# Research Terms of Reference

## Area-Based Assessment of Sub-River Basins in the Fergana Valley
## REG2301
## Kyrgyzstan, Tajikistan, Uzbekistan (Central Asia)

**25/01/2022**
**Version 0.1**

IMPACT Shaping practices Influencing policies Impacting lives

## Executive Summary

| | | | | | | |
|---|---|---|---|---|---|---|
| **Country of intervention** | Kyrgyzstan, Tajikistan, Uzbekistan (Central Asia) | | | | | |
| **Type of Emergency** | X | Natural disaster | X | Conflict | □ | Other *(specify)* |
| **Type of Crisis** | □ | Sudden onset | □ | Slow onset | X | Protracted |
| **Mandating Body/ Agency** | *USAID* | | | | | |
| **IMPACT Project Code** | 05AXR 0A7 (IMPACT)<br>ACTED: *03FFS(TJK), 05FFS (KYR), 06FFS (UZB)* | | | | | |
| **Overall Research Timeframe** *(from research design to final outputs / M&E)* | 11/01/2022 to 08/30/2023 | | | | | |
| **Research Timeframe**<br>*Add planned deadlines (for first cycle if more than 1)* | 1. ToR Finalization: 20/02/2023 | | 5.Phase 2 Pilot/ training: 26/05/2023 | | | |
| | 2. Collection of Data for Phase 1: 30/06/2023 | | 6. Phase 2 Start collect data: 29/05/2023 | | | |
| | 3. Data Analysis for Phase 1: 27/03/2023 | | 7. Phase 2 Data collected: 30/06/2023 | | | |
| | 4. Prioritisation of SRBs: 15/05/2023 | | 8. Data analysed: 15/07/2023 | | | |
| | 5. Phase 2 Tool Development: 26/05/2023 | | 9. Product Drafting: 31/07/2023 | | | |
| | 10. Product Finalization 30/07/2023 | | 11. Workshop presentations: September 2023 | | | |
| **Number of assessments** | X | Single assessment (one cycle) | | | | |
| | □ | Multi assessment (more than one cycle)<br>*[Describe here the frequency of the cycle]* | | | | |
| **milestones**<br>*Specify **what** will the assessment inform and **when** e.g. The shelter cluster will use this data to draft its Revised Flash Appeal;* | **Milestone** | | **Deadline** | | | |
| | □ | Donor plan/strategy | _ _/_ _/_ _ _ _ | | | |
| | □ | Inter-cluster plan/strategy | _ _/_ _/_ _ _ _ | | | |
| | □ | Cluster plan/strategy | _ _/_ _/_ _ _ _ | | | |
| | □ | NGO platform plan/strategy | _ _/_ _/_ _ _ _ | | | |
| | X | Other (Specify): ACTED and Alert International public consultations & stakeholder engagement | 30/09/2023 | | | |

| **Audience Type & Dissemination** *Specify **who** will the assessment inform and **how** you will disseminate to inform the audience* | **Audience type** | **Dissemination** |
|---|---|---|
| | X Strategic<br>X Programmatic<br>□ Operational<br>□ [Other, Specify] | **X** General Product Mailing (e.g. mail to NGO consortium; HCT participants; Donors)<br>□ Cluster Mailing (Education, Shelter and WASH) and presentation of findings at next cluster meeting<br>X Presentation of findings (e.g. at HCT meeting; Cluster meeting)<br>X Website Dissemination (Relief Web & REACH Resource Centre)<br>□ [Other, Specify] |
| **Detailed dissemination plan required** | X Yes | □ No |
| **General Objective** | *To provide an updated and in-depth understanding of the root causes of conflict over natural resource management n the Fergana Valley of Uzbekistan, Tajikistan, and Kyrgyzstan through an assessment of communities in transboundary watersheds, which will be used to foster regional dialogue around the current shared risks the region faces and inform programming to mitigate risks at community-level. (note:changes on focus from conflict to impact of climate change on NRM)* | |
| | SO1: Understand the current exposure to natural, socio-natural, and anthropogenic impacts on water resrouce management, as well the impact of climate change on communities within trasnboundary watersheds in the Fergana valley, and how their impacts are likely to stress water resources in the present and future as part of a, "watershed stress index" that will assist in prioritization and adovacy efforts regarding which watersheds are hot spots for tension & conflict..<br><br>S02: Develop an understanding of water allocation across individual communities (Ayil Aimak / Jamoat) and between communities in the same SRB, including water usage and practices to meet different needs (agriculture, industry, drinking etc.), management structures and practices at, resource-related infrastructure, and their impacts on local tensions over natural resource management.within each at-risk watershed.<br><br>SO3: Understand the contextual barriers and challenges faced by communities and local governance within each watershed with regards to resource management, conflict mitigation, and land use practices, including agriculture, industry, power, and other sectors.<br><br>S04: Develop policy recommendations and community-led response plans to address key gaps highlighted by the analysis of water resource management in the Fergana Valley. | |
| **Research Questions** | *RQ for SO1:*<br>1. What are the current factors impacting the availability of water in watersheds in the Fergana Valley (includng climate change, water use, and natural disasters)?<br>2. What are the current priority anthropogenic casues for watershed stress in the Fergana Valley (inlcuding conflict, pollution, and waste) management?<br>3. What is the settlement composition and population of the transboundary watersheds between the 3 countries in the Fergana valley<br>4. Which watersheds are most at risk of overstressing their water supply in the Fergana Valley? | |

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| | RQ for SO2:<br>1. Which communities are reliant on which water sources within each watershed?<br>2. What water management structures and practicespresently exist to manage water usage and reduce tension between communities over water usage?<br>3. How well do current water resource mechanims function, and what is the current capacity of the staff in addressing resource tensions?<br>4. What are the current infrastruture, uses and demands for water from the for each watershedin the Fergana Valley?<br>5. What are the main land use types and livelihood practices (agriculture, pastoralism, industry, etc.) by communities in each watershed, and what are their water needs?<br><br>RQ for SO3:<br><br>1. Which are the main underlying reasons for tesnions over water supply between transboundary communities within each watershed?<br>2. What are the main uses for water in the Fergana valley, and how are they prioritized within and between watersheds?<br>3. What are the main stakeholders and mechanisms through which communities manage water usage and mitigate tensions between transboundary communities?<br><br>RQ for SO4:<br><br>1. What are the key recommendations from authorities within the region about how to better manage water stress within transboundary watersheds in the Fergana Valley?<br>2. What do key stakeholders and authorities see as the main challenges to addressing blockages to more effective resource management?<br>3. Who are the key stakeholders that should be involved to improve transboundary natural resource management and dialogue within watersheds?<br>4. What do programmes do communities think will address some of the root casues of inter-communal tensions within watersheds in the Fergana Valley? |
| **Geographic Coverage** | *Fergana Valley (Kyrgyzstan, Tajikistan, Uzbekistan)* |
| **Secondary data sources** | *Secondary Data sources*:<br>*1.*<br>*2. Further secondary data sources to be identified through partner & stakeholder consultation process* |

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| **Population(s)** *Select all that apply* | □ | IDPs in camp | □ | IDPs in informal sites |
| | X | IDPs in host communities | □ | IDPs [Other, Specify] |
| | □ | Refugees in camp | □ | Refugees in informal sites |
| | X | Refugees in host communities | □ | Refugees [Other, Specify] |
| | X | Host communities | X | Residents |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Stratification** *Select type(s) and enter number of strata* | X | Geographical #:Watershed (local) Population size per strata is known? X Yes □ No | □ | Group #: _ _ _ Population size per strata is known? □ Yes □ No | □ | *[Other Specify]* #: _ _ Population size per strata is known? □ Yes □ No |
| **Data collection tool(s)** | □ | Structured (Quantitative) | **X** | Semi-structured (Qualitative) | | |
| | **Sampling method** | | **Data collection method** | | | |
| **Semi-structured data collection tool (s): KIIs** *Select sampling and data collection method and specify target # interviews* | X Purposive<br>□ Snowballing<br>□ [Other, Specify] | | X Key informant interview (Target #):26 per SRB<br>□ Individual interview (Target #):_ _ _ _ _<br>□ Focus group discussion (Target #):_ _ _ _ _<br>□ [Other, Specify] (Target #):_ _ _ _ _ | | | |
| **Collection of Quantitative Datasets: Secondary Data Review** *Select sampling and data collection method and specify target # interviews* ****If more than 2 structured tools please duplicate this row and complete for each tool.* | X Purposive<br>□ Snowballing<br>□ [Other, Specify] | | □ Key informant interview (Target #):_ _ _ _ _<br>□ Individual interview (Target #):_ _ _ _ _<br>□ Focus group discussion (Target #):_ _ _ _ _<br>□ Datasets per SRB (Target #):50 per SRB | | | |
| **Target level of precision if probability sampling** | _ _% level of confidence | | _ _+/- % margin of error | | | |
| **Data management platform(s)** | x | IMPACT | □ | UNHCR | | |
| | □ | [Other, Specify] | | | | |
| **Expected ouput type(s)** | □ | Situation overview #: _ _ | X | Report #: 1 report in 3 separate languages | □ | Profile #: _ _ |
| | X | Presentation (Preliminary findings) #: 1 | X | Presentation (Final) #: 1 | X | Factsheet #: 0 |
| | □ | Interactive dashboard #:_ | X | Webmap #: _ | □ | Map #: _ _ |
| | □ | [Other, Specify] #: _ _ | | | | |
| **Access** | X | Public (available on IMPACT website and other humanitarian platforms) | | | | |
| | □ | Restricted (bilateral dissemination only upon agreed dissemination list, no publication on IMPACT or other platforms) | | | | |
| **Visibility** *Specify which **logos** should be on outputs* | ***IMPACT*** | | | | | |
| | ***Donor:** USAID* | | | | | |
| | ***Coordination Framework:** [List logos here as relevant]* | | | | | |

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|---|---|
| | ***Partners:*** *ACTED, Alert International* |

# 1. Rationale

## 1.1 Background

Since the collapse of the Soviet Union and the establishment of the modern state structure in Central Asia, transboundary water management has been a critical issue.[1] The Syr Darya River Basin, which crosses Kyrgyzstan, Tajikistan, and Uzbekistan at multiple instances as it flows through the Fergana Valley, is relied upon my numerous communities in all three countries, but lacks centralized management, creating a situation in which communities at the end of the basin's complex network of rivers, canals, and dams, are often dependent upon the water policies of other countries' governments that lack many direct structural incentives to support those communities. This is particularly severe in the case of water, which many people in the Valley rely upon for agriculture and hydropower.[2] This often leads to conflicts over how water is used, as those communities further downstream may be affected by water usage decisions by those upstream.[3]

While ostensibly local community-level disputes, in recent years, these conflicts have become national issues, particularly in border areas between the provinces of Batken (Kyrgyzstan) and Sughd (Tajikistan), where tensions on the Kyrgyz-Tajik border boiled over in May 2021. The flashpoint was a disagreement over a water distribution point, but the backdrop was aggressive posturing at the national level, which pushed the militaries of both countries into direct confrontation in a meaningful way for the first time, and lead to a standstill in bilateral dialogue, including on Natural Resource Management (NRM).[4] This has led to high tensions that continue to present real security challenges, escalating in intermittent clashes between January and September 2022.[5] As access to water for both livelihoods and public services remains high, things are likely to worsen due to the impacts of climate change; The Syr Darya river basin remains one of the most climate change affected areas in the world, according to projections.

