basis of prevailing minimum wage rate for the assigned task. The record of work done for labour engaged will have to be maintained and the wages paid accordingly. Hours of work and the timing of the hours will be determined in consultation with the labour provided and the prevailing practices in the area.

Positive discrimination in favour of women may be used to provide fair and equal opportunity to women to seek employment as labour. All forms of negative discrimination in respect of employment and occupation will be eliminated. The project will not engage in child labour in any of its activities or interventions. All forms of forced or compulsory labour will be eliminated.

Under Component 2, local community members may be exposed to the risk of accidents while implementing EbA interventions. In addition, there is a low risk of child labour outside the limits of the law.

**Principle 7. Indigenous Peoples.**
There is the risk of inequitable access of indigenous peoples to the project's resources. Project activities have been designed in accordance with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples. In addition, activities are aligned with all other applicable national and international instruments relating to indigenous people in Tajikistan.

**Principle 8. Involuntary Resettlement.**
The project design does not include voluntary or involuntary resettlement.

**Principle 9. Protection of Natural Habitats.**
By implementing EbA activities, the project promotes the improved management of natural landscapes. The project is therefore likely to result in the improved protection of natural habitats rather than having any negative effect. Moreover, the project will consult and involve responsible officers and community representatives at district and village level to ensure this principle is adhered.

Despite this focus on improving ecosystem goods and services, there is a low risk that the construction of EbA interventions could result in the destruction of small areas of natural habitat.

**Principle 10. Conservation of Biological Diversity.**

By implementing EbA activities, the project promotes the improved management of natural habitats. Therefore, the project is likely to result in the improved protection of natural habitats and biodiversity.

Despite this focus on improving ecosystem goods and services, there is a low risk that the construction of EbA interventions could result in negative impacts on biodiversity.

**Principle 11. Climate Change.**
The project will contribute to climate change adaptation efforts in Tajikistan. Through Component 2, the project is designed to improve the delivery of climate information to all government-level decision-makers. Through this improved delivery of information and the enhanced governance coordination included under Component 1, the project addresses climate change adaptation planning.

The project is designed to: i) transfer technology to promote climate change adaptation to local communities to reduce their vulnerability to climate change; and ii) promote the development of innovative, community-based projects to increase resilience to climate change. Therefore, the project will enhance the local-level capacity of local communities to adapt to climate change. The project's climate change interventions focus on EbA activities and none of these interventions are likely to result in an increase in greenhouse gas emissions.

**Principle 12. Pollution prevention and Resource Efficiency.**
The project will not require (during or after implementation) significant amounts of water, energy, materials or other natural resources. It is also highly unlikely that project activities will result in the production of significant quantities of wastes, especially of hazardous or toxic wastes. The project will not produce significant volumes of effluents or air pollutants, including greenhouse gases. All applicable international standards will be met for maximising material resource use and minimising the production of wastes and the release of pollutants.

**Principle 13. Public Health.**
None of the project activities are envisioned to impact negatively on public health. Instead, the project will have positive impacts on health. In particular, through activities in Component 2, reduced nutrient runoff into KRB rivers and its tributaries will increase water quality and improve public health.

**Principle 14. Physical and Cultural Heritage.**
The EbA interventions to be implemented by the project are relatively small-scale and unlikely to result in the alteration, damage or removal of any physical or cultural heritage.

**Principle 15. Lands and Soil Conservation.**
The project will promote the conservation of soil and land resources. Specifically, through the implementation of EbA activities in Component 2 – including agroforestry – soil stability will be increased, the runoff of nutrients from topsoil will be reduced, and the fertility of soil at target sites will be increased.

**Table 15.** Potential impacts, risks and mitigation measures for environmental and social risk management for the project.

| Checklist of Environmental and Social Principles | Potential impacts and risks | Mitigation measures |
|---|---|---|
| *Compliance with the Law* | N/A | Project activities will be undertaken in full compliance with the domestic laws of Tajikistan, as well as with all relevant international laws. |
| *Access and Equity* | Project activities could restrict availability and/or quality of, and access to, resources or basic services. Particularly for marginalised individuals or groups. | To address the potential limitations regarding gaining access to pasture lands and forests, activities under the project will promote alternative business solutions and community enterprise developments that will help communities to generate alternative incomes. The project will also address the need to reduce extensive livestock grazing through: i) enhanced fodder production techniques (within exclusion zones, rotational grazing, on-site production and demonstration plots); ii) productive on-site animal husbandry; and iii) the establishment of watering sites at mid-stream levels of watershed areas (saving livestock energy in search of water sources in the upstream).<br><br>There will be widespread engagement with relevant stakeholders at regional, sub-regional and community levels to agree on rotational routes for the transit of larger herds. Such engagement will also facilitate monitoring of grazing control measures applied locally by large herd owners from other communities, districts and/or regions. *Jamoat*-level monitoring and control mechanisms will be introduced to enforce agreed-upon measures for the mitigation of land degradation and to improve vegetation growth in target pasture lands, as well as to ensure that target communities effectively benefit from project interventions.<br><br>Energy-efficient stoves will also be introduced into target communities to compensate for the limited access to forest resources for energy. Best practices and lessons learned from similar past projects in Tajikistan will be adapted and applied to the Kofirnighan River Basin (KRB) context.<br><br>The project will also support the implementation of long-term financing of an integrated catchment management strategy through Payment for Ecosystem Services (PES) models that will be developed for each target district. These models will further enable communities to access the finance required to undertake initiatives that strengthen and increase access to ecosystem services, as well as build climate resilience within each target district. The PES models will be designed based on a combination of regional, international and local best practices. PES model design will also be informed by the results of existing PES models used in Tajikistan. |
| *Marginalised and Vulnerable Groups* | Marginalised groups could potentially be excluded from fully participating in decisions that may affect them. | Marginalised groups in the KRB include those: i) living in areas exposed to increasing impacts of climate change; ii) food-insecure households; and iii) households with limited or no productive assets, livestock and/or agricultural land plots. Single female-headed households, and those with small children and/or elderly members may also be considered vulnerable. Such vulnerable groups have a limited ability to participate during critical stages of project design and implementation.<br><br>During project inception phase, a vulnerability assessment of target communities will be carried out in a participatory manner, through focused consultations. Where feasible, vulnerable and marginalised |

