PROFILE

Irrigation Management in Pump Khana Manteqa, Jawzjan

August 2025 | Pump Khana Manteqa, Jawzjan Province, Afghanistan

KEY MESSAGES

- Most households reported insufficient irrigation water, with seasonal shortages and drying of sources mid-season contributing to widespread concern about future availability.
- Borewells seem to be the dominant source of irrigation, but prolonged drought and rising evapotranspiration are increasing pressure on groundwater, with limited recharge and signs of unsustainable extraction.
- Water access and allocation appear to rely heavily on informal coordination and public infrastructure, yet frequent breakdowns, sediment buildup, and limited storage capacity are likely to reduce reliability and predictability.

ASSESSMENT OVERVIEW

This assessment aims to analyze seasonal and year-round patterns of irrigation water use and access, evaluate drivers of variability and scarcity, including climatic and socio-economic pressures, and examine local governance structures and community capacities to inform sustainable irrigation interventions across five manteqas in Northwest Afghanistan.[2] The selected manteqas have been targeted to implement a pilot of Acted's THRIVE initiative to support rangeland restoration in cooperation with local communities.

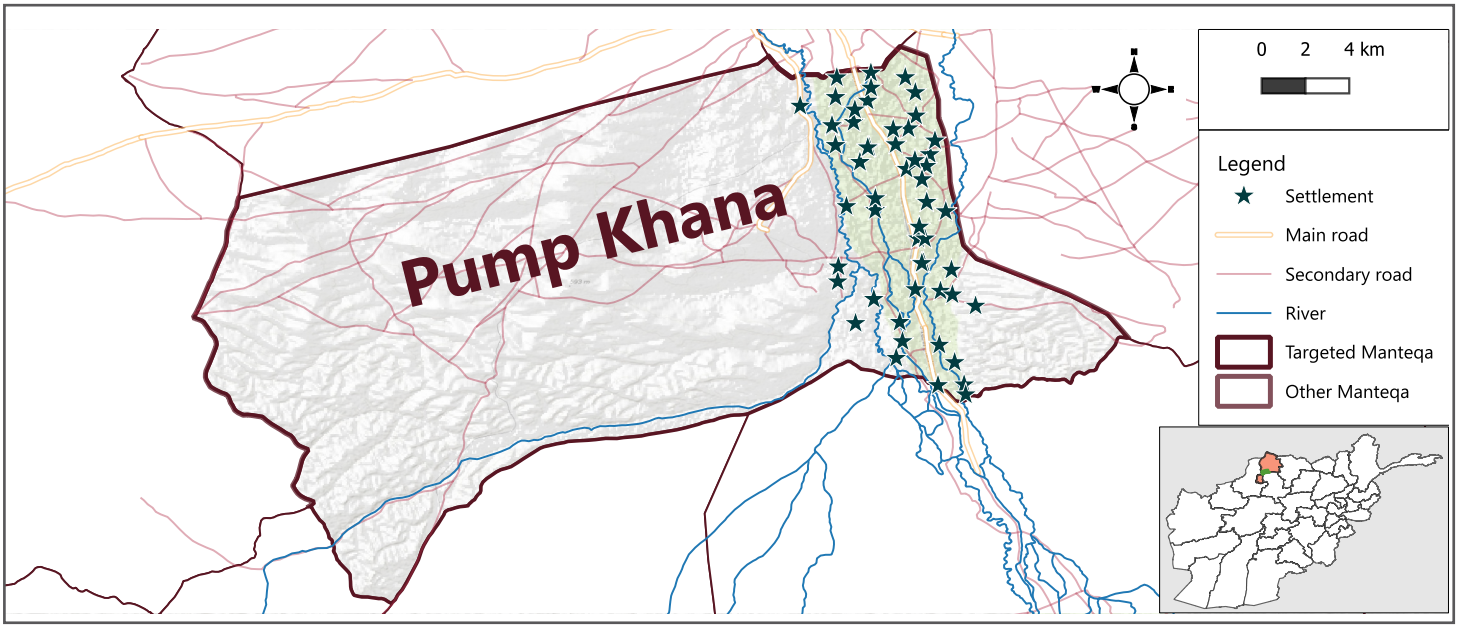
Methodology

The Irrigation Management Research Assessment uses a mixed-methods approach combining a household survey, Key Informant Interviews, and remote sensing indicators to assess irrigation sources, systems, management, and performance in five manteqas in Northwest Afghanistan. Data collection took place between 26 May and 13 June 2025. All findings presented here should be considered indicative. For an overview of the methodology, please see below.