Given the clear importance in improving natural resource management between communities in the region, several development projects aiming to improve water management between governments and communities in each of the three countries in the Fergana Valley have been launched. However, these approaches have tended to focus on regional level dialogues, rather addressing the issues at local level. This is important as implementing at the community level may prove more impactful, particularly in an environment where decision making is often very top-down and doesn't always incorporate community concerns or needs.

## 1.2. Intended impact

To help ameliorate some of the stressors around transnational water management between local communities in the Fergana Valley, IMPACT, ACTED, and International ALERT will conduct an area-based assessment of Sub-River Basins (SRBs) and their associated communities in the Fergana Valley.[6] This will involve a detailed assessment of hazards and risks impacting the availability of water, through a "Water Stress Index," which IMPACT will develop based on multi-hazard

[1] Bichel, Conflict Transformation in Central Asia: Irrigation disputes in the Fergana Valley, Routledge, 2009.

[2] International Alert, The impact of climate change on the dynamics of conflicts in the transboundary river basins of Kyrgyzstan, Kazakhstan and Tajikistan, July 2021 – January 2022.

[3] UNECE & INBO, Water and Climate Change Adaptation in Transboundary Basins: Lessons Learned and Good Practices, 2015.

[4] Reuters, Kyrgyzstan, Tajikistan agree ceasefire after border clashes, 1 May 2021.
[5] Human Rights Watch, Kyrgyzstan-Tajikistan Border Clashes Prove Deadly for Civilians, September 2022.
[6] Examples from IMPACT Initiatives include Ukraine, Syria, Afghanistan, and Armenia.

risk models used in other contexts, including Ukraine[7] and Armenia.[8] This will be supplemented with detailed primary data to provide context around issues related to water management and water use practices, along with a conflict analysis by International ALERT.[9] All of this data will provide a detailed profile of each SRB, which will be used both to foster a regional dialogue over improved resource management between different countries in the Fergana Valley, and to provide a roadmap for engagement with watershed communities and developing projects to improve overall water management.

The project will rely on the AGORA area-based approach[10], a joint venture between ACTED and IMPACT. See figure 1 below.

AGORA works through local territories to ensure meaningful community engagement, program impact, and scalability. It grounds actions in local knowledge to ensure that solutions are tailored to each context, by developing an understanding of both local dynamics and provision of public goods. Through participatory methods and capacity building across the project cycle, AGORA puts local communities and actors at the center of aid planning and delivery, and strives to link local solutions with external actors that have the capacity to help provide technical or financial resources to implement them. As a partnership between ACTED and IMPACT, AGORA is about evidence-based planning and programming to achieve program objectives, combining IMPACT's know-how in terms of data collection and analysis with ACTED's program expertise and ability to deliver to the last mile.

Using this methodology as an enabler, the project will then be implement projects to improve water management within and between communities, as well as formulate policy level recommendations to improve water management at watershed level. To this end, the project will rely on ACTED's THRIVE approach, in which programs are designed to restore degraded land and improve resource sharing in order to rejuvenate and improve livelihoods. Specifically, Pillar 3 of THRIVE, INTEGRATE, will be implemented.[11] INTEGRATE focuses on improving intercommunal exchange to improve transboundary natural resource sharing to improve livelihoods and reduce conflict.[12]I The INTEGRATE approach is outlined in figure 1 below:

**Figure 1: INTEGRATE approach to be informed by research:**[13][14]

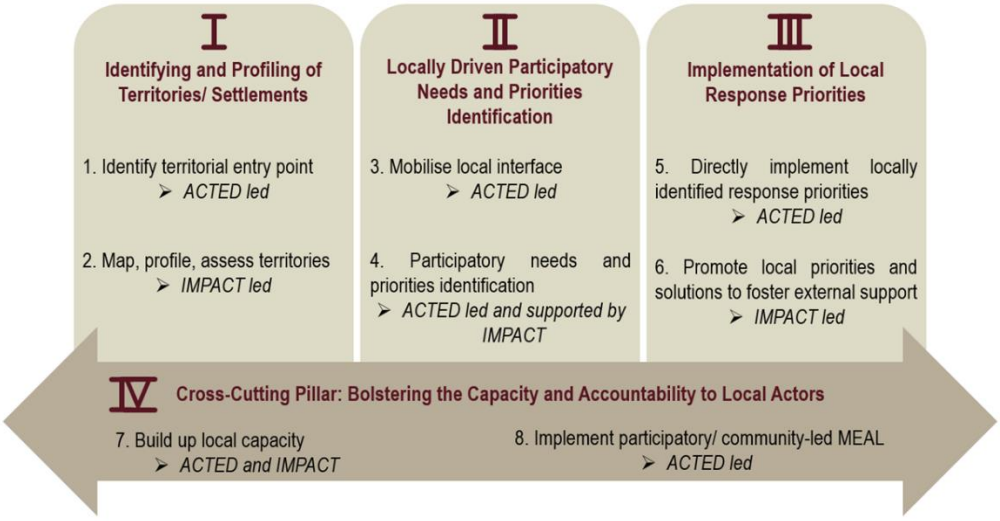

[7] IMPACT, Area Based Risk Assessment, Bakhmut Taion, Donetska Oblast, Eastern Ukraine, August 2020.
[8] IMPACT, Area-Based Risk Assessment in Tsaghkadzor consolidate community, Kotayk region, August 2022.
[9] International ALERT, Conflict Hub, 2023.
[10] ACTED, AGORA, 2023.
[11] ACTED, THRIVE: A New Approach to Building Resilience in Agro-Pastoral Communities, 2021.
[12] ACTED, PILLAR 3: INTEGRATE, 2022.
[13] Ibid.
[14] For the STREAM project, exchange visits may be limited, and both research and implementation will focus on Joint Natural Resource Management, rather than Trade Integration, given the context within rural transboundary areas of the Fergana Valley, where improved integration of natural resources is the main challenge.

# 2. Methodology

## 2.1 Methodology overview

For this research, the AGORA approach (see figure 1 below) will use a multi-stage assessment model designed to inform community engagement through a series of sequential assessments, which are detailed in Phase 1 and Phase 2 of the methodology below. [15] These is then followed by Phase 3, which constitutes a series of community dialogues, which are facilitated through the sharing of research findings with local, regional, national, and local stakeholders through the discussion of key findings and best practices. Following this, discussion of areas of collaboration and potential projects will be developed, which will inform the subsequent implementation of the STREAM project in line with THRIVE. The AGORA approach will be informed by the Integrated Watershed Management (ISWM) Approach,[16] successfully used by ACTED and other NGOs in similar projects in the region. through which each transboundary SRB of the Fergana Valley is identified, assessed, and then stakeholders relevant to the management of each watershed are engaged in workshops for the development of both implementation of projects to improve cross-border natural resource management and transboundary dialogue.

**Figure 1: the AGORA methodology**




Each phase of the project is detailed in the sub-sections below:

**Phase 1: Identification and Prioritisation of Sub-River Basins for intervention:**

In this stage, IMPACT, with the Support of ACTED and ALERT, will identify key transboundary SRBs of the Fergana Valley, and conduct a quantitative analysis in order to prioritise the watersheds most in need of support for natural resource management.

[15] Global Shelter Cluster, Settlements Approach Guidance Note, December 2020.
[16] ACTED, HELVETAS& GIZ, Integrated Watershed Management in Tajikistan context, 2018.

- Identification of the Watershed: Using GIS-supported watershed modelling and official secondary data sources, with the support of ACTED and ALERT, IMPACT identify the watershed boundaries in transboundary areas.
- Detailed Desk Review of Existing Research: This will involve research into existing datasets for geospatial analysis, and an in-depth dive into research that has already been conducted on water resource management, both in Central Asia and elsewhere.
- Geospatial Water Stress Index (WSI) Assessment: Using data collected during the desk review, IMPACT will conduct a detailed analysis of current environmental and anthropogenic stressors likely to be affecting water supply and conflict, as well as potential future risks that may be triggered by climate change. These indicators will be compared separately and be combined through the development of a Water Stress Index (WSI) to measure the overall likelihood that communities within the territorial unit of intervention will experience conflict or tension, which will be used to prioritise the watershed communities that ACTED and ALERT will support.

**Phase 2: SRB Profiling Through Primary Data Collection:**

In this stage, after the most in-need SRBS are prioritised, IMPACT, ACTED, and ALERT will conduct a detailed profiling assessment of the SRB(s) of intervention, in order to inform the implementation of an Integrated Watershed Management (ISWM) Approach, collecting data at the Ayil Aimak (Kyrgyzstan) and Jamaot (Tajikistan) level, which is an administrative and community level of a collection of villages that lies between the district and village.

- Local Secondary Data & Key Informant Interviews: Following the Desk Review, IMPACT and ACTED will devise a list of key quantitative datasets needed from local stakeholders to conduct a detailed analysis of the SRB's watershed. Key stakeholders identified from the desk review will be interviewed and the datasets needed will be requested, and aggregated into usable and comparable datasets in Microsoft Excel. These datasets will be analysed according to the data analysis plan. In addition, Key Informant Interviews will be conducted with key officials at SRB level from district offices on qualitative aspects of watershed and land usage, to provide a deeper understanding of the quantitative data. Together, the analysed data will provide a comprehensive understanding of how the SRB is managed, as well as current challenges.
- Conflict Analysis: In addition, ALERT will conduct conflict analyses for each watershed to provide a detailed understanding of main sources of tension, drivers of conflict, and points of potentially reconciliation for cross-border tensions between communities in the SRB on either side of international borders.

**Phase 3: Presentation of Information through Workshops and Community Response Plans**

In this stage, the data is presented to key stakeholders in order to derive both regional level recommendations for how to improve water management across borders, and to work with local communities to develop community response plans to improve overall water management.

- Workshops on findings at regional level, and development of watershed-level projects to be implemented at community level, ensuring a community-lead development approach.[17]

These activities will be used to build a detailed profile of each SRB, broken down across the different Ayil Aimak and Jamoat that they contain , in order to inform both the support and creation of an integrated water management structure and approach, as a model for improving local water management in some of the most at-risk communities for natural resource management. The next sections include Key Information on the size and scope of the assessment, followed by a detailed outline of Phases 1, 2, and 3.

[17] ACTED & IMPACT Initiatives, AGORA 2.0: Internal Guidance for ACTED and IMPACT staff, 2022.

# KEY ASSESSMENT INFORMATION:

## 2.2 Key Definitions:

- **Watershed**: A watershed is the area of land that, "drains all of the streams and rainfall to a common outlet," which can refer to any body of water, including a reservoir, lake, river, or canals, and is sometimes used interchangeably with a drainage basin or catchment. [18]

- **Territorial Unit of Intervention:** The place where people live as a socially defined and spatially bound unit, which reflects the interaction of dynamic social, cultural, economic, political and environmental features in space and time.[19]

• **Hazard:** a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural or anthropogenic in origin[20]

• **Exposure:** the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas[21]

• **Ayil Aimak/Jamoat:** An administrative layer in Kyrgyzstan and Tajikistan that lies between the District and Village level. These are typically clusters of 3-8 villages that share common resources, and are in geographically similar areas. Districts typically have about 10 Ayil Aimak per district, of which about 5 fall within the part of an SRB that lies inside their national boundaries (for about 10 Ayil Aimak/Jamoat per SRB) making these a manageable layer for data collection to occur. In addition, they also represent the administrative layer at which community and government management of water and other resources meet, making them an ideal level for assessment.