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| | | groups will be prioritised for adaptation interventions. The Stakeholder Engagement Plan will guide consultations during preparation phases, ensuring the broad representation of relevant community-based organisations and groups. These organisations and groups include farming associations and cooperatives, women's committees, intervention-related initiative groups, pasture development associations, water user associations (WUAs), forestry cooperatives and communal health promoters. Throughout the project, the extent of involvement of vulnerable and marginalised people within such groups and associations will be monitored and assessed.<br><br>Targeted actions that may be prioritised for vulnerable groups may include on-farm adaptation interventions, household plots, improved productivity measures and the selection of demonstration plots with support from farmer field schools (FFSs). Certain enterprise developments and income-generating activities (such as beekeeping, fodder production and livestock productivity support) may also be suitable for the given groups to ensure that benefits are distributed inclusively and in an equitable manner. |
| *Human Rights* | N/A | Project activities will adhere to and, where applicable, promote international human rights.<br><br>The project will directly benefit an estimated 50,000 individuals who are especially vulnerable to the impacts of climate change, through the design and implementation of on-the-ground EbA interventions for more efficient natural resources management. These measures will also provide social and economic benefits to the target population in terms of livelihoods, health and wellbeing. In particular, the project's interventions will: i) increase profit margins and income from farming activities; ii) reduce crop losses as a result of slope instability, drought and dry spells, ineffective agricultural practices and overgrazing of livestock; iii) reduce agricultural inputs and water consumption; iv) reduce the risk of economic failure by diversifying on- and off-farm production; v) reduce the susceptibility of crops to pests; vi) increase food security; vii) increase availability of fuelwood and timber; and viii) increase pasture productivity and fodder production. In addition, project interventions will increase non-material benefits such as ecosystem services, tourism, recreation and the conservation value of the natural Tajikistan landscape.<br><br>Throughout the implementation period, the project will seek to ensure that benefits are shared broadly, and in a non-discriminatory and equitable manner. The project will ensure that all relevant stakeholders participate in decision-making processes and consultations, and that such participatory processes are transparent. Necessary strategies, action plans, site selection criteria and lessons learned will be documented and shared regularly through community-driven consultation platforms facilitated by those implementing the project. |
| *Gender Equity and Women's Empowerment* | Women may not be adequately represented with regard to decision-making or participation in the design and implementation of the project activities. As a result, women may have limited access to resources, opportunities and benefits. | Tajikistan has a relatively large Gender Inequality Index rating of 0.36, with women's labour force participation representing ~59% of the female population, as opposed to men participation representing ~77% of the male population in the country. In rural Tajikistan, the relatively larger rates of labour migration among men typically leave women with large workloads, including formal employment to earn income, household and care responsibilities, and growing of food for household consumption. Project interventions will therefore ensure that women are actively included in stakeholder participation and take part in all decision-making processes. This will ensure that benefits are distributed equitably and fairly among men and women in target zones. In particular, project activities will be designed and implemented so that all genders are: i) able to participate fully and equitably; ii) receive comparable social and economic benefits; and iii) do not suffer disproportionate adverse effects as per the UNDP Gender Mainstreaming Strategy. |

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| | | A gender analysis will be undertaken in the initial phase of the project to develop recommendations on how project activities will promote women's equality and empowerment, including participation in decision-making processes, as outlined in the ESMF. It is anticipated that at least 50% of project beneficiaries will be women.<br><br>Appropriate measures will ensure that women receive an equitable share of benefits and that their status and interests are not marginalised. Participatory processes will include methodologies that enhance the participation of women and promote the inclusion of their views into the activities of the project.<br><br>Monitoring of project outputs will include disaggregated and measurable data related to gender equality and empowerment of women. Furthermore, measures and techniques that contribute to closing the inequality gap between men and women will be promoted, where possible. |
| *Core Labour Rights* | N/A | Project activities will adhere to the core labour standards of Tajikistan, as well as those identified by the International Labour Organisation. |
| *Indigenous Peoples* | N/A | Project activities will be designed in accordance with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples, as well as with all other applicable national and international instruments relating to indigenous people. |
| *Involuntary Resettlement* | N/A | Project activities will not lead to any involuntary resettlement of local communities. |
| *Protection of Natural Habitats* | N/A | Project activities will not involve any conversion or degradation of critical natural habitats, including those that are: i) legally protected; ii) officially proposed for protection; iii) recognised by authoritative sources to be of high conservation value; and iv) recognised as protected by traditional or indigenous local communities. |
| *Conservation of Biological Diversity* | There is a risk that alien and/or invasive alien species are used in reforestation activities. | The project's activities will promote the rehabilitation/restoration of abandoned and overexploited forests and degraded forest ecosystems, as well as reforestation of areas adversely affected by extreme climate events. The use of native and climate-resilient varieties will be promoted, but alien species may be introduced if necessary. Certain alien species may be used for complementary planting (climate-resilient crops seed varieties) in areas being reforested to increase biological biodiversity and enhance climate resilience. Prior to such introduction, relevant experts at the Committee for Environmental Protection (CEP) and among development partner agencies will be consulted on successful examples across the regions. National environmental norms, standards and procedures for the introduction of alien species will be followed in each case. |
| *Climate Change* | N/A | Project activities will not result in a significant increase in GHG emissions or any other drivers of climate change. In contrast, project interventions directly support the implementation of climate change adaptation and mitigation measures, including climate-smart agriculture and sustainable land management in agro-ecological landscapes. Such interventions include: i) the rehabilitation and restoration of degraded forest ecosystems; ii) vegetation growth support; iii) water retention measures; and iv) climate-resilient crop seed planting. All of these interventions prevent and mitigate water-related extreme climate events that have typically threatened the livelihoods and health of target communities. |
| *Pollution Prevention and Resource Efficiency* | The application of pesticides may have a negative effect on the environment or on human health. | Local communities will be supported to adopt improved farming techniques, including organic agriculture, and soil and water conservation. These techniques would reduce the use of fertilisers and harmful pesticides. Although biological pest control is preferred, pesticides may be needed for specific use. In this case, they will be properly managed and stored, following national and international standards, regulations and procedures. |