CONTEXT & RATIONALE

The convergence of prolonged environmental stress, socio-economic hardship, and limited institutional capacity has placed rural communities in Northwest Afghanistan under increasing pressure. In areas where livelihoods depend on irrigated agriculture, recurring droughts, declining surface flows, and growing competition over groundwater have intensified vulnerabilities.[1] To support sustainable recovery and resilience-building, the Irrigation Management Assessment aims to generate localized, evidence-based insights into water use, availability, and the governance of irrigation systems. Conducted as part of the Sustainable Rural Development V programme, the assessment seeks to inform programming and prioritization for sustainable irrigation by tracking seasonal patterns and household practices across five manteqas. The inclusion of remote sensing enhances the ability to monitor environmental change and irrigation demand over time and to triangulate these patterns with community-reported data.

Map 1: Pump Khana Manteqa



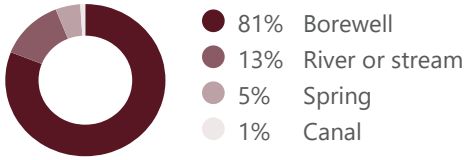
IRRIGATION INFRASTRUCTURE AND COORDINATION

Introduction

Pump Khana is located in Jawzjan Province, comprising 56 villages with an estimated 16,530 households (111,698 individuals).[3] Less than 1% of the population are returnees and around 1% are internally displaced persons (IDPs).[4] According to a previous assessment, most of Pump Khana's residents rely on agriculture for their livelihoods, and around 16% of its area is considered irrigated land, all of which is located around the manteqa's settlements.[5]

Water sources and infrastructure

Primary irrigation water source (by % of surveyed HH)

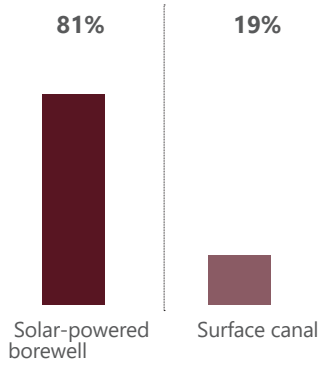


Most surveyed HHs reported drawing irrigation water from borewells. As per a previous REACH assessment, excessive use of borewells is likely to enhance risks of overextraction, with groundwater levels and soil moisture dropping substantially in dry periods.[7]

According to KIs, other common irrigation-related infrastructures in the manteqa include water intakes, culverts, and retaining walls to store water, fed mostly by rainwater and snow-melt.

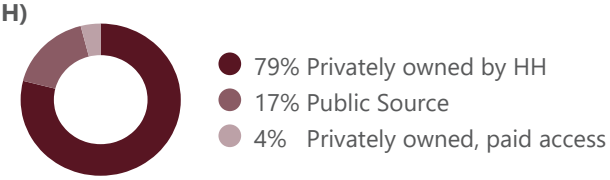
While many surveyed households reported using borewells as their main irrigation source, some also described surface canals as additional irrigation methods. The chart below shows the share of households using each irrigation system (multiple responses allowed). This indicates that irrigation practices may involve a mix of water delivery systems, even if based on groundwater extraction.

Irrigation systems used (% of surveyed HH)[6]



Private ownership of water sources in the manteqa seems widespread, although some also reported public ownership. Households that do not rely on common infrastructure may be less likely to coordinate with others, which may risk local overextraction of available water.