## 2.3 Population of interest

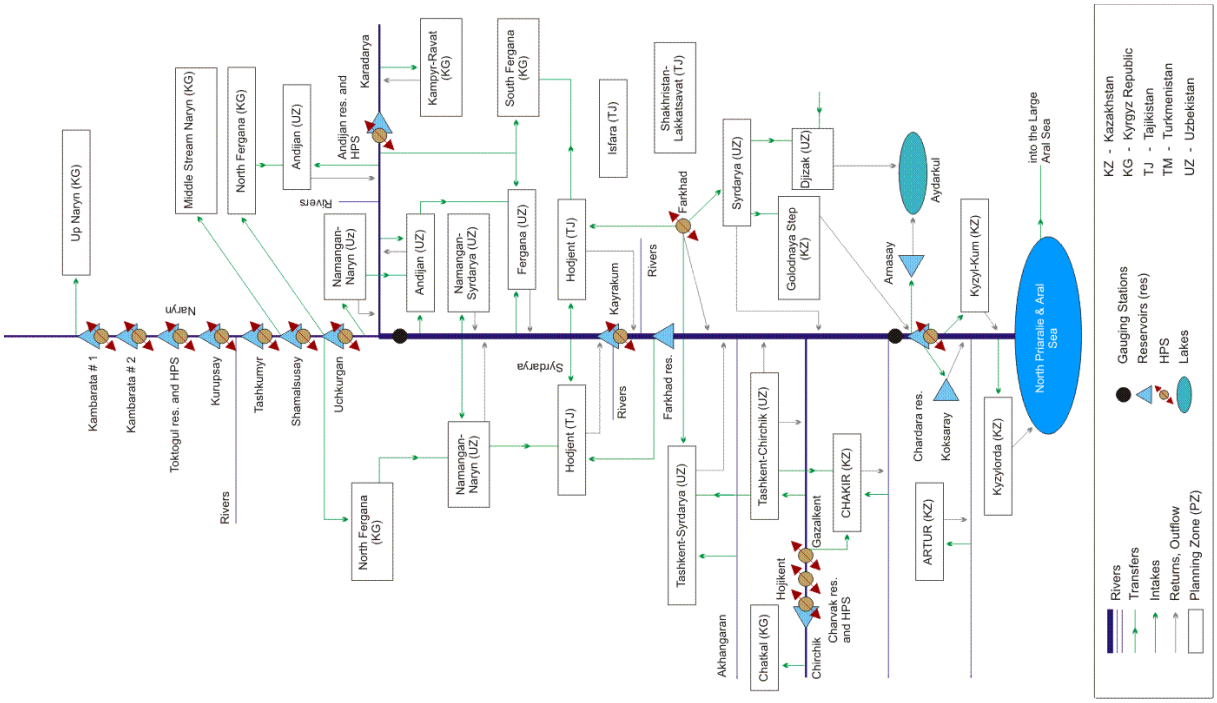
The assessment's population of interest are the communities living in areas contained within each local transboundary (crosses an international boundary) watershed[22] often referred to as Small River Basins (SRBs) within Fergana Valley portion of the Syr Darya River Basin. At a national level, the Sur Darya River Basin System is managed through a system of state-managed reservoirs and canal network, which is coordinated through the Interstate Commission for Water Coordination of Central Asia,[23] reproduced from the Interstate Commission for Water Coordination of Central

[18] A watershed is the area of land that, "drains all of the streams and rainfall to a common outlet," which can refer to any body of water, including a reservoir, lake, river, or canals, and is sometimes used interchangeably with a drainage basin or catchment. For more information please see: USGS: Watersheds and Drainage Basins, 2019.
[19] Global Shelter Cluster, Settlements Approach Guidance Note, December 2020. Referred to as the "Settlement" within the Settlement Approach Guidance note.
[20] UNDRR, Hazard Definition & Classification Review: Technical Report, 2020.
[21] ibid.
[22] A watershed is the area of land that, "drains all of the streams and rainfall to a common outlet," which can refer to any body of water, including a reservoir, lake, river, or canals, and is sometimes used interchangeably with a drainage basin or catchment. For more information please see: USGS: Watersheds and Drainage Basins, 2019.
[23] ICWC, Mandates and Objectives, 2022.

Asia Figure 1 below.[24] This system does not take into local water issues and management, which may be better accounted for at SRB level.

Previous work by ACTED and other international organizations has found water-resource management programmes to be most effective when conducted at SRB level, such as the DIPECHO X implemented by ACTED project in 2017.[25] The assessment will be used to then target communities on both sides of the border of specific transboundary Sub-River Basins in order to foster transnational dialogue for improvement of water management (Result 1.2 of STREAM). and develop a detailed development and water management system and plan for implementation (Purpose 2 of STREAM). While this is not an officially recognised administrative level, it is a level at which ACTED has successfully implemented before, including both the DIPECHO X in 2017 and the SDC IWSM pilot project in 2018.[26]

**Figure 2: Syr Darya River Basin Scheme**




The area of research would focus on the SRBs reliant on the water networks of the Toktogul Reservoir in Kyrgyzstan, Andijan Reservoir in Uzbekistan, and the Karyakum Reservoir in Tajikistan, which provide most of the water for communities within the Fergana Valley. Specifically, the research will focus on transboundary SRBs, or cross-border SRBs that fall within more than one country. While not all SRBs of the Fergana Valley are clearly identified in publicly available research, previous research programmes, including a study conducted by ACTED, Helvetas, and GIZ in Tajikistan in 2018 and the Eurasian River Basin Management portal, which was developed as a part of the SMART WATERS project, have identified the approximate boundaries of the SRBs. IMPACT has roughly identified these boundaries of 16 SRBs in Map 1 below. As these are approximations, the exact boundaries that will be used will be corrected through secondary data sources.[27] Within each SRB, there are smaller watersheds which different local communities rely on, which will be examined in Phase 2 of the assessment.:

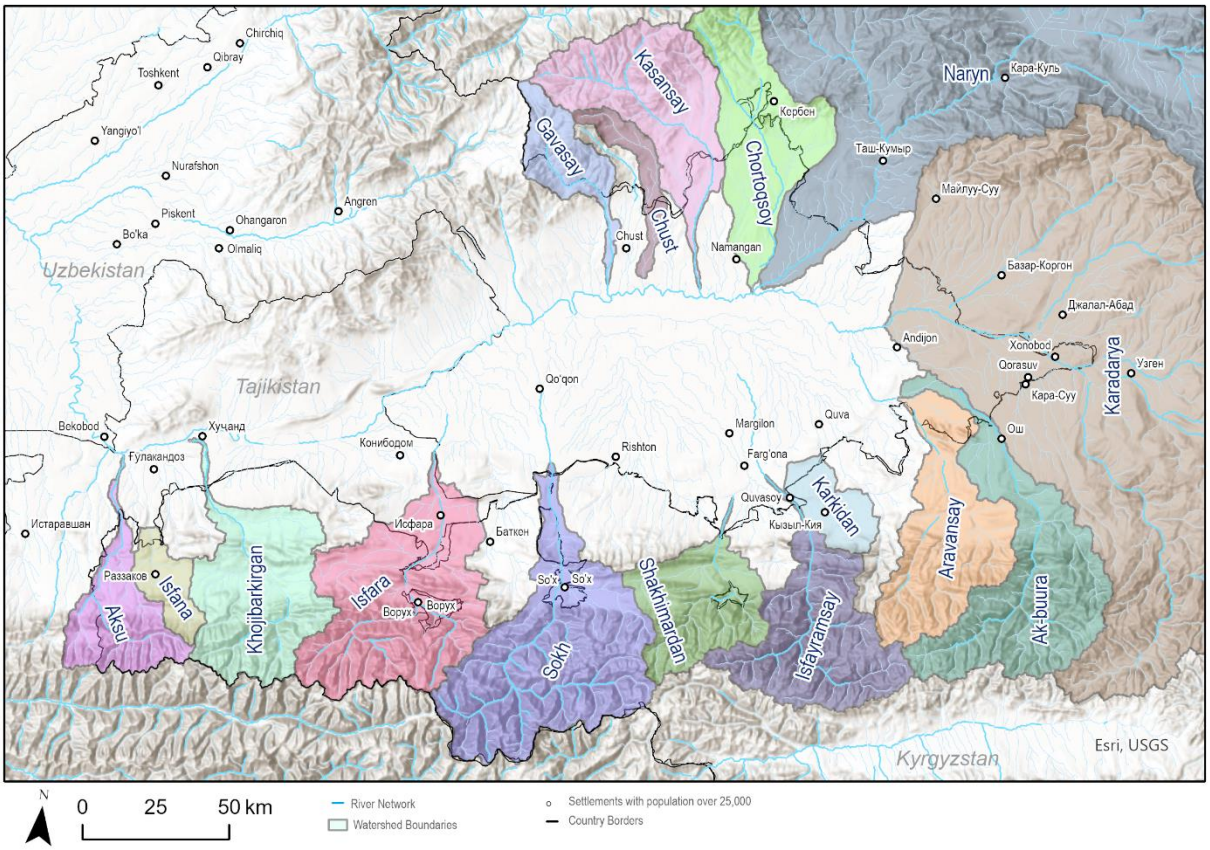
[24] Interstate Commission for Water Coordination of Central Asia, Basin Water Organization, "Syrdarya"

[25] ACTED, ACTED launches EU-funded DIPECHO X promoting integrated Watershed Management between Tajikistan and Kyrgyzstan, August 2017.

[26] ACTED, HELVETAS & GIZ, Transition of Tajikistan Water Sector from Irrigation Water Management to Integrated Water Resources Management, 22 November 2018.

[27] ACTED, HELVETAS & GIZ, Transition of Tajikistan Water Sector from Irrigation Water Management to Integrated Water Resources Management, 22 November 2018.