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| | | Project activities will be designed and implemented in a way that meets applicable international standards for maximising energy efficiency while minimising material resource use, waste production and the release of pollutants. Interventions included in project design are not expected to produce any significant amounts of waste or other pollutants. Any potential opportunities identified for improved resource efficiency and pollution reduction during the project development phase will be captured in the project design. |
| *Public Health* | Small-scale construction activities under the proposed project may pose safety risks to community members implementing them. | All construction activities will follow the relevant environmental impact assessment procedures and will ensure compliance with: i) national construction standards and norms; ii) sanitary norms and regulations; and iii) all relevant national laws and regulations related to forestry, water, environment, and health. Activities will also follow technical guidance and best practices regarding rainwater-harvesting systems, drip-irrigation techniques, and micro-reservoirs.<br><br>Other project activities may include the construction of gabions, terracing, bank enforcement and small dams. Best practices and lessons learned from other previous and ongoing projects in Tajikistan will be used to address community safety risks from such construction. |
| *Physical and Cultural Heritage* | During project implementation, there is a risk that physical or cultural heritage sites are disturbed. | Project activities will be designed and implemented in a way that avoids the alteration, damage or removal of any physical cultural resources and sites, as well as any sites recognised as having unique value at the community, national or international level. Regional experts will be consulted to ensure compliance with national heritage legislation and that project design adheres to best-practice guidelines. |
| *Lands and Soil Conservation* | N/A | Activities under the project will promote soil conservation, while avoiding the degradation and conversion of productive land or land that provides valuable ecosystem services. Specifically, through the implementation of EbA measures under Component 2, soil stability will be increased, runoff of nutrients from topsoil will be reduced and soil horizons at project sites with sheet and/or gulley erosion will be restored. |

## D. Monitoring and evaluation

Monitoring and evaluation (M&E) will be applied in accordance with the established UNDP procedures throughout the project lifetime and will be developed in detail in the Full Proposal. The executing entity, together with the UNDP Country Office, will ensure the timeliness and quality delivery of the project implementation.

**Audit:** The project will be audited according to UNDP Financial Regulations and Rules and applicable audit policies on NIM implemented projects.

**Project start**
A project Inception Workshop (IW) will be held within the first three months of the project start date with those stakeholders with assigned roles in the project management, namely representatives from the Adaptation Fund (AF), UNDP Country Office and other stakeholders where appropriate. The IW is crucial to building ownership for the project results and to plan the first-year annual work plan (AWP).

**Mid-term Review**
The project will undergo an independent Midterm Review (MTR) at the mid-point of implementation. The evaluation will focus on the effectiveness, efficiency and timeliness of the implementation of project activities. Furthermore, the MTR will highlight issues requiring decisions and actions and will present initial lessons learned about project design, implementation and management.

**Project closure**
An independent Final Evaluation will be undertaken three months prior to the final PSC meeting. The final evaluation will focus on the delivery of the project's results as initially planned and as corrected after the MTR.

## Monitoring procedure

UNDP Tajikistan and CEP will be responsible for monitoring and evaluation (M&E) of the proposed project and for project output monitoring in line with the M&E policies and procedures. The M&E system will be governed by the following outlined principles.

- **Accountability**: ability of UNDP to be answerable to donors and to the beneficiaries through availability of specific, timely and relevant data.
- **Evidence-base**: readily available information to support the development of more appropriate and improved programmes in future.
- **Learning**: use of simplified and frequent reporting to support reflection, learning and sharing of good practices and solutions.
- **Transparency**: sharing of information with all of UNDP's stakeholders, including strategies, plans, budgets and reports to promote openness.

The project management team will produce the following deliverables for M&E throughout project implementation.

- An Issue Log shall be activated in ATLAS and updated by the PM to facilitate tracking and resolution of potential problems or requests for change.

- Based on the initial risk analysis submitted (see Annex 4[322]), a risk log shall be activated in ATLAS and regularly updated by reviewing the external environment that may affect project implementation.
- Based on information recorded in ATLAS, a Project Progress Report (PPR) shall be submitted by the PM to the PSC, using the standard report format.
- A project lesson learned log shall be activated and regularly updated to ensure ongoing learning and adaptation within the organisation, and to facilitate the preparation of the lessons learned report at the end of the project.
- A Monitoring Schedule Plan shall be activated in ATLAS and updated to track key management actions and events.
- **Annual Review Report**. An Annual Review Report shall be prepared by the Project Manager and shared with the PSC. As a minimum requirement, the Annual Review Report shall consist of the Atlas standard format for the PR covering the whole year with updated information for each above element of the PR as well as a summary of results achieved against pre-defined annual targets at the output level.
- **Annual Project Review**. Based on the above report, an annual project review shall be conducted during the fourth quarter of the year or soon after, to assess the performance of the project and appraise the Annual Work Plan (AWP) for the following year. In the last year, this review will be a final assessment. This review is driven by the PSC and may involve other stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes.