Reported ownership of water source (% of surveyed HH)

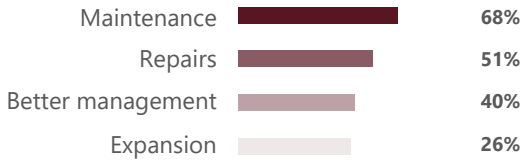


Maintenance of irrigation infrastructure

KIs indicated that existing water infrastructure is maintained through community action and community financial contributions, sometimes with the help of the local government department for irrigation and NGOs. Such maintenance includes repairs and regular removal of sediments, and is traditionally coordinated by local water managers.

Surveyed HH reported that irrigation systems in the manteqa could benefit from improvements such as maintenance (68%), repairs (51%), and better management (40%), with only about a quarter pointing to a need for expansion. These findings may suggest that irrigation infrastructure is broadly sufficient but prone to breakdown.

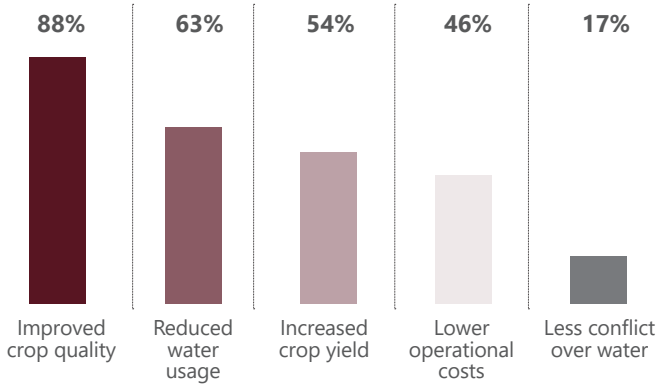
Desired irrigation infrastructure improvements (% of surveyed HH)[6]



KIs echoed the need for repairs and expansion of existing infrastructure, and suggested training for farmers to improve knowledge and reduce water wastage. They also noted frequent breakdowns due to sediment buildup.

Survey results further hint at reasons for these perceived needs, with most respondents pointing to improved crop quality (88%), reduced water usage (63%), increased yields (54%) and lower operational costs (57%) as expected outcomes. It seems likely that agricultural outputs are constrained in quality and quantity by existing systems, despite many having access to canal water or borewells, likely as a result of water scarcity.

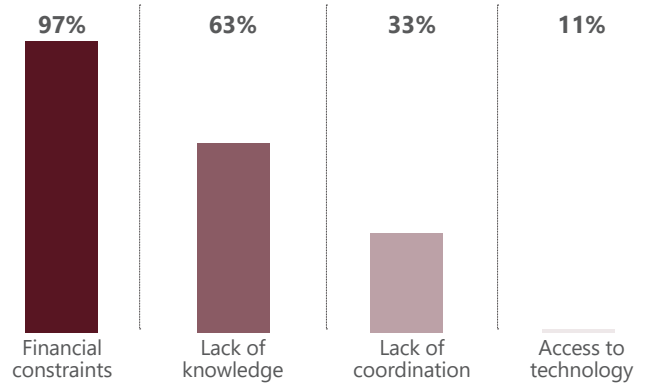
Expected outcomes of the desired irrigation infrastructure improvements in the manteqa (% of surveyed HH)[6]



IRRIGATION INFRASTRUCTURE AND COORDINATION

Barriers to implementing such improvements were overwhelmingly reported as financial (97%). Other reported constraints included a lack of knowledge (63%) and a lack of coordination (33%), while fewer mentioned access to more efficient technology for irrigation systems (11%). Based on these findings, agricultural extension services may prove very effective in supporting households to overcome such constraints.

% of HH by reported barriers to implementing improvements to irrigation infrastructure[6]

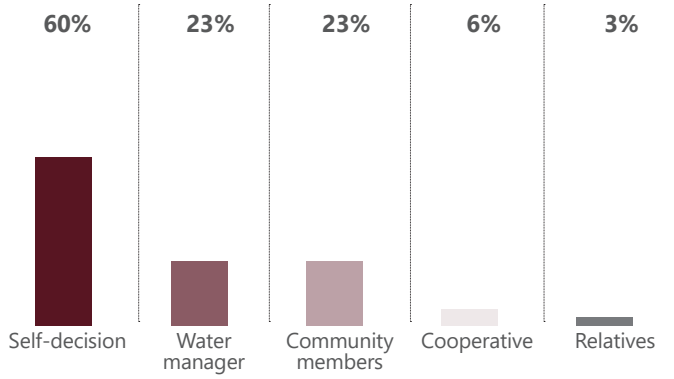


Water allocation and decision-making

Key Informants indicated that decisions around irrigation water in the manteqa are based on customary practices and formal water laws. They described water allocation as depending on land ownership with adjustments made based on seasonal fluctuations of available water, and pointed to infrastructure deterioration and climate trends having seriously affected the availability and variability of water.