**Map 1: Tentative boundaries of Trans-boundary Watersheds in the Fergana Valley, 2023**




In addition to watershed boundaries demarcated in previous development project, Official sources of government demarcated SRBs will be used to triangulate and correct any of the previous boundaries as well. A January 26 Meeting of SDC's Sub-ResEAU Central Asia Network meeting highlighted that SRBs of the Syr-Darya River for official administration differ by country as follows:[28]:

Table 1: Official Status of Sub- River basin demarcation according to ResEAU, by Country:

[28] SDC, ResEAU: About the ResEAU, 2022

| OID | Country | Method of Sub-Basin Demarcation |
|---|---|---|
| 1 | Kyrgyzstan | Boundaries of SRBs have been officially demarcated by government with the support of SDC. IMPACT will attempt to acquire the data from SDC during the Secondary Data Review. |
| 2 | Tajikistan | No official system in place; Authorities are still reliant on SRB boundaries previously mapped under the IWSM pilot by ACTED, HELVETAS, and GIZ and are reported to be open to NGO-demarcated SRBs as long as the data and analysis is shared. |
| 3 | Uzbekistan | Boundaries are defined by Soviet-era hydrological surveys. IMPACT will aim to acquire data during Secondary Data Review. As direct data collection at community level is likely to be more limited, obtaining SRB-level boundaries from the Uzbek Government is likely to not be necessary. |

Given the size of the Syr Darya River Basin, in order to ensure that implementation provides the greatest impact towards transboundary natural resource management at the community level, IMPACT will only look at watersheds that cross an international boundary (as is highlighted in Map 1, above). IMPACT may furthermore exclude basins on the northern edge of the valley due to the lower population, greater water levels, and overall fewer concerns over water resource management. This would direct focus on communities in the 8 transboundary watersheds in the Batken Region of Kyrgyzstan and Sughd Region or Tajikistan.[29] In addition, the heart of the Fergana Valley, in Uzbekistan, will not be included, due to the lack of SRBs that cross transnational boundaries, and the large, state-managed water networks which require less attention for coordinating effective water resource management.[30].

As SRBs are not an official administrative layer, management of resources within them typically falls on government departments at district level, and communal management at the Ayil Aimak (Kyrgyzstan) and Jamaot (Tajikistan) level. Several NGOs and Development Actors have created coordination platforms at the SRB level, making them ideal layers for implementation. However, they lack organic stakeholder representation or management. To address this, data collection and analysis will be done at the Ayil Aimak/Jamaot level, and aggregated up to SRB for Phase 2 of the assessment.

## PHASE 1: IDENTIFICATION AND PRIORITISATION OF WATERSHEDS FOR INTERVENTION:

As noted in the Population of Interest section above, Phase 1 will focus on identifying and prioritising the SRBs which IMPACT, ACTED and ALERT will support as part of the STREAM project. In addition to identifying the transboundary SRBs in the Fergana Valley, this phase will also include a detailed desk review of previous research and existing datasets and an analysis of geospatial data to understand the overall hazards to water and natural resource management in each watershed. All data for this phase will be pre-existing, and will need to be acquired by IMPACT, ACTED, and ALERT from other sources.

### 2.4.1 Identification of most vulnerable cross-border watersheds in Fergana Valley

As noted in section 2.3, for Area-based Assessments to be successful, it is critical to identify the relevant territorial entry point at which ACTED, ALERT, and IMPACT should engage. In complex water systems like the Syr Darya River Basin,[31]

[29] ACTED, Helvetas, & GIZ, Transition of Tajikistan Water Sector from Irrigation Water Management to Integrated Water Resources Management, 22 November 2018.
[30] ICWC, Basin Water Organization "Syrdarya", 2022.
[31] All of the Water in the Fergana Valley is part of the larger Syr Darya River Basin, which runs from the Tien-Shan Mountains in Kyrgyzstan to the Aral Sea in Kazakhstan and Uzbekistan.

each river, tributary, canal, and sub canal, in addition to the entire river basin, has its own watershed, leading this to be a somewhat subjective definition, depending on which level the research is focuses on.[32] As this research is intended to be part of a larger Area-Based Assessment (ABA) approach intended to inform ACTED and ALERT interventions to improve local-level resource management, IMPACT will first identify the right level of sub-watershed. Given the importance of improving resource management of water by local governance and communities, the sub watersheds at sub-river basin level are the most logical territorial entry point.[33].[34] This level is currently represented in Map 1, using data from the open-source watershed database HydroSHEDS.[35]

These only represents tentative boundaries, however; in order to ensure that the boundaries are accurate, IMPACT triangulate its boundaries with any pre-existing datasets that exist from other sources, often more official sources. In these cases, IMPACT will aim for the watershed boundaries that align with those of pre-existing sources. So far, the following sources have been identified:

- ACTED, Helvetas & GIZ, Transition of Tajikistan Water Sector from Irrigation Water Management to Integrated Water Resources Management, 22 November 2018
    - 8 Transboundary Watersheds bordering Tajikistan and Kyrgyzstan
- Eurasian River Basin Management Portal, 2023. 21
    - Selected Transboundary watersheds bordering Tajikistan, Kyrgyzstan, Kazakhstan, and Uzbekistan.
- SDC, Sub-ResEAU Eastern Europe and Central Asia, 2023.
    - Aware of a Kyrgyzstan-wide watershed dataset, and knowledge of how Uzbekistan's watersheds are structured.

In addition, IMPACT will also seek more official water network data and water user association data; while the HydroSHEDS is open source, previous watershed profiling from Eurasian River Basin Management Portal used different, more official data, which lead to the watersheds being identified differently. If new watershed boundaries need to be identified, it would be best to identify them from the same dataset, so that the boundaries are as accurate as possible. During the desk review, IMPACT, ACTED, and ALERT will confer with other identified stakeholders at regional, national, sub-national, and community level to ensure that these understandings are accurate and should be kept, or if the community in relation to water and resource management exists at a different level.

### 2.4.2 Desk Review

The Desk Review of existing literature will involve several sequential steps, in order to build a complete picture of the existing systems of resource management in the Fergana Valley and understand what research and work has already been conducted by other organisations. This will be critical to both understanding the different types of risks and pressures on livelihoods and natural resource management in the Fergana Valley, and how these are likely to change over time with the impacts of climate change and human intervention, such as changes in agricultural practices and the expansion of hydroelectric power.[36]. The following contextual data sources will be consulted:

**Table 2: Main IMPACT Sources Consulted for the Secondary Data Review**

[32] USGS, Watersheds and Drainage Basins, 8 June, 2019.
[33] International ALERT, The impact of climate change on the dynamics of conflicts in the transboundary river basins of Kyrgyzstan, Kazakhstan and Tajikistan, January 2022.
[34] International ALERT, The impact of climate change on the dynamics of conflicts in the transboundary river basins of Kyrgyzstan, Kazakhstan, and Tajikistan, January 2022.
[35] Hydro SHEDS, Hydro BASINS, 2023
[36] Rakhmatullaev, Abdullaev, Kazbekov, Water-Energy-Food-Environmental Nexus in Central Asia: From Transition to Transformation, 2017.

| Data source |
|---|
| Bichel, Conflict Transformation in Central Asia: Irrigation disputes in the Fergana Valley, Routledge, 2009. |
| ODI, Climate change, migration and displacement: The need for a risk-informed and coherent approach, November 2017. |
| Pak et. Al., Re-examining conflict and cooperation in Central Asia: a case study from the Isfara River, Fergana Valley, 2014. |
| Radchenko et. Al., Climate Change Impacts on Runoff in the Fergana Valley (Central Asia), Water Resources, 2017. |
| Rheinbay, A Threat to Regional Stability: Water and Conflict in Central Asia, 20 April 2021. |
| ZOI, Environment and Security: Transforming risks into cooperation, 2006. |
| IMPACT, Armenia: Area-Based Risk Assessment in Tsaghkadzor consolidate community, Kotayk region, August 2022. |
| United Nations, In-depth Review of Disaster Risk Reduction in the Kyrgyz Republic, 2010. |
| International Alert, The impact of climate change on the dynamics of conflicts in the transboundary river basins of Kyrgyzstan, Kazakhstan and Tajikistan, July 2021 – January 2022. |
| CADRI Partnership, Capacity for Disaster Reduction Initiative: Scoping Mission Report: Kyrgyz Republic, 1-4 June 2021. |
| UNECE & INBO, Water and Climate Change Adaptation in Transboundary Basins: Lessons Learned and Good Practices, 2015. |
| UNOCHA, Emergency Response Plan: Kyrgyzstan, Executive Summary, 2021. |
| Blue Peace Central Asia, Climate-Cryosphere-Water Nexus: Central Asia Outlook, 2018. |
| IFAD, Introduction to Community Pasture Management Plans in Kyrgyzstan: Synthesis of the Country's rural pastoral development and lessons learned through IFAD-funded projects, October 2022. |
| Centre for Development and Environment, IWSM Policy Brief: Integrated watershed management in Tajikistan, March 2012. |
| Torre, Climate Change Adaptation Through a Security Lens: A Conflict-Sensitivity Approach to Peacebuilding in the Fergana Velley of Central Asia, June 2020. |
| Global Shelter Cluster, Settlements Approach Guidance Note: Where Boundaries and Action Merge, December 2020. |
| ACTED, HELVETAS & GIZ, Transition of Tajikistan Water Sector from Irrigation Water Management to Integrated Water Resources Management, 22 November 2018. |
| ICWC, Mandates and Objectives, 2022. |
| ACTED, HELVETAS& GIZ, Integrated Watershed Management in Tajikistan context, 2018. |
| ACTED, HELVETAS, GIZ, National Water Resources Management Project in Tajikistan, Disaster Risk and Watershed Assessment of Aksu Watershed: Final Report, January 2016. |
| ACTED, HELVETAS, GIZ, Aksu Watershed Management Plan: Tajikistan, 2021-2025., 2018. |
| ACTED, HELVETAS, GIZ, Additional Assessments of Risks of Natural disaster in Ak-Suu and Khoja-Bakyrgan River Watersheds, 2014. |

In addition, IMPACT, ACTED, and ALERT will engage closely with local stakeholders, in order identify similar projects to STREAM, as well as understand what data is presently available. This will be critical for ensuing that STREAM builds off of existing watershed boundaries and programmes already in use, so as to strengthen existing community engagement and

management structures. As of January 2023, IMPACT is aware of the following programmes using area-based approaches to engage with local communities to improve water resource management in Watersheds of the Fergana Valley:

- World Bank, Ferghana Valley Water Resources Management - Phase II
- USAID, Regional Water and Vulnerable Environment Activity
- USAID, SMART WATERS (completed project)
- SDC, National Water Resources Management Tajikistan
- UNDP, Climate Change and Resilience in Central Asia.
- ACTED, DIPECHO X
- EU, WEECOP
- GIZ, Green Central Asia

Alongside this overall desk Review, ALERT will also conduct a desk review of conflict analysis literature of the area to provide higher-level overview of conflict triggers and dynamics in the most at-risk parts of the Fergana Valley. As one of the primary methods for data collection in Peace and Conflict Analysis, the desk review will offer a thorough understanding of the conflict context in the Batken/Sughd Area. It will involve a comprehensive review of existing studies, reports, and articles related to regional conflict. The desk review will encompass both academic and non-academic sources such as government reports, news articles, and NGO publications.

It aims to identify the historical, political, economic, environmental, demographic, and social factors contributing to the conflict in the region. Moreover, examining relevant policy documents and legal frameworks related to climate policies in the area may lead to a more comprehensive understanding of the conflict's profile, root causes, actors, and dynamics.