Together with UNDP, the PSC will carry out two independent external evaluations as follows.

- **Mid-Term Evaluation (MTE)**. The MTE will be carried out in the 6th quarter of the programme implementation and will be independent and external. The evaluation will engage all programme stakeholders and will assess the extent to which progress is being made towards the outputs and their alignment with outcomes. The evaluation may propose mid-course corrective measures and may reassess the objectives and revise implementation strategy.
- **Terminal Review (TR)**. The TR will be conducted at the conclusion of the programme. UNDP will commission a full external evaluation assessing the accomplishment of objectives.

Table 16 and 17 outlined the monitoring and evaluation plan, respectively. These outlines include the purpose of each M&E activity and the respective complementary actions.

**Table 16.** Monitoring plan for the proposed project including frequency and expected action(s).

| Monitoring activity | Purpose | Frequency | Expected action(s) |
|---|---|---|---|
| **Track results progress** | Progress data against the results indicators in the RRF will be collected and analysed to assess the progress of the project in achieving the agreed outputs. | Quarterly, or in the frequency required for each indicator. | Slower than expected progress will be addressed by project management. |
| **Monitor and Manage Risk** | Identify specific risks that may threaten achievement of intended results. Identify and monitor risk management actions using a risk log. This includes monitoring measures and plans that may have been required as per UNDP's Social and Environmental Standards. Audits will be conducted in accordance with UNDP's audit policy to manage financial risk. | Quarterly | Risks are identified by project management and actions are taken to manage risk. The risk log is actively maintained to keep track of identified risks and actions taken. |

[322] Annex 4 includes the detailed Environmental and Social Management Framework (ESMF) for the project.

| Monitoring activity | Purpose | Frequency | Expected action(s) |
|---|---|---|---|
| **Learn** | Knowledge, good practices and lessons will be captured regularly, as well as actively sourced from other projects and partners and integrated back into the project. | At least annually | Relevant lessons are captured by the project team and used to inform management decisions. |
| **Annual Project Quality Assurance** | The quality of the project will be assessed against UNDP's quality standards to identify project strengths and weaknesses and to inform management decision making to improve the project. | Annually | Areas of strength and weakness will be reviewed by project management and used to inform decisions to improve project performance. |
| **Review and Make Course Corrections** | Internal review of data and evidence from all monitoring actions to inform decision making. | At least annually | Performance data, risks, lessons and quality will be discussed by the PSC and used to make course corrections. |
| **Project Report** | A progress report will be presented to the PSC and key stakeholders, consisting of progress data showing the results achieved against pre-defined annual targets at the output level, the annual project quality rating summary, an updated risk long with mitigation measures, and any evaluation or review reports prepared over the period. | Semi-annually, and at the end of the project (final report) | |
| **Project Review/ Project Steering Committee (PSC)** | The project's governance mechanism (i.e., the PSC) will hold regular project reviews to assess the performance of the project and review the Multi-Year Work Plan to ensure realistic budgeting over the life of the project. In the project's final year, the PSC shall hold an end-of project review to capture lessons learned and discuss opportunities for scaling up and to socialize project results and lessons learned with relevant audiences. | Semi-annually | Any quality concerns or slower than expected progress should be discussed by the PSC and management actions agreed to address the issues identified. |

**Table 17.** Evaluation plan for the proposed project including stakeholders and planned date of completion.

| Evaluation activity | Planned completion date | Stakeholders |
|---|---|---|
| Mid-term Review (MTR) | August 2022 | CEP; MEWR |
| Terminal Review (TR) | March 2023 | CEP; MEWR |

The respective costs for M&E are outlined in Table 18 according to the type of M&E activity.

**Table 18.** Monitoring and evaluation costs of the proposed project.

| Type of M&E activity | Responsible parties | Budget (147,160 US$) | Timeframe |
|---|---|---|---|
| Direct Project Monitoring and Quality Assurance including progress and financial reporting, project revisions, technical assistance and risk management | • Project Manager<br>• Project team<br>• UNDP<br>• External consultants – i.e. evaluation team | (supported from staff costs included in Project execution, and from MIE fee) | Quarterly, half-yearly and annually, as needed |
| Evaluations (Mid-term Evaluation and Terminal Review) | • Project Manager<br>• Project team<br>• UNDP | 56,000 | At midpoint and at end of project implementation |
| Audit | • Project Manager<br>• Project team<br>• UNDP | 5,000 | Annually, at year end |

| Type of M&E activity | Responsible parties | Budget (147,160 US$) | Timeframe |
|---|---|---|---|
| Inception meeting, field visits and steering committee meetings | • Project Manager<br>• Project team<br>• UNDP | 86,160 | Inception meeting within first two months and bi-annual PSC meetings (and sub-committee meetings) |
| **TOTAL indicative cost** | | **147,160** | |

*Note: Above costs do not cover UNDP staff time. All UNDP staff costs associated with M&E are covered by the MIE Fee.*

## **E.** Results framework

**Table 19.** Results framework for the proposed project outlining the indicators, targets, assumptions and sources of verification of the outcomes and outputs against the baseline.

