AGORA

Drought Impact & Resilience In Agro - Pastoral Communities

Executive Summary

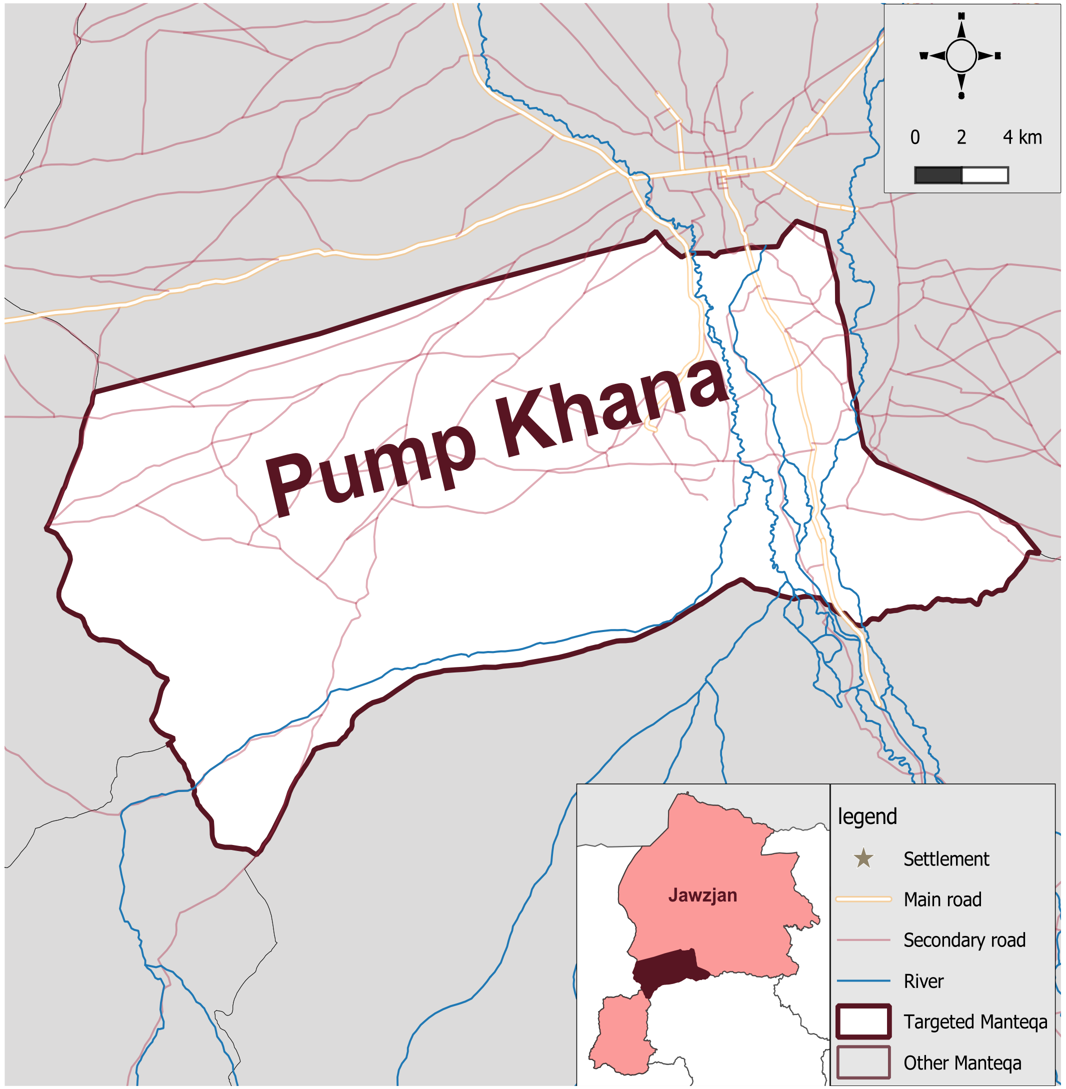
In terms of climate, Afghanistan ranks as the 5th most at-risk country globally, with natural hazards exacerbated by low household resilience. Recurring droughts heighten vulnerabilities in rural areas, where livelihoods heavily depend on agriculture and livestock. In Pump Khana Manteqa, food security is classified as being in Integrated Food security Phase 3 classification (IPC Acute Food Insecurity Analysis, assessed 18 December 2024), indicating acute challenges in meeting basic needs.