In contrast, the majority of surveyed HH (60%) reported making independent decisions on irrigation water use, likely due to their reliance on groundwater. Despite the prevalence of private ownership, 23% indicated consulting water managers, and just as many referred to other community members outside the households as potentially influencing their decisions.

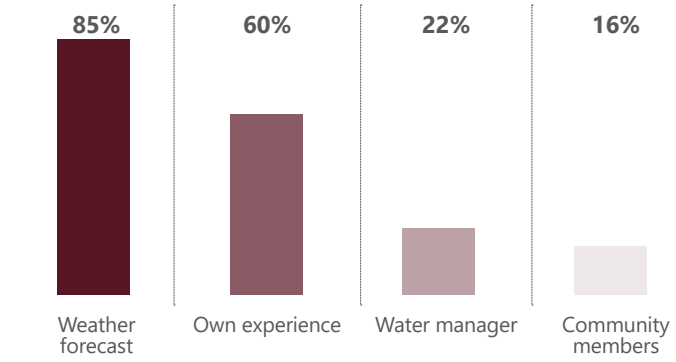
% of surveyed HH that reported consulting other actors for irrigation water use[6]



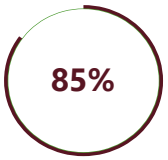
Key Informants highlighted the role of local water managers (*Mirab Bashi* and *Chakbashi*) that engage with communities on irrigation water through local councils (*jirga*) and meetings.

Most surveyed HH reported learning about the availability of irrigation water at the start of the season from weather forecasts (85%) or relying on their own experience (60%), with less than a quarter relying on water managers or the advice of other community members. These findings may suggest that own experiences are trusted more than more institutional sources, perhaps due to seemingly high rates of private boreholes.

% of surveyed HH by reported information sources for availability of irrigation water at the start of the planting season[6]



Nearly all surveyed HHs reported being concerned about future irrigation water availability.[8] It is likely that already limited resources and declining groundwater levels as well as consecutive droughts have contributed to high levels of concern. Agriculture, the main reported source of income in the manteqa, is likely to be an important means of subsistence that may be eroded if irrigation water availability declines.[9]



of surveyed HH reported being very concerned about the availability of irrigation water in the future.

SUMMARY

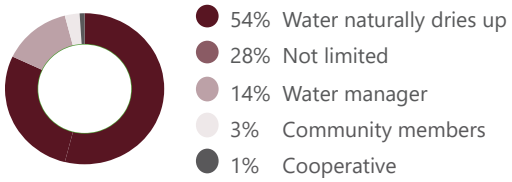
- Borewells appear to be the primary irrigation source, with surface canals used by a minority, indicating mixed systems based on groundwater and surface flow.
- Most water sources are reportedly privately owned, but public sources remain relevant, enabling some coordination through local water managers.
- Surveyed HHs prioritized maintenance and repairs over expansion, suggesting infrastructure is broadly sufficient but prone to breakdown.
- Financial constraints were the main reported barrier to improvements, followed by lack of knowledge and coordination.
- Nearly all households are highly concerned about future irrigation water availability, driven by drought, groundwater decline, and reliance on agriculture.

WATER AVAILABILITY AND FARMING PRACTICES

Availability of Irrigation Water

The large majority of households reported no limits on irrigation water imposed by water managers, but available water drying up during the season, which may be a regular occurrence due to the manteqa's climate or reflect the impact of drought conditions on water availability.[11] For a minority, limits are reportedly set by water managers, other community members, or cooperatives, seemingly in line with public ownership rates.