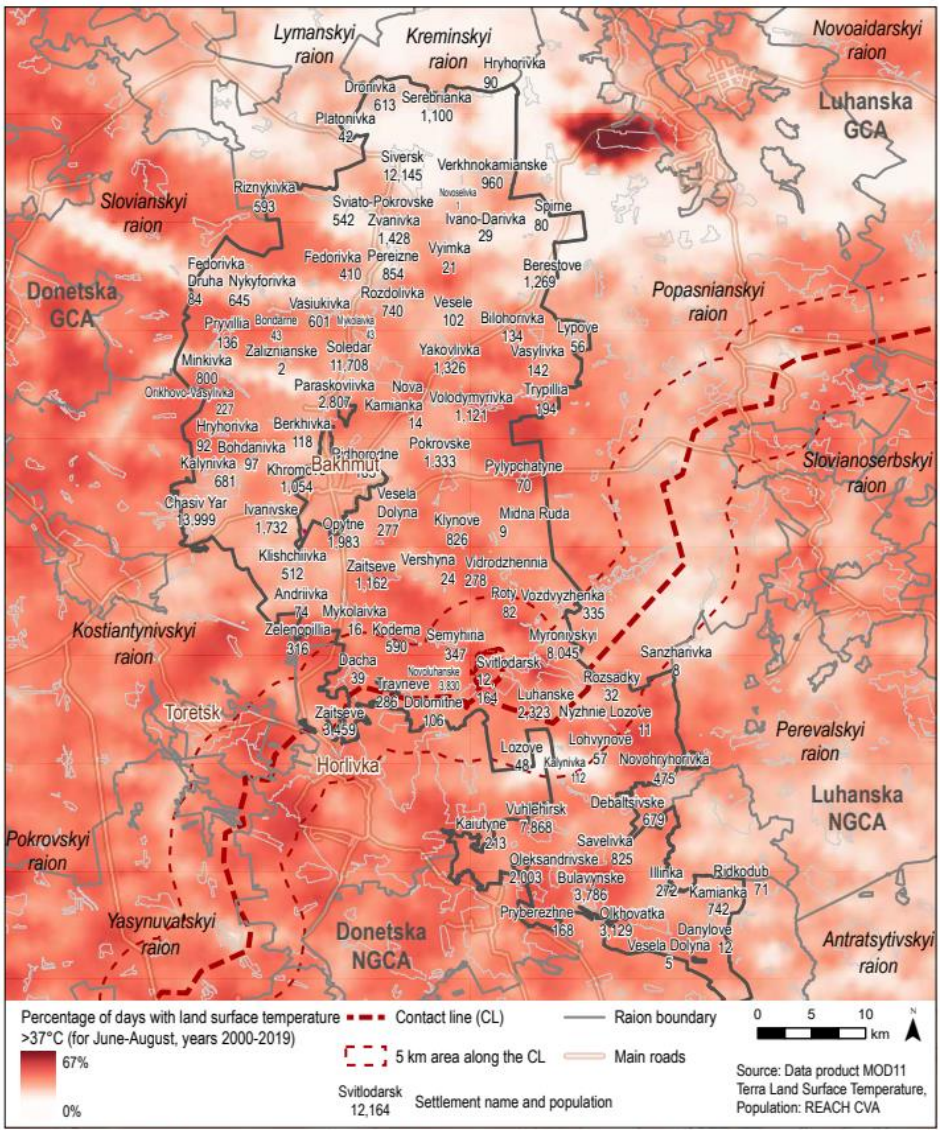
The Secondary Data Review will also include a detailed stakeholder mapping, in order to identify key stakeholders for engagement at Regional, National, Subnational, District, and Community Level. This exercise was initiated in an internal ACTED and IMPACT meeting on 1 February and will continue to be updated on a regular basis. Engagement with these stakeholders will vary depending on the roles that they play in SRB water management. Other stakeholders will be identified as potential Key Informants to be interviews in Phase 2. In some cases, IMPACT, ACTED, and ALERT will reach out for data sources, while in others, the stakeholders will be supported through STREAM programming. A full list of stakeholders is included in Annex 1.

In tandem with the Desk Review of Secondary Data, IMPACT will seek to identity and acquire any quantitative geospatial datasets that are to be used in the planned Watershed Stress Index of the Fergana Valley (see 2.4.3, below). These indicators are informed by a preliminary reading of the sources noted in the secondary data review and will be updated following the Desk Review as necessary. Data for these indicators will be collected primarily through existing datasets, such as the Kyrgyz Government's online repository[37] and common operational datasets available on the Humanitarian Data Exchange.[38] This information will be supplemented by raster geospatial data taken from satellite imagery such as MODIS[39],

[37] Republic of Kyrgyzstan, Portal of geoinformation and climate data of the Kyrgyz Republic, 2023.
[38] UNOCHA, The Humanitarian Data Exchange, 2023.
[39] NASA, Moderate Resolution Imaging Spectroradiometer, 2023

LANDSAT[40], and Sentinel[41] Satellites.[42] As most of this data will either be discretely defined infrastructure (infrastructures, industry, public services, etc.) with specific GPS locations, or natural formations (rivers, canals), or raster satellite imagery which can be analysed down to the pixel size of the data (usually a space between 1 and 30 metres), all data should be able to be analysed up to the level of each watershed. An example of this kind of geospatial Analysis conducted by IMPACT in Ukraine is shown in Map 2, below:

**Map 2: Heat Wave Prevalence between 2000-2019 in Bakhmut Raion, Ukraine, August 2020**




IMPACT will rely primarily upon online open-source available data for this analysis. In cases where any datasets are not available online, though non-open-source datasets may be consulted if necessary.

[40] NASA, LANDSAT Science, 2023

[41] European Space Agency, Sentinel Online, 2023.

[42] For a more detailed understanding of Raster and Vector geospatial data, please see: Gigography, Vector vs Raster: What's the Difference Between GIS Spatial Data Types?, 2023

The following GIS datasets have been identified by the IMPACT research team as being pertinent to the Watershed Stress Index analysis:

**Table 4. List of available GIS data sources to be utilized.**

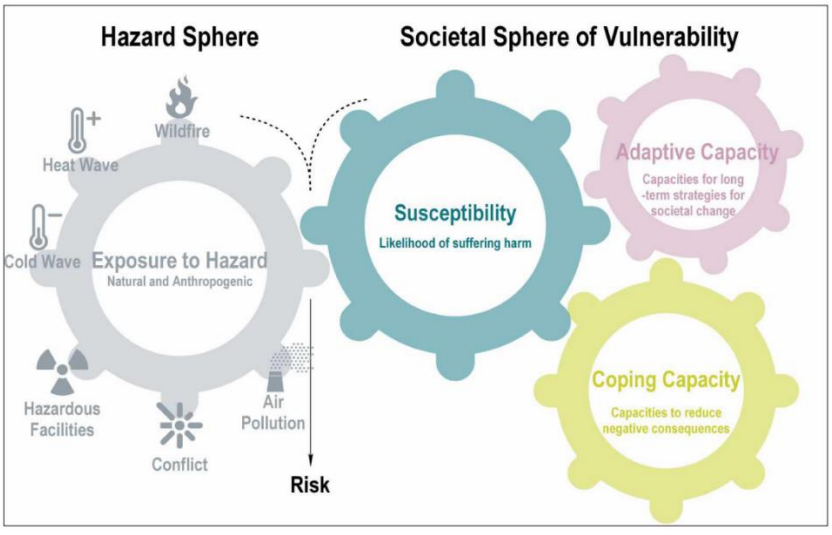
| Data source | Category | Short description | Area | Available data and comment | Risk data type |
|---|---|---|---|---|---|
| **Sentinel-2** | imagery | RS | Global | Multispectral imagery (10-30 meters) | Exposure |
| Planet | imagery | RS | Global | Multispectral imagery (3-7 meters) | Exposure |
| **MODIS Land surface temperature** | imagery | LST, 2001-2019 | Global | Data on historical land surface temperatures | Exposure |
| **Landsat 8** | imagery | RS | Global | Multispectral imagery (15-30 meters) | Exposure |
| Copernicus land use raster | imagery | Radar based, data of built environment, 2019 | Global | Data on built environment exposure, Agricultural lands | Exposure |
| **GHS Population raster** | imagery | Global population raster | Global | Population raster, RS-based, classic | Exposure |
| **ADM0** | administrative | Administrative boundaries | Central Asia | National administrative boundary | Exposure |
| **ADM1** | administrative | Administrative boundaries | Central Asia | Regional sub-national administrative boundaries | Exposure |
| **ADM2** | administrative | Administrative boundaries | Central Asia | Sub-regional administrative boundaries | Exposure |
| **ADM3** | administrative | Administrative boundaries | Central Asia | Community boundaries | Exposure |
| **ADM4** | administrative | | Central Asia | Settlement boundaries | |
| **Lakes** | **hydrography** | Lakes (large and small) | Global | OpenStreetMap | Exposure |
| **Reservoirs** | **hydrography** | Man-made reservoirs | Global | OpenStreetMap | Exposure |
| **Rivers** | **hydrography** | River network | Global | OpenStreetMap | Exposure |
| **Protected Areas** | **natural environment** | Nationally protected areas | Global | OpenStreetMap | Exposure |
| **Vegetation types** | **natural environment** | | Global | OpenStreetMap | Exposure |
| **Digital Elevation Model (ALOS)** | **natural environment** | ALOS DEM | Global | Raster model of 12 m resolution | Exposure |

| | | | | | |
|---|---|---|---|---|---|
| **Digital Elevation Model (Sentinel-1)** | **natural environment** | ALOS DEM | Global | Raster model of 10 m resolution | Exposure |
| **Wikimedia** | | Crowd mapping portal | Global | Includes locations of dangerous objects (farms, waste-sites, industrial facilities) | Exposure |
| **European Severe Weather Database** | **hydrometeorology** | Web-portal with information about severe weather events | Global | Meteorological data; | Exposure |
| **RP5** | **hydrometeorology** | meteorological datasets | Global | Temperature, precipitation, wind speed | Exposure |
| **World Clim 6** | **hydrometeorology** | Bioclimatic variables | Global | Climate change projections | Exposure |
| **ACLED** | **Societal hazards** | Conflict incidents | Global | Locations and size of incidents of conflict | Exposure |

### 2.4.3 Geospatial Analysis of Watersheds:

Following the collection of the GIS data, IMPACT will conduct a geospatial analysis of stressors of water and other resource use within each defined watershed, based on a similar model used to conduct Area-Based Risk Assessments (ABRAs) in Ukraine[43] and Armenia. ABRAs utilize a methodology adapted by IMPACT from the World Risk Index[44] multi-hazard risk equation. This falls within the Global Facility for Disaster Risk Reduction and Recovery (GFDRR) framework, which aims to help countries better understand and reduce their vulnerability to natural hazards and climate change.[45] Due to the specific focus on water usage for agricultural, power, and personal use, this analysis will modify the existing Multi-Hazard Risk model to focus specifically on stress to water sources, constituting a "Water Stress Index (WSI)."

**Figure 3: IMPACT Multi-Hazard Risk Model (Water Stress Index Variant)**




[43] IMPACT Ukraine, Area Based Risk Assessment: Bakhmut Raion, Donetska Oblast, Eastern Ukraine, August 2020.
[44] Bundnis Entwicklung Hälftete World Risk Report, 2022..
[45] GFDRR, Guide to Developing Disaster Recovery Frameworks: Sendai Conference Version, March 2015.

The model, shown in Figure 2, below, outlines the overall stressors on a given watershed by calculating the Exposure to particular stressors that a population in a given area shares against that population's overall vulnerability, if relevant, to those hazards.