Under ACTED's THRIVE program, this research examines occurrence and impact of drought in five manteqas across Balkh, Faryab, Samangan, and Jawzjan provinces. The study highlights how these regions, which are heavily reliant on agriculture and natural resources, face severe consequences from drought, including depleted water sources, degraded vegetation, and reduced crops and livestock productivity. Examples include drying springs, degraded pastures, and declining horticultural yields. Socio-economic effects include diminished financial assets, exacerbated by limited access to financial services (e.g. loans), increased illness, especially among women, child labour, and strained community cohesion due to conflicts over shrinking resource pools.

Qualitative data from Focus Group Discussions (FGDs) with farmers, sharecroppers, and women, paired with satellite-data analysis of temperature and precipitation trends, reveal external vulnerabilities. These include a 1°C increase in summer temperatures since 1981, declining rainfall, and heightened drought susceptibility of rainfed lands and pastures.

The 2023 drought, driven by below-average precipitation, underscores the persistent risks to agro-pastoral livelihoods. While communities employ various coping strategies, these are not always sustainable. Coping practices such as food reduction, occupational changes, child labour, and migration, reflect the limitations of these resilience frameworks. This assessment identifies priority areas for adaptive agricultural practices and sustainable natural resource management to combat the ongoing impacts of drought in the studied manteqas.

Location of Pump Khana Manteqa (Jawzjan Province)



July 2024

Key Findings

Water Management: Conflicts over water use have resulted in inefficient water management of available irrigation water in Pump Khana, further exacerbated by unequal access to boreholes.

Natural Resources: Community members report the use of vegetation cover for fuel, as well as declining groundwater levels due to borehole overuse, putting strain on the manteqa's natural resources.

Climatic Vulnerabilities: By 2040, precipitation in the Manteqa is expected to decline, with rising temperatures particularly near the manteqa's settlements. Effective natural resource management mechanisms will become essential to ensure sustainable levels of demand pressure on the manteqa's natural resources.

Impact on Education and Child Welfare: With most livelihoods in the manteqa depending on agro-pastoralism, communities noted resorting to child labour and earlier marriages to increase household income, suggesting that drought may affect access to education in Pump Khana.

Community Safety Nets: The financial strain caused by drought results in a breakdown of charity systems and community level safety nets that affects the community's most vulnerable members.

Socio-Economic Inequalities: Financial capacity varies among households, influencing their ability to adapt to changing climatic conditions, to pursue alternative livelihoods, or to access health services due to drought-induced income decline.

About Pump Khana

Pump Khana, located within the Jawzjan province, is a geographically diverse manteqa. Literally meaning 'home to pumps ', it derives its name from its abundant reserves of oil, gas, and underground water. According to a (2023) IMPACT assessment the manteqa is home to approximately 16530 households, predominantly consisting of host populations, though Key Informants mentioned the presence of displaced populations. Additionally, Pump Khana's economy relies on agriculture and livestock,with mechanized agricultural techniques reportedly adopted by 95% of villages. Land ownership is divided, with most of the Lalmi (rainfed) lands and pastures belonging to the government, although some are privately managed. Pasture lands, in contrast, are publicly managed.