| Expected outcome/ outputs | Outcome/ output indicator | Baseline | Target | Sources of verification | Assumptions |
|---|---|---|---|---|---|
| **Outcome 1.** Catchment management strategy to manage climate risks operationalised at *raion* (district) and *jamoat* (sub-district) levels in Kofirnighan River Basin (KRB). | Number of staff trained to respond to impacts of climate-related events (gender disaggregated). | 0 | By the end of the project, at least 30 staff (of which at least 30% are women) trained on integrated catchment management.<br><br>By the end of the project, at least 100 staff (of which at least 30% are women) trained on integrated catchment management. | • Attendance registers from training workshops<br>• Workshop reports<br>• Interviews with selected staff members of relevant ministries | Training workshops provide staff with the capacity to integrate climate resilience into integrated catchment management. |
| Output 1.1. Multi-hazard climate risk models (MHCRMs) developed for target watersheds in the KRB. | Number of risk models developed. | 0 | Gap analysis conducted for KRB that details climate risks for all watersheds.<br><br>By the end of the project, at least one MHCRM developed for each watershed in the KRB (and each target district). | • Gap analysis<br>• MHCRMs that detail climate risks for each watershed and target district<br>• Results of studies including data and GIS information | Gap analysis and MHCRMs will inform the selection of vulnerable sites in the target districts as well as the identification of appropriate EbA interventions. |
| Output 1.2. Providing support for establishing automated weather stations in KRB sub-catchments to provide data for refining the multi-hazard climate models [developed under Output 1.1]. | Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis. | Currently, weather stations do not provide up-to-date and relevant information in a timely manner to inform climate risks. There is limited delivery of climate information to local communities. | Policy- and decision-makers in KRB receive forecasts from Hydromet.<br><br>By the end of the project, policy- and decision-makers in KRB receive forecasts and downscaled national climate information every quarter from Hydromet.<br><br>By the end of the project, local communities in the project interventions sites receive tailored climate information packages. | • Climate information packages<br>• Interviews with government and local communities | Existing climate information producers are committed to participating in the development and implementation of forecasts and area-specific advisories. |

| Expected outcome/ outputs | Outcome/ output indicator | Baseline | Target | Sources of verification | Assumptions |
|---|---|---|---|---|---|
| Output 1.3. Integrated catchment management strategy developed for the KRB. | Integrated catchment management strategy developed.<br><br>Number of staff trained (gender disaggregated).<br><br>Number of community members trained (gender disaggregated). | 0 | By year 3 of the project, at least 30 staff (of which at least 30% are women) trained on integrated catchment management across all target departments.<br><br>By the end of the project, at least 100 staff (of which at least 30% are women) trained on integrated catchment management across all target departments.<br><br>At least 100 community members in each district (of which 30% are women) trained on identification of suitable EbA interventions (600 people in total). | • Project reports<br>• Monitoring and evaluation reports per intervention site<br>• Reports on community consultations, trainings and surveys<br>• Reports on site/field visits | Training workshops provide staff with the capacity to integrate climate resilience into integrated catchment management.<br><br>All communities surrounding project intervention sites are committed to participating in project activities, taking up/adopting climate resilient techniques and practices and providing training to other officers/community members. |
| Output 1.4. Strengthened coordination and training mechanisms for integrated climate-resilient catchment management. | Strengthened coordination evident in streamlined mandates and the number of meetings conducted. | 0 | By the end of the project, at least 2 meetings are held per year between different government sectors, RBOs, district authorities etc. | • Meeting reports<br>• Monitoring and evaluation reports<br>• Annual workplans<br>• Meeting minutes and reports | Institutions, government ministries and agencies are committed to participating in and addressing climate risks, with integrated catchment management central to the adaptation pathway for KRB. |
| Output 1.5. Payment for Ecosystem Services (PES) models to support the long-term financing of integrated catchment management strategy implementation. | PES models developed for the KRB that target communities for EbA interventions | 0 | By the end of the project, at least 1 PES model developed and at least one policy brief submitted to government detailing the model. | • Policy brief on PES model<br>• Meeting reports<br>• Monitoring and evaluation reports | Institutions, government ministries and agencies are committed to participating in and addressing climate risks, with integrated catchment management central to the adaptation pathway for KRB. |

| Expected outcome/ outputs | Outcome/ output indicator | Baseline | Target | Sources of verification | Assumptions |
|---|---|---|---|---|---|
| **Outcome 2.** An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level. | Number of people practising climate change adaptation technologies. | 0 | At least 600 people (100 per district) are implementing EbA interventions for climate risk management. | • Registers of project beneficiaries at each site<br>• Site visits<br>• Community surveys. | Community members continue to practice adaptation technologies once they have been trained and provided with the necessary equipment. |
| Output 2.1. Agro-ecological extension services supported at the *jamoat* level to provide technical support for EbA implementation. | Number of extension service providers trained. | 0 | At least 1 private extension service provider in each target KRB district supported | • Annual workplans<br>• Workshop reports<br>• Monitoring and evaluation reports | All communities surrounding project intervention sites are committed to participating in project activities, taking up/adopting climate-resilient EbA techniques and practices and providing training to other community members. |
| Output 2.2. Watershed Action Plans (WAPs) developed that promote climate resilience and enhance economic productivity for target communities. | Number of WAPs developed. | 0 | By the end of the project, at least 1 WAP developed in each of the 14 target *jamoats*. | • Annual workplans developed for the WAPs<br>• Monitoring and evaluation reports | None of the *jamoats* have overlapping watersheds in the project area. |
| Output 2.3. EbA interventions implemented in target watersheds by local communities. | Number of households at project sites in each district benefitting from EbA activities. | 0 | At least 100 households in each district benefitting from EbA activities (600 households in total). | • Monitoring and evaluation reports per intervention sites<br>• Reports on community consultations/trainings and field visits | All communities surrounding project intervention sites are committed to participating in project activities and taking up/adopting climate-resilient techniques and practices. |
| | Number of hectares of land with EbA activities implemented at project sites in each district | 0 | At least 250 ha of land in each district undergoing EbA implementation (1,500 ha in total). | • Monitoring and evaluation reports per intervention site<br>• Reports on community consultations/trainings and field visits<br>• GIS | All communities surrounding project intervention sites are committed to participating in project activities and taking up/adopting climate-resilient techniques and practices. |