The specific types of relevant to a particular context vary, making each risk model different depending upon the needs of the assessment. The specific hazards relevant to the Fergana Valley will be identified in the SDR and will be aligned with UNDRR's Hazard Classification scheme.[46] The risks identified thus far are outlined in the table below:

Using a simple analytic framework, each inceptor will be given a score by the severity in each SRB. This score will then be weighted based on its overall importance compared to other indicators. The final scores will then be added up, to give a single, overall "Water Stress Index "that can be used to rank and priorities the most in-needed SRBs.

In order to ensure that the analysis remains population-focused, all analyzed data will be presented as a % of settlements within each watershed, rather than the % of the total watershed area.

The Watershed Stress Index Analytic Framework is shown in Annex 2 at the end of this document, which includes the indicator, proposed weighting, and the Hazard Types and Clusters designated by UNDRR's World Risk Index:

The Water Stress Index is intended to measure the overall risk of watershed stress. While this will allow IMPACT, ACTED, and ALERT to identify the watersheds most at risk of stress over available natural resources, it does not account for all of the selection criteria for which SRBs will be selected for implementation. The following criteria will also be considered for selection:

- Estimated Population Size: SRBs with larger populations will be favored in order for STREAM to support a greater number of Beneficiaries.
- Implementing Agency Presence/Experience: SRBs where ACTED and ALERT are already present and are known by local stakeholders will be prioritized, in order to leverage pre-existing organizational resources and acceptance from local actors.
- Security and Access: Only SRBs where IMPACT, ACTED, and ALERT have access from national and local authorities to implement activities.

## PHASE 2: WATERSHED PROFILING THROUGH PRIMARY AND SECONDARY DATA COLLECTION:

Following the identification of the SRBs for STREAM implementation that IMPACT, ACTED, and ALERT will conduct a more detailed assessment of the selected SRB(s) through a combination of primary and secondary data collection in the SRB(s) themselves. Depending on the data required, data collection will occur with stakeholders from District or Ayil Aimak and Jamaot offices that represent different aspects of the SRB. To ensure a focused scope of research, data collection will only be conducted in SRB(s) prioritized for intervention by ACTED, IMPACT, and ALERT.

This research will take an Integrated Watershed Management (IWSM) approach, seeking to seek to understand the SRB's watershed across 5 key dimensions:

1. Water Resource Management
2. Agricultural Land Use

[46] UNDRR, Hazard Definition & Classification Review, 2020

3. Pastureland management
4. Disaster Risk Reduction
5. Conflict Analysis

Together, these 5 dimensions will provide a full profile of natural resource management practices, and risks, as well as their major implications in the SRB. This will be done primarily through a mixed methods approach, utilizing both quantitative and qualitative data collection. Quantitative data collection will involve the collection of key quantitative and geospatial datasets from local stakeholders knowledgeable on these topics, primarily from District-level and community-level (Ayil Aimak / Jamaot) institutions with relevant expertise. This data will, at District level, be supplemented with qualitative Key Informant Interviews (KIIs) which will provide additional context for the quantitative findings. The following key stakeholders will be consulted: In addition, International Alert will conduct the conflict analysis, which will involve qualitative KIIs with a variety of stakeholders in the SRB.

It should be noted that this activity may be limited to communities in Kyrgyzstan and Tajikistan, due to difficulties in access regarding community-level data collection in Uzbekistan. Even if access in Uzbekistan is granted, data collection will need to occur through a government-approved 3rd party. In addition, if access is not forthcoming, secondary data will be used to fill gaps regarding parts of transboundary communities. However, this is unlikely to cover all data gaps, and it should be expected that there will be a lack of data regarding transboundary SRB communities within Uzbekistan's boundaries.

In total, the following estimated quantitative interviews per SRB are expected (for the entire SRB, including data collection in both countries that have territory that is part of the SRB):

- x10 sets quantitative datasets from each community authority
- x10 sets pf quantitative datasets from each Water User Association
- x2 set of quantitative datasets from the District Agriculture Department
- x2 set of quantitative datasets from District Water Authorities
- x2 sets of quantitative datasets from ministry of emergency services

For qualitative data, the following number of interviews are expected:

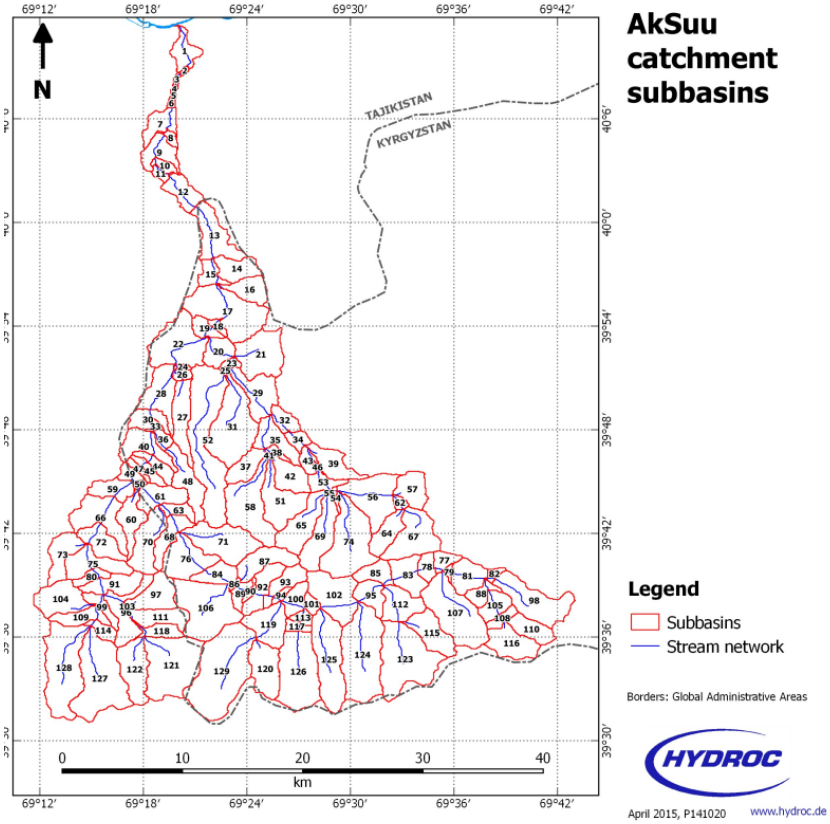
- 2-4 Water Management KIIs per SRB
- 2-4 Land Usage KIIs per SRB
- 2-4 Disaster Risk Reduction KIIs per SRB.

### 2.4.4. Collection of Local Secondary Data

During the secondary data review, IMPACT will carefully review previous research relevant to IWSM, and identify the datasets that are needed. In addition, a review of ABRAs previously conducted by IMPACT will be done to identify the datasets needed to conduct a full ABRA for the watershed. These sources will be used to identify the necessary datasets to fully profile the SRB to build an understanding of what datasets will be needed. In addition, IMPACT will review literature on how water wand land is managed, including the existence of Water User Associations or River Basin Councils, their structure, and how resources within the watershed are managed, and what the water is used for. Any maps or lists of water user associations, smaller, sub-watersheds of the SRB, and local water management institutions will be used as a baseline for how the SRB is structured overall. An example of such geospatial data is shown below, reproduced from the ACTED,

HELVETAS, and GIZ research on the Aksu watershed in 2018, which shows all of the sub-watersheds of the Aksu SRB. Where possible, these sub-watersheds will be compared with data on Water User Associations, villages, and other key infrastructure, to understand how the natural watershed is (or isn't) managed at a local level:

**Map 3: Sub-watersheds of the Aksu Sub River Basin, 2015:**




Depending on the datasets needed, data collected during this stage will be collected at one of 2 levels: 1) with community leadership from each Ayil Aimak / Jamaot in the Sub-River Basin, and 2) with District-level government authorities responsible for management of water within the SRB. According to ACTED teams experienced with engagement with local authorities, data is not held in a central, national repository, and it is common for some data to only be collected and held at a community or district level. As SRBs are not a formal administrative level, and are instead a natural topographic area, there is not any formal administrative office congruent to an SRB. However, the communities and government district offices that use and manage water and other natural resources in the SRB do manage resources at a level at or below the SRB, and it remains a relevant geographic area at which resources are used and managed, so stakeholders will be able to speak directly about the SRB with clarity. The stakeholders to be targeted for these datasets are listed in table XX below;

**Table 3: Local Stakeholders to be interviewed as part of Phase 2 data collection, 2023**.

| OID | District | Community |
|---|---|---|

| | | |
|---|---|---|
| 1 | District Water Authority | Water User Associations |
| 2 | Agriculture Department | Ayil Okmotu |
| 3 | Ministry of Emergency Services. | |
| 4 | Women's Advocacy CSOs | Women's Health Committees |

Quantitative data will be collected at all levels, while 1-2 KIIs will be conducted with each District-level authority.

Based on a thorough review of ACTED IWSM Assessments and IMPACT Area-Based Risk Assessments (ABRAs), a total of 42 datasets needed for data collection were identified. These are included in a table in Annex 3. The datasets include information on the following Topics:

- Natural Hazards
- Livestock
- Demographics
- Meteorological data
- Water
- Agriculture
- Economy
- Land
- Household Vulnerability

The following number of datasets will need to be collected from local stakeholders is outlined in the table below. There is an overlap in datasets between certain local stakeholders, as there may be a difference in the quality of data and the amount of data available between stakeholders at different levels, so to ensure that the data needed is collected, IMPACT and ACTED will aim for some redundancy in these datasets.

**Table 5: Quantitative datasets to be collected from each stakeholder**

| **Stakeholder** | **# of datasets needed** |
|---|---|
| WUA | 6 |
| Community Authority | 28 |
| Agriculture Department | 9 |
| District Water Authority | 5 |
| MOES | 10 |

These datasets will be checked daily by the assessment team during data collection to ensure that they contain the necessary data. Once collected, all datasets will be aggregated into a single database with a standard format for ease of use for the data analysis.

#### 2.4.5.1. Qualitative Key Informant Interviews

In addition to quantitative data, IMPACT, with the support of ACTED and ALERT, will develop a semi-structured[47] qualitative tool to interview Key Informants (KIs) at district level, specifically the District Water Authority, Agriculture Department, and Ministry of Emergency services. Three tools will be developed, which are intended to provide information on 3 difference aspects of natural resource management in the SRB:

1. **Water Resource Management KII:** A KII with the District Water Authority. Provides an understanding of how water resources are managed, how water is used and apportioned, and how disputes over water usage are managed. Also provides information on the impact of climate change on water availability.
2. **Land Management and Use KII:** A KII with the District Agriculture Department. Provides an understanding of how land is owned and used in the SRB. Includes information on agricultural growing practices and crop output, livestock grazing patterns and pasture management, and the use of other natural resources like forests and mines. Includes information on impact of climate change on crop growing and livestock rearing practices.
3. **Disaster Risk Reduction KII:** A KII with MOES staff. Covers patterns and impact of natural disasters and land degradation, as well as local community practices that both mitigate and worsen the impact of natural disasters on the SRB's water and land quality and availability.
4. **Gender Representation KII:** A KII with representatives from women's community health committees and advocacy CSOs on the role of women in natural resource management, how well they are represented as part of the current resource management structures, and how their representation can be improved.