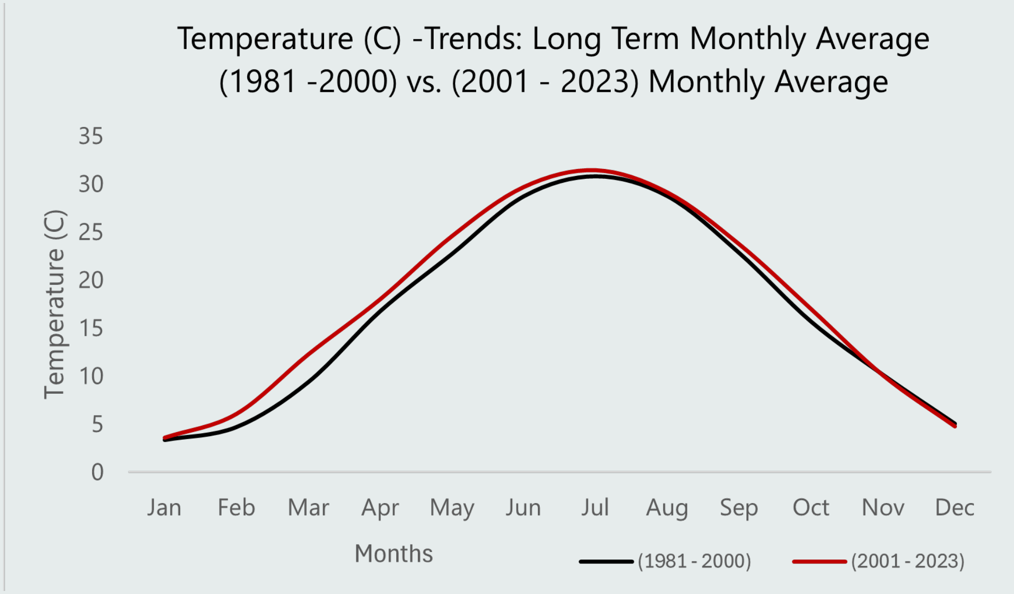
Population	111698	**Irrigated land**	16 %
Villages	56	**Rainfed Land**	55%
IDPs	In 50% of villages	**Pasture**	30%
Food Insecurity	Phase 3 IPC AFI	**Horticulture**	1%
Irrigation Source	Water pumps	**Minimum Expenditure Basket (Faryab 2023)**	U$241
		MEB (Faryab 2024)	U$261

According to Focus Group Discussion (FGD) participants, the Manteqa's reliance on rainfed agriculture leaves it acutely vulnerable to environmental shocks, particularly drought, with infrastructure-related water scarcity identified as critical challenges. Climate change has exacerbated these issues, contributing to rising temperatures and erratic rainfall and snowfall patterns over the past four decades—a trend projected to persist until 2040. Agro-pastoral communities in Pump Khana, whose livelihoods are heavily dependent on agriculture and livestock, face heightened vulnerability within this context due to their reliance on weather-sensitive income sources. In contrast, other residents with skill-based income are less affected. Drought-induced poverty, for example, is pervasive within agro-pastoral communities. Consequently, families often resort to drastic coping strategies: like, sending their children abroad for work or selling their livestock or household items.

Overall, the findings of this assessment suggest that the community's resilience framework lacks recourse to sustainable adaptive practices, such as constructing check dams or water reservoirs, that could mitigate the impacts of drought and decrease its vulnerability to future shocks.

Temperature

Pump Khana has experienced a steady warming trend over the past four decades. The annual average temperature increased from 17°C in 1981-2000 to 18°C from 2001-2023, further underscoring the region's warming trajectory. Seasonal data for 2001-2023 show deviations from historical norms, affecting agricultural cycles.



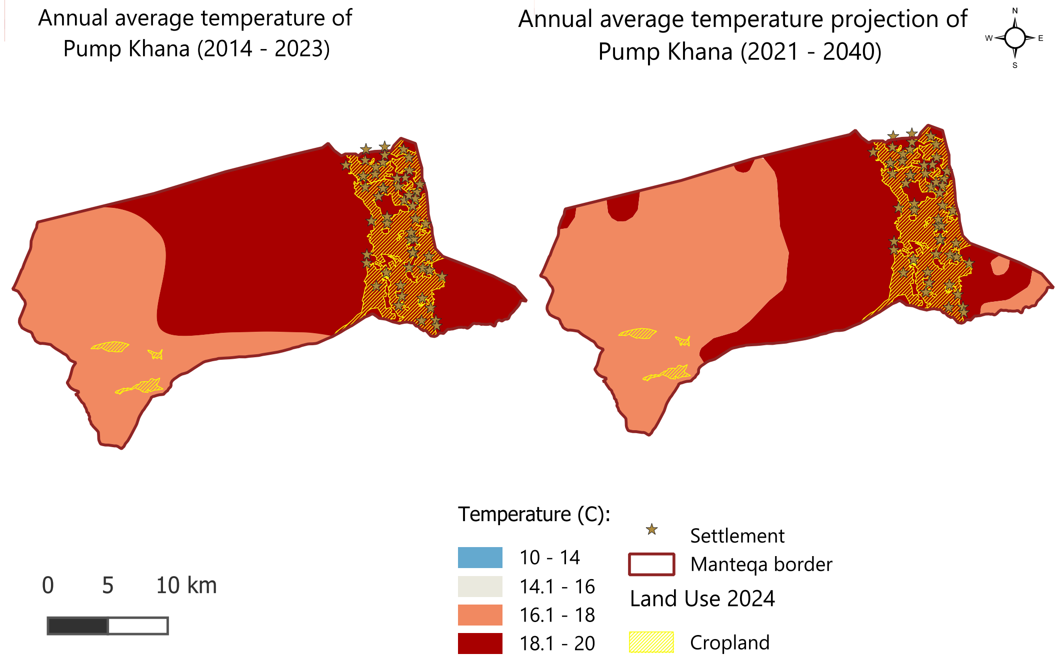
In 2001-2023, temperatures showed deviations from the historical average (1981-2000) particularly during winter, early summer, and autumn.