% of surveyed HH by imposed limits on irrigation water

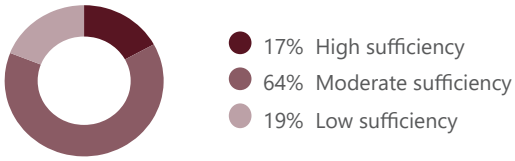


Among those facing restrictions, 63% reported a daily time limit exceeding five hours. These limits are at the higher end of what is typical in the region and, although exact extraction rates are unknown, they may indicate a substantial risk of overextraction if local groundwater availability is not taken into account.

On average, surveyed HH irrigate **6 jerib** on **21 Days** per year[12]

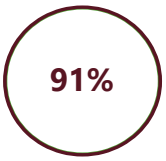
While many households appear able to cultivate under current conditions, shortages and limited predictability may still constrain stability. Surveyed households reported differing levels of irrigation water sufficiency, with most falling in a moderate range and smaller shares reporting either high or low sufficiency.

Aggregated irrigation water sufficiency (% of surveyed HH)



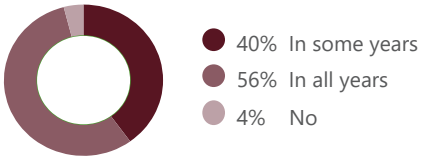
This measure combines household experiences of sufficiency, seasonal variation, duration of shortages, and predictability at planting to reflect the overall stability of irrigation supply.

Nearly all households also reported adjusting their farming practices in recent years, with many also diversifying income sources to meet household needs. Reported changes in farming practices seem to be reactive to water scarcity, while reliance on additional off-farm work suggests that agriculture alone may not always provide sufficient income for households.



of surveyed HH reported a change in agricultural activities to secure sufficient income or yield in the past 5 years.

% of surveyed HH that reported taking up additional work due to insufficient farm income in the past 5 years

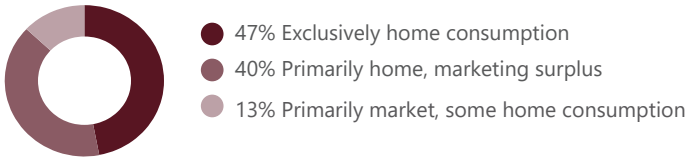


Cropping Patterns and Agricultural Activity

According to findings from an earlier REACH profiling, cotton, vegetables, and cereals (wheat, barley, maize) are the most common crops in the manteqa.[10]

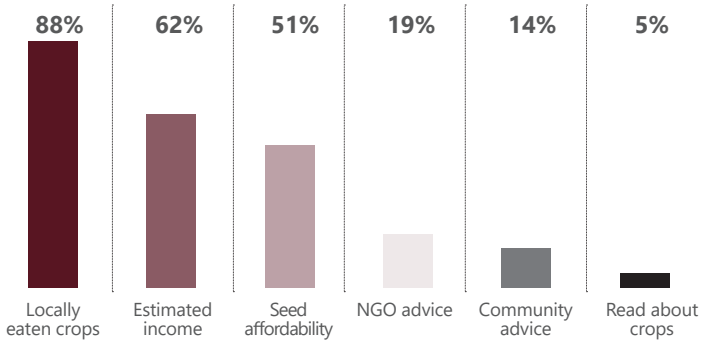
Farming seems to be primarily for household use. Nearly half of the surveyed HH reportedly farmed exclusively for home consumption, while 40% indicated products are primarily for home use with market surplus.

Reasons for farming (% of surveyed HH)



Crop selection seems to be heavily driven by local consumption needs, more so than any other reason reported by HH. A majority also indicated selecting crops based on estimated income and the affordability of seeds, in line with the most reported reasons for farming above.

Reasons for crop selection (% of surveyed HH)[6]



WATER AVAILABILITY AND FARMING PRACTICES

Evapotranspiration as an Indicator

Evapotranspiration (ET) is the combined transfer of water from land to the atmosphere through soil evaporation and plant transpiration. It serves as a proxy for crop water demand and thus provides an indication of irrigation pressure across the manteqa.