| Expected outcome/ outputs | Outcome/ output indicator | Baseline | Target | Sources of verification | Assumptions |
|---|---|---|---|---|---|
| **Outcome 3.** Existing knowledge management platforms supported for integrated catchment management and EbA. | **Knowledge management centre strengthened through the support of project activities** | 0 | By the end of the project at least 1 knowledge centre has been strengthened. | • Reports and training materials<br>• Monitoring and evaluation reports | Strengthening existing knowledge management centres promotes local knowledge sharing and raises awareness among communities. |
| Output 3.1. Existing knowledge management platforms supported for collating information on the planning, implementation and financing of EbA interventions. | Existing knowledge centre/ platforms/ hubs in Tajikistan are supported and include information and data on KRB and specifically climate risk information. | Climate change research is not coordinated within the KRB and across Tajikistan.<br><br>Knowledge generated through projects is not collated, shared or disseminated. | By the end of the project at least 1 knowledge centre has been strengthened. | • Meeting/workshop reports<br>• Minutes from forum meetings | All representatives involved in the knowledge centres (public institutions, NGOs and resource users etc.) are dedicated to developing, adopting and implementing interdisciplinary approaches to climate resilient EbA techniques and practices for integrated catchment management in the KRB specifically. |
| Output 3.2. An impact evaluation framework (IEF) to enable effective adaptive management of EbA activities. | Evaluation of EbA interventions in target sites conducted. | Several projects have undertaken activities on climate change adaptation within Tajikistan. However, none of these activities have been evaluated according to their impacts for communities. | By the end of the project, an IEF will be developed that details the process of evaluating the impact of implemented EbA measures on communities. | • Site visits<br>• Data collection<br>• Community consultation<br>• Data analysis of EbA impacts | Community members will be more aware of EbA interventions in and surrounding their communities. By conducting the IEF, awareness on the benefits of EbA interventions will be raised. |

## F. Alignment with Adaptation Fund Results Framework

Proposed project alignment with the Adaptation Fund Results Framework is detailed in Table 20.

**Table 20.** Project alignment with the Adaptation Fund Results Framework including Outcome and Output Indicators.

| **Project Objective**(s)[323] | **Project Objective Indicator**(s) | **Fund Outcome** | **Fund Outcome Indicator** | **Grant Amount** (US$) |
|---|---|---|---|---|
| Reduce vulnerability and enhance climate-resilience of small-scale farmers and pastoralists in Tajikistan to respond to the impacts of climate change. | | **Outcome 3.** Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level | **3.** Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses | **10,000,000** |
| **Project Outcome**(s) | **Project Outcome Indicator**(s) | **Fund Output** | **Fund Output Indicator** | **Grant Amount** (US$) |
| **Outcome 1.** Catchment management strategy to manage climate risks operationalised at *raion* (district) and *jamoat* (sub-district) levels in Kofirnighan River Basin (KRB). | **2.1** No. of targeted institutions with increased capacity to minimize exposure to climate variability risks | **Output 2.2** Targeted population groups covered by adequate risk reduction systems | **2.1.2** Percentage of population covered by adequate risk reduction systems | **1,500,000** |
| ***Outcome 2.*** *An integrated approach to building climate resilience of agro-ecological landscapes operationalised at a village level.* | **5.** Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress | **Output 5.** Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability | **5.1** No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets) | **5,950,000** |
| ***Outcome 3.*** *Existing knowledge management platforms supported for integrated catchment management and EbA.* | **3.** Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses | **Output 3.** Targeted population groups participating in adaptation and risk reduction awareness activities | **3.1** No. and type of risk reduction actions or strategies introduced at local level | **750,000** |

## G. Budget

[323] The AF utilised OECD/DAC terminology for its results framework. Project proponents may use different terminology, but the overall principle should still apply.