- Winter (Jan-Mar): Temperatures averaged 1°C above the historical mean (6°C), disrupting winter crop cycles and reducing the chilling period required for certain crops. This warming trend also limits snowpack accumulation, essential for spring water supply and early-season irrigation.

- Summer (Jun-Aug): Temperatures were 1°C higher than the historical average of 29°C, particularly in June and July, increasing water demand for crops and livestock, potentially lowering yields where water resources are limited.

- Autumn (Sep-Nov): Autumn temperatures were 1-2°C above the long-term average (16°C), especially in October and November, delaying cooler temperatures needed for winter crop planting and reducing soil moisture retention.

Predictive Forecast

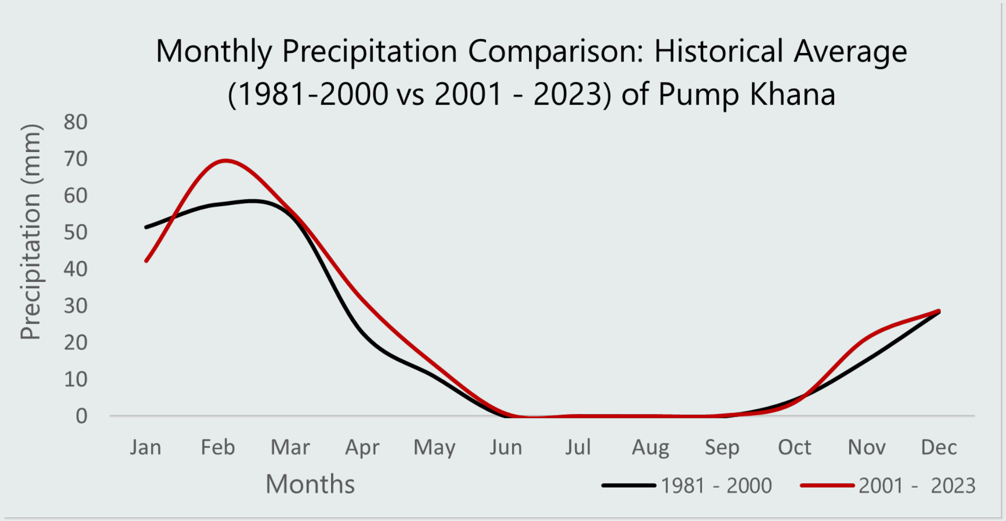


Projections for 2023-2040 (ERA5 & WorldClim, assessed 2024) indicate that regions in Pump Khana with the highest annual average temperatures (18-20°C) will shrink by 2040, covering less than half of the manteqa compared to 2014-2021. The Lalmi (rainfed) land and pastures, which previously experienced higher temperatures, could cool by 2°C, reaching an average of 16-20°C. Over time, if sustainable practices are adopted, pastures may develop more plant cover, enhancing evapotranspiration and local cooling.

Cropland patches in the southwest, marked in yellow, are expected to remain cooler at 16-18°C. However, cropland surrounding the manteqa's villages will continue to fall within the high-temperature zone and is unlikely to experience significant cooling, increasing heat stress on irrigated crops.