2021–2022

In Pump Khana, evapotranspiration remained modest and was concentrated inside the irrigated eastern strip, while surrounding rainfed land stayed low. This pattern fit the dry context, with 2022 precipitation reported as below normal at about 188 mm and with weak vegetation that year. Higher values in the strip reflected applied irrigation water that sustained crop use, whereas low values elsewhere indicated limited moisture in non-irrigated fields. Irrigation therefore supported consumption locally without lifting use across the wider area.

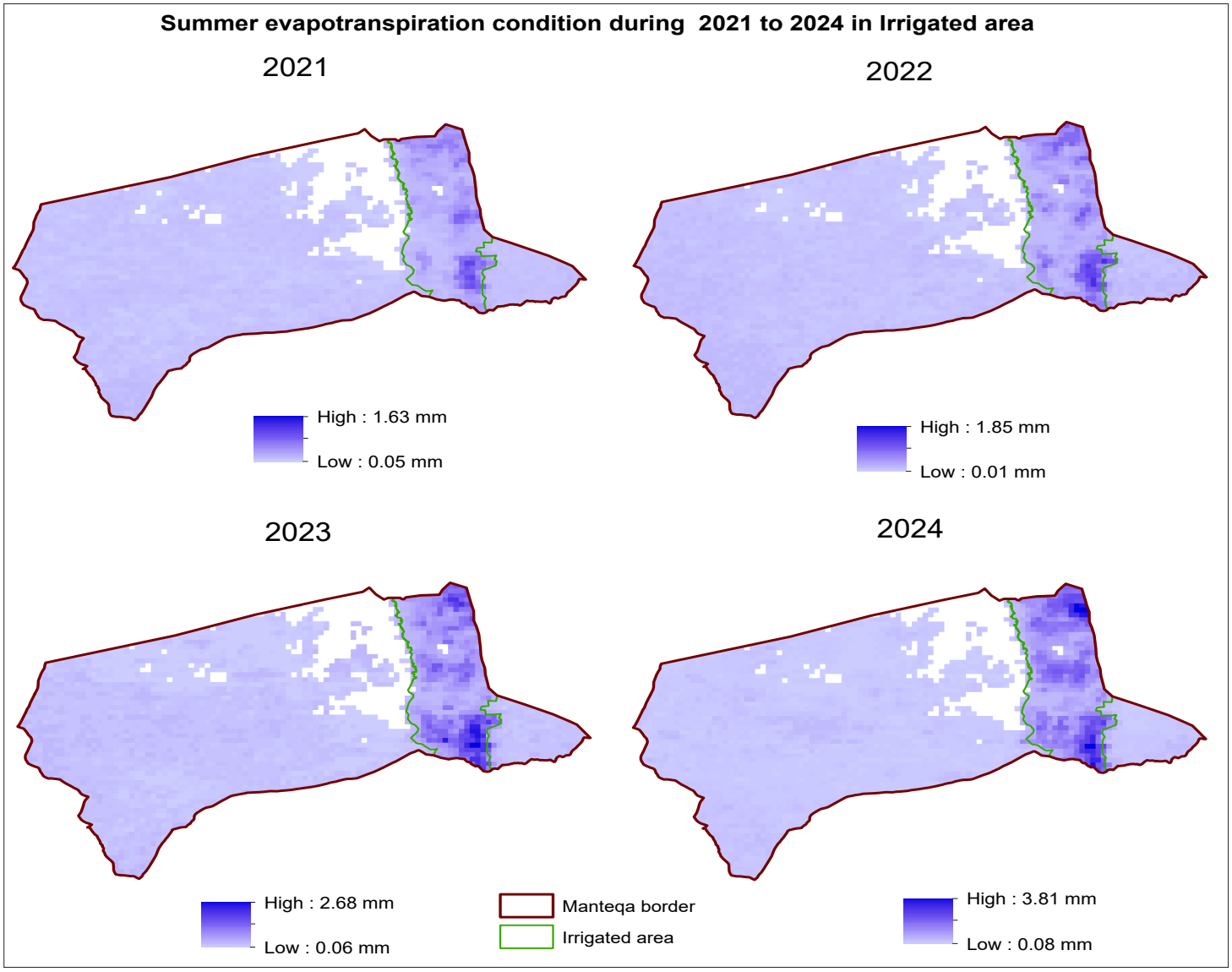
2023-2024

In 2023, precipitation fell to about 155 mm and soil moisture dropped early, so evapotranspiration rose mainly inside the irrigated strip and stayed low outside it.[13] The increase in the strip showed that crops consumed delivered water during the dry season, likely a mix of canal supplies and private pumping, while non-irrigated land could not sustain comparable use.
With better winter rainfall and greener vegetation in 2024, evapotranspiration increased and spread beyond the irrigated strip. Inside the strip it remained high, but more of the recorded use could be met by rainfall and short-term soil storage, so crop consumption extended into adjacent fields that had not shown high use during the drought.

Implications

Across 2021 to 2024 in Pump Khana, the ET maps showed that high consumption in dry years was concentrated inside the irrigated eastern strip and was sustained by delivered water, likely including groundwater from private borewells. Even with better winter rain in 2024, reliance on irrigation in the core area persisted, raising concerns about groundwater decline, soil salinity, and long term sustainability.

Map 2: Summer evapotranspiration condition, 2021-2024

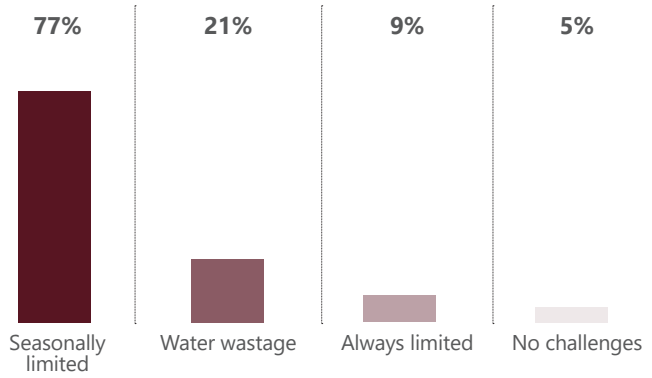


WATER AVAILABILITY AND FARMING PRACTICES

Challenges

The biggest challenge with irrigation water identified by surveyed HH was limited availability in certain seasons (77%), or in all seasons (9%), but some also referred to water wastage (21%), which may point to households perceiving water as being used relatively inefficiently. Despite this, a small proportion indicated that there were currently no challenges with irrigation water, despite high reported levels of concern about future availability of irrigation water.