These interviews will be necessary for providing a background context for the quantitative data collected. Due to IMPACT and ACTED's limited resources for this research, these KIIs will only be able to be conducted at District level.

To support the limited amount of qualitative data collected, a more general KII tool will be developed by IMPACT to collection information from unstructured interviews. All of the data from both the quantitative and qualitative data collection will need to be collected in meetings with the local stakeholders. These stakeholders will want to discuss the larger issues with the watershed, and have additional, unplanned information regarding topics around the quantitative datasets being collected. To ensure this information is adequately captured, the unstructured tool will include several formal categories, within which interview notes can be recorded. These will include:

- The stakeholder's role in management of natural resources in the watershed
- Challenges the stakeholders faces in managing resources in the watershed.
- How the stakeholder and other stakeholders or the population work together to manage resources in the watershed
- And major challenges in managing resources in the watershed.
- What kind of external support they think they need to manage the watershed.

In addition, the DRR KII contains an additional, quantitative section to record the history of natural disasters and the overall risk regarding impact and frequency of disasters for each village in the SRB, using the MECO methodology that ACTED used in its previous IWSM assessments.

[47] A semi-structured tool is a data collection tool that has fixed questions that are asked to every respondent, but also allows for open ended responses, where any answer may be given by the respondent. This is a common type of tool for Key Informant and Focus Group Discussion methodologies.

1 informal interview (II) will be conducted per meeting to with each local stakeholder to obtain data, which means that in total:

- X10 KII with Ayil Okmotu
- X10 KII with WUAs
- X10 KII with Women's Health Committees
- X1-2 KII with Agriculture department staff
- X1-2 KII with Water Department Staff
- X1-2 KII with MOES staff.
- X1-2 KII with Women's Advocacy CSO staff

ACTED and ALERT will support IMPACT in identifying the most appropriate Key Informant participants to be interviewed on behalf of each SRB. These will most likely be Representatives from the Water User Associations, Pasture Committees, and Ayil Okmotus. At district level, it will include representatives of the District Agriculture Department, District Water Department, and District Department of Emergency Services . Data will be collected by IMPACT Staff with the support of ALERT and ACTED. Data will be written down on paper forms and transcribed from the language of the interview (either Kyrgyz, Tajik, Uzbek, or Russian) into English. This data will be kept in password-protected files with no personally identifiable information, according to IMPACT Guidelines.[48]

#### 2.4.5.2. Conflict Analysis

The Conflict Analysis will be conducted with a gender-sensitive approach, in accordance with Alert's guiding principles. This will involve analyzing peace and conflict dynamics and actors through a gender and intersectional lens. The analysis also should be carried out in a conflict-sensitive manner, avoiding aggravating the conflict in the areas where the analysis will be conducted. Moreover, it should cover both peace and conflict factors, provide an in-depth understanding of the conflict profile, causes, actors, and dynamics at a specific level, take into account regional or international dynamics, and consider multiple perspectives.

The Conflict Analysis methodology will be aligned with USAID's Conflict Assessment Framework[49] (CAF 2.0) and will take the following steps:

- CAF 2.0 methodology workshop – a training for Conflict Analysis team and partners on the CAF 2.0 methodology and the joint development of the data collection tools.
- desk review – this will be based on the broad desk review on conflict context in the Batken/Sughd Area which was conducted as part of the Phase 1 on Identification and Prioritization of Watersheds for Intervention.
- data collection – qualitative field study combining KIIs and FGDs in each of the selected watersheds.

| Locations | Responsible | FGDs | KIIs |
|---|---|---|---|
| To be selected | ALERT | Number of FGDs – TBD<br><br>FGDs within each defined watershed comprising women, youth, community leaders, farmers… | Number of KIIs – TBD<br><br>Resource people at national, sub-national, local and community levels |

[48] IMPACT< Personally Identifiable Information Standard Operating Procedures, 2020
[49] USAID, Conflict Assessment Framework Application Guide, June 2012.

| | | | |
|---|---|---|---|
| | | Each FGD will have a minimum of 10 and a maximum of 15 participants. | |

**Exploring conflict profile, causes, actors and dynamics: guiding questions, including gender questions**[50]

| | Definition | What you are trying to understand – guiding questions |
|---|---|---|
| **Conflict profile** | Brief characterization of the context under analysis, whether at the local, sub-national, national or regional level | What are the historical, political, economic, social, cultural, demographic and environmental issues that define the overall context?<br><br>How are women and men, girls and boys, and people with other gender identities differently affected by this context?<br><br>What are the emergent political, economic, environmental, and social issues?<br><br>What conflict-prone/affected areas can be situated within the context?<br><br>Is there a history of conflict (e.g., critical events, external intervention)? |
| **Conflict causes** | Specifically, these include causes of violence and violent conflict, both structural (relating to the structure of society, politics or the economy) and proximate (relating to the immediate social, political or economic environment), as well as triggers (specific events or actions that have, or could, set off violence) | What are the structural causes of conflict?<br><br>What issues can be considered as proximate causes of conflict?<br><br>What triggers could contribute to the outbreak/further escalation of conflict?<br><br>What new factors contribute to prolonging conflict dynamics? Are there clearly identifiable conflict effects which are becoming causes in their own right?<br><br>What factors can contribute to peace?<br><br>Are these factors differently perceived/defined by women and men, girls and boys, and people with other gender identities? How? |
| **Conflict actors** | Individuals, groups, institutions contributing to conflict or being affected by it in a positive and negative manner, as well as those engaged in dealing with conflict; and how they relate to one another. Alert and/or partner(s) should be included as stakeholders in the context.<br><br>Consider their interests, motivations, power, influence, capability, legitimacy, opportunities and resources, as well as their vulnerabilities.<br><br>Power is key when considering actors, specifically its distribution and control. | Who are the main actors in the conflict being analyzed?<br><br>Does the list of actors include both men and women and consider their different roles in local conflict?<br><br>What are the main actors' interests, goals, positions, capacities and relationships?<br><br>How is power distributed between the main actors?<br><br>Are some actors more marginalized than others? Which ones?<br><br>Who perpetrates violence? Who is subject to violence?<br><br>Which actors have the capacity and desire to promote peace and stability?<br><br>What formal and informal mechanisms for conflict management exist at local, national and regional levels? What is their capacity? |

[50] International Alert, Peace and conflict analysis, 2021

| | | |
|---|---|---|
| **Conflict dynamics** | The result of the interaction of the issues identified in the profile, causes and actor analyses. Understanding the dynamics enables the identification of different trends of violent conflict occurring, and the possible formulation of scenarios. | What are current conflict trends (e.g., escalation, de-escalation, and spiraling)?<br><br>Are there any factors that might contribute to an escalation or prolongation of the conflict in the future (e.g., competition over resources, etc.)?<br><br>What events, actions, and decisions can be identified as actual or potential trigger factors? What consequences have these trigger factors had or will they have on structural causes and key actors?<br><br>How are women and men, girls and boys, and people with other gender identities differently affected? Or could be differently affected?<br><br>What factors can contribute to peace? What factors are bringing people together?<br><br>What conflict management strategies have been tried in the past? What were the results of these efforts? What are the advantages or disadvantages of pursuing the same strategy or strategies for the present conflict? |

## PHASE 3: PRESENTATION OF INFORMATION THROUGH WORKSHOPS AND COMMUNITY RESPONSE PLANS

In the final phase, the information collected will be aggregated and analysed in detail, and drafted into a final report , after which the findings will be presented back to key experts and communities, in order to develop recommendations and project plans based on the report findings. This will be done through workshops held at two levels:

1) At regional level, with experts to determine policy prescriptions regarding how natural resource management can be improved, given the findings of the assessment.
2) At local level, with local governance and community leadership, who will help develop and agree upon projects that the communities believe will support improvements in natural resource management between different communities in the watershed(s) of intervention. This will also be an opportunity to adjust and adapt the IWSM to a local policy level, in order to improve water management. This should be done with stakeholders from both Jamoat / Ayil Aimak level, who can identify local issues, and then at the level of the SRB to identify and discuss cross-community issues.

### 3.5 Product Drafting and Preliminary Findings

Following the completion of data collection, IMPACT, with the support of ACTED and ALERT, will draft 2 products, one for each workshop:

1. x1 Regional report outlining key drivers of water stress and methods of resource management in transboundary SRBs
2. x1 Profile of the SRB of intervention, including water management structures, key stressors of water availability, and transboundary resource management dynamics.

Both reports will be relatively concise, focusing on presenting the key findings of the assessment, providing both the geospatial findings of the assessment, along with contextual information on how the different data streams link together.

The regional report will largely rely on the data analysis from Phase 1, with an overview of Phase 2 as a potential "case study" to illustrate local dynamics in contrast with regional trends.

The SRB Profile will take information mainly from Phase 2, to provide a comprehensive assessment of the SRB watershed. This will be combined with WSI indicators analysed at sub-SRB level to provide an understanding of key water stressors within the SRB,

All products will be validated by IMPACT's global Research Department, to ensure it meets global IMPACT quality standards. Input from ACTED and ALERT will also be integrated into the reports.

### 3.5 Public Consultations and presentation of regional analysis

Following the completion of both the regional report and SRB profile, ACTED and ALERT, with the support of IMPACT, will engage at both regional and SRB level, presenting both products in respective workshops:

**Regional Dialogue Workshop**

The regional report will be shared as part of a regional workshop in August 2023 with key stakeholders from all three countries. This will be a detailed discussion at mainly national level regarding major transboundary watershed issues and seek to outline policy solutions on how to address greater resource sharing and communication, in order to improve national resource management at a community level between countries. These will include members of government, academia, and civil society, who have experience that may be brought to bear in interpreting the analysis and findings of the assessment and may highlight additional context and key issues that may help explain some of these analyses, as well as identify possible solutions and recommendations to issues highlighted in the analysis.

**SRB Local stakeholder workshop**

The SRB profiles will be shared in local workshops with key government and community stakeholders within the selected SRBs. These workshops will present the data from Phase 2 back to the SRB stakeholders with the data of the specific SRB, and, building off its Area Based Methodology for community response planning in Armenia, will use a structured workshop in order to explain the data's key findings, and discuss additional underlying reasons, and possible projects that may resolve these issues. These projects will then be agreed upon during the workshop, the most feasible of which will become an SRB development, "agenda" which ACTED, and ALERT will support the SRB community and local government structures in implementing. The final list of projects will become a published product, which may be used by ACTED and ALERT for additional advocacy to implement under future grants or be used by other NGOs to implement under their existing funding and constituting a form of community-based coordination and planning.

The final Community Response Plans will also be shared with the government, with the aim of integrating these plans into larger, government development planning documents.