| Award ID | 00113350 | | | Project ID | | 00111538 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Title | An integrated landscape approach to enhancing the climate resilience of small-scale farmers and pastoralists in Tajikistan | | | | | | | | | | |
| Business Unit | TJK10 | | | | | | | | | | |
| PIMS No. | PIMS 6219 | | | | | | | | | | |
| Implementing Partner | Committee for Environmental Protection (CEP) | | | | | | | | | | |
| **Outcome/ Atlas Activity** | **Responsible Party/ Implementing Agent** | **Fund ID** | **Donor Name** | **Atlas Budgetary Account Code** | **ATLAS Budget Description** | **Amount Year 1 (USD)** | **Amount Year 2 (USD)** | **Amount Year 3 (USD)** | **Amount Year 4 (USD)** | **Amount Year 5 (USD)** | **Total (USD)** | **Budget Notes** |
| **Component 1. Integrated catchment management to build climate resilience.** | UNDP/CEP | 62040 | AF | 71200 | International consultant | 83,500 | 69,000 | - | - | - | 152,500 | 1 |
| | | | | 71300 | Local consultant | 81,000 | 74,000 | 30,000 | - | - | 185,000 | 2 |
| | | | | 71600 | Travel | 10,000 | 10,000 | 10,000 | 10,000 | - | 40,000 | 3 |
| | | | | 72100 | Contractual Services-Companies | 40,000 | - | 10,000 | 10,000 | 10,000 | 70,000 | 5 |
| | | | | 72300 | Materials & Goods | 70,000 | 70,000 | 70,000 | - | - | 210,000 | 7 |
| | | | | 72400 | Audio Visual&Print Prod Costs | - | 15,000 | 5,000 | 5,000 | 5,000 | 30,000 | 6 |
| | | | | 74500 | Miscellaneous Expenses | 20,000 | 10,000 | 10,000 | 10,000 | 10,500 | 60,500 | 8 |
| | | | | 75700 | Training, Workshops and Confer | 98,000 | 88,000 | 63,000 | 15,000 | - | 264,000 | 4 |
| | | | | | **Total Outcome 1** | **402,500** | **336,000** | **198,000** | **50,000** | **25,500** | **1,012,000** | |
| **Component 2. Ecosystem-based Adaptation, including Climate** | UNDP/CEP | | | 71300 | Local consultant | - | 100,000 | - | - | - | 100,000 | 2 |
| | | | | 71400 | Contractual Services - Individ | 36,000 | 36,000 | 36,000 | 36,000 | 36,000 | 180,000 | 10 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **smart Agriculture and Sustainable Land Management, in agro-ecological landscapes.** | | | | 71600 | Travel | 15,000 | 15,000 | 15,000 | 14,000 | 15,000 | 74,000 | 3 |
| | | | | 72100 | Contractual Services-Companies | - | 3,358,000 | 2,123,500 | 1,123,500 | 123,500 | 6,728,500 | 5 |
| | | | | 74200 | Audio Visual&Print Prod Costs | - | 24,310 | - | - | - | 24,310 | 9 |
| | | | | 75700 | Training, Workshops and Confer | 20,000 | 75,000 | 48,000 | 18,000 | 15,000 | 176,000 | 4 |
| | | | | | **Total Outcome 2** | **71,000** | **3,608,310** | **2,222,500** | **1,191,500** | **189,500** | **7,282,810** | |
| **Component 3. Knowledge management on building climate resilience through integrated catchment management and EbA in the KRB.** | UNDP/CEP | 62040 | AF | 71200 | International consultant | 36,500 | - | - | - | - | 36,500 | 1 |
| | | | | 71600 | Travel | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 5,000 | 3 |
| | | | | 72100 | Contractual Services-Companies | 20,000 | 20,000 | 12,000 | 19,000 | 20,000 | 91,000 | 5 |
| | | | | 74500 | Miscellaneous Expenses | 10,000 | - | - | - | - | 10,000 | 8 |
| | | | | | **Total Outcome 3** | **67,500** | **21,000** | **13,000** | **20,000** | **21,000** | **142,500** | |
| **Project Execution Cost** | **UNDP** | 62040 | **AF** | 71400 | Contractual Services - Individ | 85,000 | 85,000 | 85,000 | 85,000 | 85,000 | 425,000 | 10 |
| | | | | 71600 | Travel | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 35,000 | 3 |
| | | | | 72200 | Equipment and Furniture | 60,000 | - | - | - | - | 60,000 | 14 |
| | | | | 72400 | Communic & Audio Visual Equip | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 12,500 | 11 |
| | | | | 73100 | Rental & Maintenance-Premises | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 25,000 | 12 |
| | | | | 73400 | Rental & Maint of Other Equip | 5,000 | 5,000 | 5,000 | 5,000 | 2,500 | 22,500 | 15 |
| | | | | 74100 | Professional Services | 1,000 | 1,000 | 29,000 | 1,000 | 29,000 | 61,000 | 13 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 74596 | Direct project cost | 17,000 | 36,000 | 43,000 | 26,000 | 10,000 | 132,000 | 16 |
| | | | | 75700 | Training, Workshops and Confer | 3,000 | - | - | - | - | 3,000 | 4 |
| | | | | | **Total project execution cost** | **185,500** | **141,500** | **176,500** | **131,500** | **141,000** | **776,000** | |
| | | | | | **Total Project Costs** | **726,500** | **4,106,810** | **2,610,000** | **1,393,000** | **377,000** | **9,213,310** | |

| **Budget note number** | **Budget Notes** |
|---|---|
| 1 | International consultant (daily fee of US$650 * 50 days + US$4,000 air fare) for Multi-Hazard Climate Risk Modeling;<br>International consultant (IT expert - daily fee of US$650 * 30 days + US$4,000 air fare) for collecting and collating data;<br>International Consultant (Catchment management expert - daily fee of US650 for 100 days + US$4,000 air fare) on climate strategy;<br>International Consultant (Training expert on integrated catchment management, daily fee of US$ 650 for 30 days + US$ 4,000 air fare) to develop a Training programme on integrated catchment management;<br>International consultant (US$650 * 50 days + US$4,000 air fare) for development of an evaluation framework |
| 2 | National consultant to conduct gap analyses (US$200*125 days)<br>National consultants to support development of Multi-Hazard Climate Risk Models (US$200*100 days)<br>National consultants to support data collection and collation (US$200*50 days)<br>National consultants to support trainings of local community members to receive advisories (US$200*150 days)<br>National consultants to support the development of the climate strategy (2pers* US$200*100 days)<br>National consultants to assist international consultants in conducting training programme on integrated catchment management and to continue training workshops in Year 2 (US$200*100 days)<br>National Environmental Economist and National Policy Expert, for development of PES models (2 pers.*US$200*100 days)<br>National Watershed Expert for participatory mapping (US$200 for 150 days)<br>National Communications Expert for participatory mapping (US$200 for 150 days)<br>National consultants on WAPs development (2pers.*US$200*100days) |
| 3 | Travel to target districts |