Precipitation

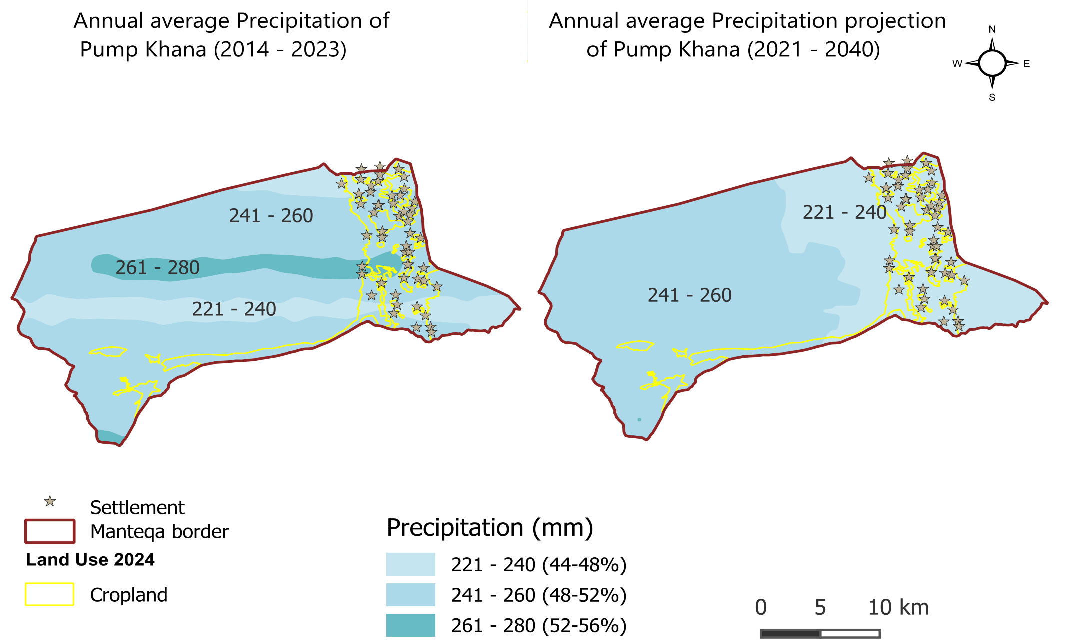
Pump Khana average annual precipitation was 244 mm from 1981 to 2000, with significant fluctuations rather than a clear trend. Since then, precipitation has increased to 270 mm from 2001 to 2023. In contrast, 2023, a drought year, saw a historic low of just 155 mm.



The 2001-2023 pattern reveals a shift in both the timing and volume of rainfall, affecting planting cycles. It also contributes to increased soil moisture retention at peak levels, helping to mitigate the risk of drought during periods of high rainfall.

- Winter (Jan-Mar): From 2001 to 2023, precipitation from January to March averaged 56 mm, closely matching the historical average of 55 mm. February experienced an early peak, deviating from the March peak that usually supports spring vegetation.
- Summer (Jun-Sep): No rainfall was recorded in both periods mentioned above. This absence of summer rain leads to water stress on crops, as June to August are the hottest months when water demand is highest.
- Autumn (Nov-Dec): The increase in precipitation from 2001-2023 from Oct-Dec increases moisture replenishment needed for winter planting and affects early-season growth.