## 3. Roles and responsibilities

**Table 2: Description of roles and responsibilities**[51]

| *Task Description* | *Responsible* | *Accountable* | *Consulted* | *Informed* |
|---|---|---|---|---|
| *Research design* | *IMPACT Team* | *Assessment Specialist* | *ACTED, ALERT* | *IMPACT RDDU* |
| *Supervising data collection* | Assessment Officer, ACTED, ALERT | Assessment Specialist | ACTED, ALERT | IMPACT RDDU |
| *Data processing (checking, cleaning)* | Assessment Officer, ACTED, ALERT | Assessment Specialist | IMPACT Data Unit | ACTED |
| *Data analysis* | GIS Officer, ALERT | GIS Specialist | Assessmetn Specialist | ACTED/ALERT |
| *Output production* | Assessmetn Officer/GIS Officer, ALERT | Assessment Specialist, | IMPACT RRU | ACTED/ALERT |

[51] Note: ALERT will be responsible for the Conflict Analysis portions of Phase 1 and 2, only.

| | | | | |
|---|---|---|---|---|
| *Dissemination* | IMPACT/ACTED/ALERT | Assessment Specialist | IMPACT RDDU | USAID |
| *Monitoring & Evaluation* | IMPACT, ACTED, ALERT | Assessment Specialist, ACTED AMEU Manager | IMPACT RDDU | ACTED |
| *Lessons learned* | *Assessment Officer* | *Assessmetn Specialist* | *IMPACT RDDU* | *ACTED* |

***Responsible:*** *the person(s) who executes the task*

***Accountable:*** *the person who validates the completion of the task and is accountable of the final output or milestone*

***Consulted:*** *the person(s) who must be consulted when the task is implemented*

***Informed:*** *the person(s) who need to be informed when the task is completed*

## 4. Key ethical considerations and related risks

***For detailed guidance on how to complete this section, see also Step 5 of the IMPACT Research Design Guidelines***

The proposed research design meets / does not meet the following criteria:

| ***The proposed research design…*** | ***Yes/ No*** | ***Details if no (including mitigation)*** |
|---|---|---|
| … Has been coordinated with relevant stakeholders to **avoid unnecessary duplication** of data collection efforts? | Yes | |
| … **Respects respondents, their rights and dignity** (*specifically by: seeking informed consent, designing length of survey/ discussion while being considerate of participants' time, ensuring accurate reporting of information provided*)? | Yes | |
| … Does not **expose data collectors to any risks as a direct result** of participation in data collection? | Yes | |
| … Does not **expose respondents / their communities to any risks as a direct result** of participation in data collection? | Yes | |
| … Does not involve **collecting information on specific topics which may be stressful and/ or re-traumatising** for research participants (both respondents and data collectors)? | Yes | |
| … Does not involve **data collection with minors** i.e., anyone less than 18 years old? | Yes | |
| … Does not involve **data collection with other vulnerable groups** e.g., persons with disabilities, victims/ survivors of protection incidents, etc.? | Yes | |
| … Follows IMPACT SOPs for management of **personally identifiable information**? | Yes | |

# 5. Data Analysis Plan

The Data Analysis Plan for both the Geospatial Analysis and the Key Informant Data Collection will be completed following the completion of the Secondary Data Review, in order to ensure that both are developed based on a complete understanding of the current context and existing information. The Key Informant Interviews from Qualitative data will be analysed using data saturation grid methodology, in which findings will be disaggregated by community, SRB, and national findings. The quantitative datasets will be disaggregated and analysed by Community, SRB, and national findings as well. As the quantitative data will come from secondary government sources, and is collected as descriptive data, the findings will largely be presented at face value, and analysed in Microsoft Excel. Some of the quantitative data will be used with Geospatial data to help to calculate risk modelling as part of an Area-based risks assessment, expanding on the assessment work done in Phase 1, but more granularly, for the Sub-River Basin.

**Annex 1: Results of Stakeholder Mapping Exercise, February 2023:**

| | **Institutions** | | **Projects** |
|---|---|---|---|
| Regional | -SIC ICWC<br>- IFAS Agency<br>- CAREC<br>- BWO Syr Darya<br>- IWMI<br>- OECD<br>- GIZ<br>- EU<br>- USAID<br>- Central Asian Institute of Applied Geoscience | | '- DIPECHO EU<br>- WEECOP<br>- WAVE USAID<br>- Smart Water USAID<br>- CAWA Project<br>- Peace CA<br>- CAREC Nexus Project<br>- Green Central Asia GIZ<br>- CaWater INFO<br>- IKI Project<br>- Climate Change and Resilience UNDP |

| **Level** | **Tajikistan** | **Kyrgyzstan** | **Uzbekistan** |
|---|---|---|---|
| National | - Executive Committee IFAS<br>- Agency for Hydrometeorology<br>- Ministry of Energy and Water Resources | – Ministry of Natural Resources, Environment and Technical Supervision of the Kyrgyz Republic<br>– Ministry of Emergency Situations of the Kyrgyz Republic<br>– <Development Partners Coordination council (DPCC)<br>– Centre for Environmental Research, Consulting and Auditing under Ministry of Natural Resources, Environment and Technical Supervision of the Kyrgyz Republic<br>– Water Resources Service under Ministry of Agriculture of the Kyrgyz Republic<br>– State Agency for Architecture, Construction, Housing, and Communal Services under the Cabinet of Ministers of the Kyrgyz Republic<br>– Agency on Hydrometeorology under Ministry of Emergency | - Ministry of Water Resources<br>- Ministry of Rural Development<br>- Ministry of Natural Resources<br>- Ministry of Emergencies<br>- Ministry of Foreign Affairs<br>- Committee on Inter-Ethnic Relations and Friendly Relations with Foreign Countries<br>- International Institute for Central Aisa<br>- Irrigation and Water Research Institute |

| | | | |
|---|---|---|---|
| | | Situations of the Kyrgyz Republic<br>– Institute of Water Problems and Hydropower at the National Academy of Sciences of the Kyrgyz Republic | |
| Sub-national | - Oblast Khuhumat<br>- Syr Darya BVO<br>- Committee of Emergency<br>- Joint commission on border demarcation<br>- Joint committee for cross border cooperation | – Regional Offices of the Plenipotentiary Representatives of the President of the Kyrgyz Republic in Osh, Jalal-Abad, and Batken provinces<br>– The authorized representative office of the Ministry of Foreign Affairs of the Kyrgyz Republic in Osh, Jalal-Abad, and Batken provinces<br>– Regional Departments of Ministry of Natural Resources, Environment and Technical Supervision of the Kyrgyz Republic in Osh, Jalal-Abad, and Batken provinces<br>– Basin Water Management Departments of Water Resources Service under Ministry of Agriculture of the Kyrgyz Republic in Osh, Jalal-Abad, and Batken provinces | - Provincial level of Water Ministry<br>- Hukumat administration<br>- State Reserves Management Committee<br>- Working Group on Delimitation and Demarcation<br>- BWO Syr Darya |
| Local Administration | - Agroprom<br>- Vodokhoz<br>- Vodokanal<br>- Leskhoz<br>- Youth Committees<br>- Women's committees | – Local State Administrations in Osh, Jalal-Abad, and Batken provinces<br>– Karadarya-Syrdarya-Amudarya Basin Water Resources Administration<br>– District Water Management Departments of Water | - City Khokimiyats<br>- District Khokimiyats |

| | | | |
|---|---|---|---|
| | | Resources Service under Ministry of Agriculture of the Kyrgyz Republic | |
| Community Level | - Mahalla Committees<br>- Community Members<br>- Jamoat municipal authorities<br>- WUA<br>- Farmers<br>- Small basin councils/Working Groups | – The executive bodies of the local government (Aiyl Okmotu)<br>– The representative bodies of the local government (Aiyl Kenesh)<br>– Water Users Associations<br>– Pasture Committees<br>– Youth councils<br>– Women's groups<br>– Village Heads<br>– Farmers Unions (Dyikan Charba) | - Mahalla committees<br>- Village Heads<br>- Youth Committees |

**Table 6: Watershed Stress Index Analytical Framework, April 2023**

| Hazard group | W1 | hazard | Indicator | W2 | Primary Impact on the region | Driving force | Dataset | Justification / Comments |
|---|---|---|---|---|---|---|---|---|
| Land and natural ecosystem degradation | 0.1 | **Soil degradation** | **Soil salinity** | 0.3 | Agriculture productivity | Agriculture practices (irrigation), water and land management | Landsat-8 spectral index | |
| | | | **Soil water erosion** | 0.4 | Agriculture productivity | Hydrographic condition, soil condition and agriculture practices | RUSLE model: topography, soil clay component, rain erodibility, land use | |
| | | | **Dust storm** susceptibility / Soil wind erosion | 0.3 | Agriculture productivity | Agriculture practice, climate condition (drought condition, windstorm) | Sentinel-5 Aerosol index | |
| | | | | | | | Wind speed | |
| | | **Ecosystem losses, degradation** | **Forest and pastures disturbances** | 0.7 | Forest, and pastures losses | Deforestation, wildfires, degradation including due to drought) | Land Trend model (based on Landsat imagery) | remove |
| | | | **Wildfire** susceptibility | 0.3 | Forest, and pastures losses | Drought conditions, human activity, agriculture practices (burning to clear the field after/before harvesting), | Fire frequency: FIRMS dataset | remove |
| Climate change / **temperature-related hazards** | 0.1 | **Heatwave** | **Heatwave** susceptibility | 0.4 | Drought (agriculture productivity), wildfires, human health | Climate change – temperature rise | Heatwave index – 20y | |
| | | | | | | | Heatwave index change 10/10 years | |
| | | **Drought** | **Drought severity** | 0.6 | Drought (agriculture productivity), wildfires, human health | Climate change – temperature rise | VCI – 20-year. Methodology link | |
| | | | | | | | Temperature changes | |
| | | **Flood** | | 0.3 | | | Soil erodibility | remove |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Climate change / **precipitation-related hazards** | **0.3** | | **Flood** susceptibility | | Crop, pasture, property losses, human life threat | Climate change – seasonal temperature, precipitation change (higher temperature in winter, faster snow melting) | Topography: slope | |
| | | | | | | | Vegetation cover (NDVI) | |
| | | | | | | | Mean yearly precipitation | |
| | | | | | | | Snow cover, change in snow density (1961-1990 vs 1991-2020) | |
| | | **Water scarcity** | **Water balance** | **0.7** | Drought (agriculture productivity), wildfires, human health | Climate change – seasonal temperature, precipitation change, Water management. | Change in snow density (1961-1990 vs 1991-2020) | |
| | | | | | | | Snow cover (current) | |
| | | | | | | | Water availability (stream power) | |
| | | | | | | | Precipitation yearly mean | |
| **Societal hazards** | **0.3** | **Conflict** | Armed and non-armed conflict/violence | **1** | | Security, human life threat, agriculture disruptions | Number of clashes / non-armed conflict incidents / Number of shelling incidents | Review IA Data. Final measurement should incorporate 3 elements:<br>1. Frequency<br>2. Severity<br>3. Recency |
| **Technological hazards** | **0.2** | **Technological hazard** | Presence of other hazardous hazards | **1** | Water and soil contamination | | Number of hazardous industrial facilities (industrial zones from OSM in 1 km from river network) | Update with the most hazardous (gold mine, uranium and sewerage systems) |
| **Hazard exposure component** | | | Agriculture and pastures lands | **0.5** | | | % Of watershed land use that is agricultural | |
| | | | Population | **0.5** | | | Population density (400 m raster, 2022-06-30) | |
| | | | *Hydro-electric power industry (TBC)* | | | | Presence of Hydro-electric power/dam in the watershed | |