| | |
|---|---|
| 4 | Workshops (10 district-level workshops and 3 national-level workshops) on climate strategy; - $25,000<br>Training workshops (6 3-day workshops @US$5,000 per workshop) on integrated catchment management + training materials - $50,000;<br>Training materials, trainings (assume US$10,000 for training materials, 2 trainings per year per jamoat at US$1,000 per training); - $94,000<br>Workshops for RBOs, RBCs, districts and jamoats. Assume 1 workshop in each district + 2 workshops in Dushanbe on strengthening the coordination systems - $50,000<br>Workshops for CEP and other relevant government staff on integrating EbA in catchment management - $20,000<br>Workshops at district and national level (12 district-level workshop, 3 national-level workshops) on PES model development - $55,000<br>Training for EbA and FFS service providers - $91,000<br>Community meetings (Meetings to be held across multiple villages; assume 3 meetings per jamoat, US$500 per meeting) on participatory mapping - $21,000<br>Workshop per jamoat on developing community monitoring plans - $20,000 + Inception workshop - $3,000<br>Training for Nursery staff - $14,000 |
| 5 | Contractual Services for GIS multihazard climate risk data modeling for first year - $40,000.<br>Contract for disseminating regular advisories via SMS - $30,000<br>Contactual services for civil works / Contract for knowledge management centre - database maintenance, knowledge dissemination - $91,000<br>EbA demonstration plots for villages – 100 villages, US$3,000 per plot to be established, plus US$200 for upkeep for each EbA plot per annum * 3 years - $360,000<br>14 nurseries, US$10,000 to establish each nursery and US$973.22 upkeep for each nursery per annum * 4 years - $194,500<br>Inputs for 100 villages to implement EbA - estimated US$58,140 per village - $5,814,000<br>Farmer field schools - 100 villages, assume US$900 per field school per annum - $360,000 |
| 6 | Basic phones + airtime for 100 community representatives; |
| 7 | Materials and inputs for 3 AWS Stations (US$70,000 per station * 3 stations) - $210,000 |
| 8 | Miscellaneous Expenses (including bank charges, insurance); |
| 9 | Printing of mapping materials ($2,310) + printing & miscellaneous ($10,000) + translation services ($12,000) |
| 10 | All project personnel fees (Project Manager, Administrative/Finance Assistant, Field staff (3 @ US7,000 p.a.)<br>Programme Assistant, Project Analyst , Project Engineer) |
| 11 | Communication cost (internet, mobile and landline phones); |
| 12 | Office rent |
| 13 | Mid-term review of the project by team of consultants (28,000 USD); Final review of the project by team of consultants (28,000 USD); Audit Fees (5,000 USD) |
| 14 | Procurement of vehicle for visits to target districts for implementation of project activities; |
| 15 | All cost associated with vehicle running, like regular maintenance, etc.; |
| 16 | Expenditures for the services on HR, procurement, IT, security provided by CO. |

## **H.** Disbursement schedule

A disbursement schedule including budget distributed per year of project implementation is detailed in Table 21.

**Table 21.** Disbursement schedule including milestones.

| | **Upon agreement & signature** (US$) | **After Year 1** (US$) | **After Year 2** (US$) | **After Year 3** (US$) | **After Year 4** (US$) | **Total disbursed** (over 5 years) |
|---|---|---|---|---|---|---|
| **Scheduled date** (tentative) | March 2020 | March 2021 | March 2022 | March 2023 | March 2024 | |
| **Project funds** | 541,000 | 3,965,310 | 2,433,500 | 1,261,500 | 236,000 | 8,437,310 |
| **Project Execution Fee** | 185,500 | 141,500 | 176,500 | 131,500 | 141,000 | 776,000 |
| **Implementing Entity fee** (8.5%) | 61,753 | 349,079 | 221,850 | 118,405 | 32,045 | 783,131 |
| **Total** | | | | | | **9,996.441** |

# PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

## A. Record of endorsement on behalf of the government[324]

A list of all endorsements for the project is provided in Table 22. See Annex 2 for all endorsement letters[325].

**Table 22.** List of endorsements provided for the proposed project.

| | |
|---|---|
| Khayrullo Ibodzoda – Chairman of the Committee for the Environmental Protection (CEP) under the Government of the Republic of Tajikistan | Date*:*<br>January, 19, 2018 |

## B. Implementing Entity certification

*Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project contact person's name, telephone number and email address.*

| | |
|---|---|
| I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project. | |
|  <br>Director, Sustainable Development (Environment) a.i.<br>Executive Coordinator, Global Environmental Finance<br>Bureau for Policy and Programme Support<br>United Nations Development Programme | |
| Date: *August 6th, 2018* | Tel. and e-mail:+1 (212) 906 5143 |
| Project Contact Person: Ms. Keti Chachibaia | |
| Tel. And Email: keti.chachibaia@undp.org | |
| | |

[324] Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.
[325] Annex 2 includes endorsement letters from

## LIST OF ANNEXURES

All annexures have been included as a separate attachment to the Full Proposal.

Annex 1. Consolidated mission and stakeholder consultation report
Annex 2. Endorsements letter
Annex 3. Justification for selection of the Kofirnighan River Basin
Annex 4. Environmental and Social Management Framework (ESMF)
Annex 5. Grievance mechanism
Annex 6. Hydromet list of needs for the repair and rehabilitation of weather stations
Annex 7. UNDP Social and Environmental Screening Procedure (SESP)
Annex 8. Letter of Agreement between UNDP and Government for the provision of Support Services
Annex 9. UNDP Fees for Support to Adaptation Fund Project

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*End of Full Proposal*

**КУМИТАИ ҲИФЗИ МУҲИТИ ЗИСТИ НАЗДИ ҲУКУМАТИ ҶУМҲУРИИ ТОҶИКИСТОН**
734003, шаҳри Душанбе, кӯчаи Шамсӣ, 5/1
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19 January 2018

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

**Subject: Endorsement for the project "Increasing Climate Resilience of Rural Communities in Tajikistan"**

In my capacity as designated authority for the Adaptation Fund in Tajikistan, I confirm that the project proposal "Increasing Climate Resilience of Rural Communities in Tajikistan" is in accordance with national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Tajikistan.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project will be implemented by UNDP in Tajikistan.

Sincerely,

Khayrullo Ibodzoda
Chairman of the Committee
for Environmental Protection
under the Government of the Republic of Tajikistan