Predictive Forecast

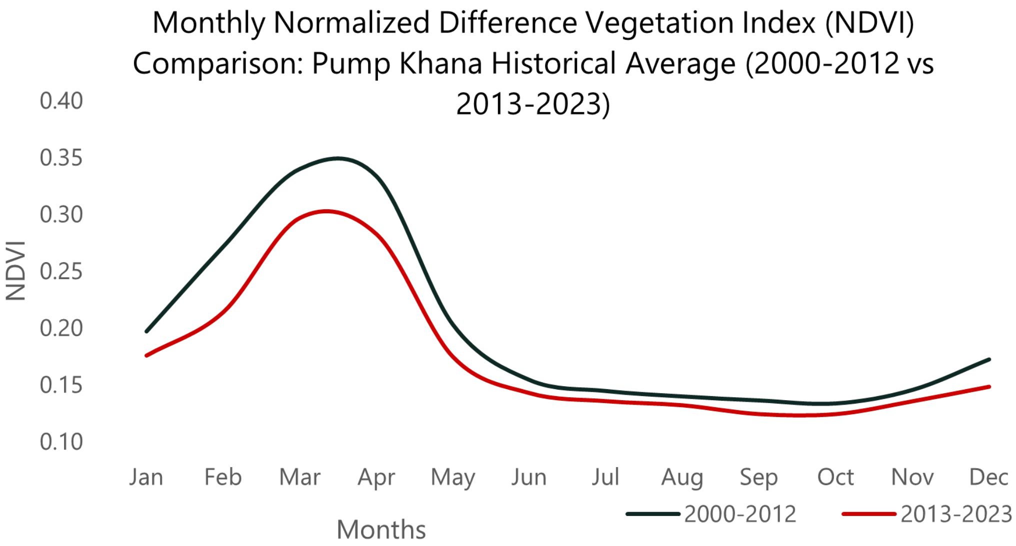


Projections (CHIRPS & World clim, assessed, 12 Nov 2024) indicate a continued decrease in annual precipitation, particularly in the northeastern and southeastern areas. In these regions, levels could drop to 221-240 mm, compared to 240-260 mm between 2014 and 2023, affecting irrigated and horticultural lands. Combined with rising temperatures in irrigated areas, this decrease poses a threat to agricultural productivity in these regions. Precipitation in rainfed and pastureland remains similar, except for two narrow strips—one with higher precipitation and the other with lower precipitation toward the northwest and southwest. Although the reduction is less severe in these areas, this trend may negatively affect pasture health and the sustainability of rainfed agriculture.

Understanding Drought Occurrence Trends and Conditions in Pump Khana

Both men (farmers and sharecroppers) and women identified reduced rainfall during critical agricultural months (December to April) as a key indicator of drought. Women in the FGDs highlighted vegetation loss and the lack of accessible water, while men focus on environmental changes such as dust storms, winds, and plant diseases, highlighting differences in how drought is perceived locally.

Drought Season and Growing Season according to Climatic parameters



Community vs. Remote Sensing on Drought Years:

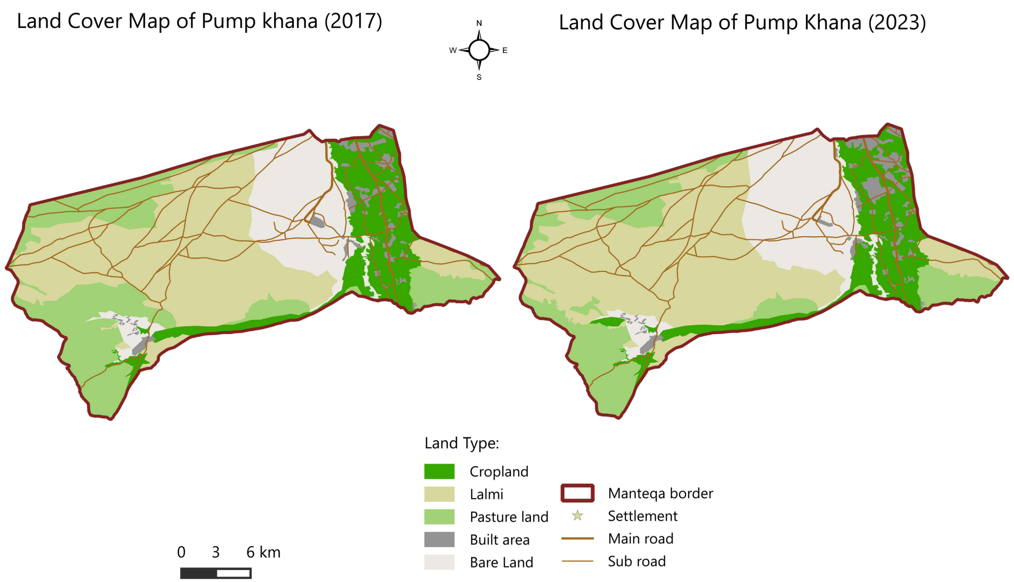
Local indicators such as a decrease in rainfall and suppression of vegetation largely align with remote sensing (RS) data:

- **2022**: Sharecroppers, relying on vegetation, crop yields, and precipitation (especially from March to May), perceive this year as drought-affected, which is supported by NDVI data (0.18) showing weak to moderate vegetation health. Precipitation for the year was also below normal, at 188 mm.
- **2023**: Both sharecroppers, farmers, and RS data identify 2023 as a severe drought year. The annual NDVI value of 0.16, indicating poor vegetation, corresponds with the lowest recorded precipitation of 155 mm.
- **2024**: Neither group considers 2024 a drought year due to adequate winter rainfall, aligning with RS data showing increased precipitation and improved vegetation.
- **Women:** No specific drought year was identified by women, who instead highlighted a longer trend of dry years since 2017.