Biggest challenges with irrigation water (% of surveyed HH)[6]



KIs pointed to inadequate irrigation infrastructure, declines in available spring water, and seasonal shortages and damages to infrastructure as the biggest challenges in the manteqa.

SUMMARY

- Most households indicated facing seasonal irrigation shortages, with water often drying up mid-season. Reported limits imposed by water managers seem to be at the higher end of what is common in the region.
- Farming seems to primarily for household use, but some marketing of surplus produce with crop choices driven by subsistence needs, seed affordability, and expected income.
- Nearly all households reported having changed farming practices and taken up additional work due to insufficient water and income from agriculture.
- Evapotranspiration rose in some years despite drought, indicating intensified irrigation and growing pressure on groundwater.
- Key informants cited water wastage and limited knowledge as major issues, suggesting both scarcity and inefficiency drive stress on irrigation systems.

Conclusion

Households in Pump Khana report irrigation challenges primarily linked to seasonal water scarcity, with most experiencing drying of sources during cultivation and limited predictability at planting. While some households perceive no current issues, nearly all express concern about future availability, reflecting widespread vulnerability. Water access is shaped by informal coordination and customary practices, with limited reliance on institutional actors. Key informants highlight deteriorating infrastructure, sediment buildup, and declining spring water as persistent problems. Reported barriers to improvement include financial constraints, lack of technical knowledge, and weak coordination, suggesting that both environmental and systemic factors undermine irrigation reliability and agricultural stability.

METHODOLOGY OVERVIEW

The Irrigation Management Assessment utilized manteqas as the primary unit of analysis. Manteqas are locally recognized geographic areas smaller than districts but larger than individual settlements, defined by shared natural resources, socio-economic ties, and customary governance structures. In the five assessed manteqas, data was collected through a combination of household (HH) surveys and key informant interviews (KIIs), including local water managers and irrigation governance stakeholders.

The sampling approach for the HH survey employed a two-stage stratified cluster methodology. Settlements were first randomly selected within each manteqa, followed by random selection of households within those settlements. A minimum of six households were surveyed per settlement, with quotas split evenly between households engaged in irrigated agriculture and those relying on pasture-based livestock. To ensure inclusivity, female enumerators conducted interviews with women where access was permitted, including remote interviews in restricted areas. In Dasht-e Laili, a total of 78 HH interviews were conducted, 17 of which with female-headed households. Key Informant interviews were conducted with 2 local water managers and 1 district-level official from the relevant line department involved in natural resource management.

In parallel, remote sensing analysis was conducted using evapotranspiration estimates to assess spatial and temporal variation in irrigation performance. This geospatial component enabled triangulation of field data with satellite imagery to identify patterns in water use and stress over time.

Limitations:

- With exact figures for the target population unknown, findings presented here should be considered indicative.
- Access constraints limited in-person interviews with women in some areas, potentially affecting gender-disaggregated insights.
- Remote Sensing data relies on coarse resolution (500m x 500m), providing limited insights into sub-manteqa-level trends.

For more information, please refer to the TOR.

Endnotes

1 Drought Impact and Resilience in Agro-Pastoral Communities in Northwest Afghanistan: Pump Khana Manteqa Profile. REACH Afghanistan, May 2025. Link

2 A manteqa is a locally recognized geographic area made up of several villages, defined by natural features and shared identity, history, and resource management practices; it functions as a basic reference point for inhabitants and is reinforced by customary governance structures that support community resilience.

3 Manteqa Profiles. REACH Afghanistan, 2024. Available on request

4 Pasture and Irrigation Management. REACH Afghanistan, 2024. Demographic indicators were captured across both assessments and are considered statistically representative at 95/5.

5 Manteqa Profiles. REACH Afghanistan, 2024. Available on request.

6 Respondents could select multiple options.

7 Drought Impact and Resilience, Pump Khana. REACH Afghanistan.

8 14% of surveyed households reported being "somewhat" concerned about future irrigation water availability, and only 1% reported no concern.

9 Manteqa Profiles. REACH Afghanistan. 2024. Available on request.

10 Manteqa Profiles. REACH Afghanistan, 2024. Available on request.

11 Irrigation water limits in Northwest Afghanistan are traditionally imposed through opening or closing canal sections after a specific amount of time set by the respective water management stakeholders (e.g. Mirab).

12 A jerib is a unit of land measurement equivalent to roughly half an acre.

13 Drought Impact and Resilience, Pump Khana. REACH Afghanistan.

About AGORA

AGORA is a joint venture between Acted and IMPACT Initiatives created in 2016 to operationalise our motto « Think local, Act global ». It is **an innovative area-based approach** that aims to **better address the relief, environmental and development needs of people in fragile contexts through a NEXUS approach**.

The key value added of AGORA is:

- Working at the **right geographical scale**, enabling both meaningful engagement with local actors and the ability to scale-up the action
- Contextualizing action through a strong evidence-base and reliance on **local knowledge** to inform programme approaches
- **Putting local actors at the centre** by strengthening their capacity, enabling them to identify their own needs and response priorities through participative research and planning approaches, and to participate and monitor implementation
- **Linking local and external actors** so that the latter can contribute resources and capacity to implement local solutions and response priorities.

AGORA strengthens territorial resilience by enabling a wide range of programmes, including strengthening local governance, improving basic services and livelihoods, climate change adaptation and mitigation, improving natural resources management, disaster risk reduction and management, anticipatory action, or supporting durable solutions to displacement.

AGORA has already been piloted in **17 countries through 20 projects**, reaching approximately **1,8 million direct beneficiaries** and supporting **nearly 1,294 organisations**.