Drought and crop growing seasons in Pump Khana were identified using climatic parameters including the Land Surface Temperature, NDVI, and Standardized Precipitation Index. The growing season generally lasts from March to August, with drought conditions most common in the hot summer months (June to August). This overlap shows that drought directly impacts crop growth.

From March to May, the optimum green months, the NDVI value for 2013–2023 was 0.25, which is lower than the 2000–2012 average of 0.29. This decline suggests minimal vegetation cover, potentially indicating drier conditions, land degradation, or an increase in non-vegetative surfaces such as bare soil. Average summer precipitation is almost absent with rising temperatures, low soil moisture leading to both pressure on rangelands and heat stress on crops, reducing yields and increasing crop failure risks. Seasonal drought patterns, particularly in summer, overlap with the crop-growing and harvesting periods, affecting crop resilience. Monitoring NDVI fluctuations is crucial to understanding drought impacts, though seasonal cycles, such as harvesting times, should be cross-checked to distinguish between drought effects and natural vegetation changes.

Mapping Drought Effects on Natural Resources in Pump Khana

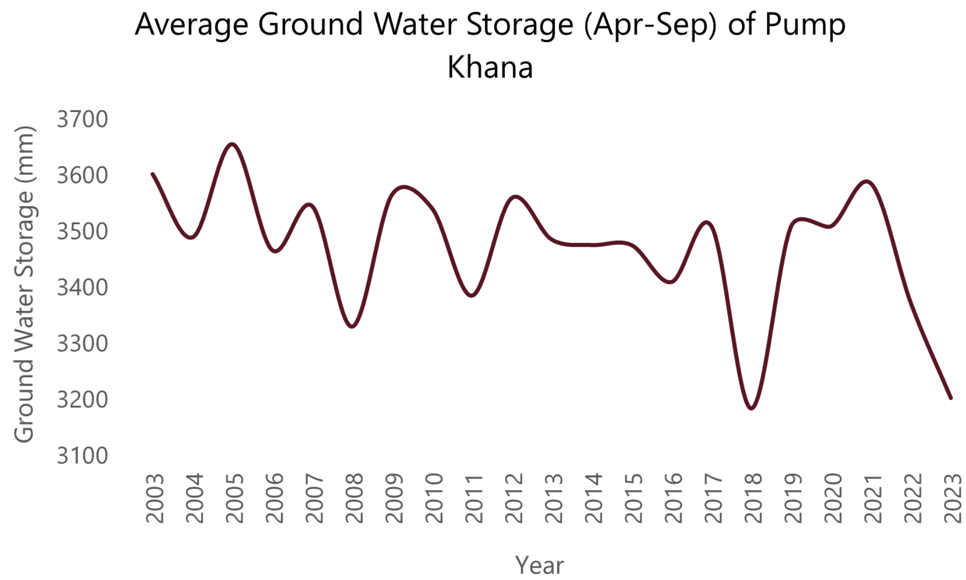


Drought Impact on Land and Vegetation

A comparison of 2017 and 2023 landcover maps reveals little observable change in cropland. Irrigated areas remain concentrated around Pump Khana's settlements, particularly towards the northeast and southeast. Since 2017, pastures have slightly shrunk, especially in the southwest of the manteqa, in favor of rainfed and irrigation agriculture, suggesting increasing pressure on traditional rangelands. Landcover imagery for 2023 also reveals an increase in built up areas around Pump Khana's settlements in the east of the Manteqa, leading to a decrease in irrigated land in the same areas.

Average Groundwater Storage:

Groundwater storage (GLDAS, assessed Dec. 2024) from (2003-2023) in months of April to September shows fluctuating levels rather than a steady trend. Groundwater storage peaked in between 2004 and 2005 following favorable rainfall, but severe droughts, particularly in 2008-2011, 2018, and 2023, have caused a significant decline. Despite occasional recoveries, there is a long-term downward trend in groundwater levels, highlighting the need for effective water management in drought-prone periods.

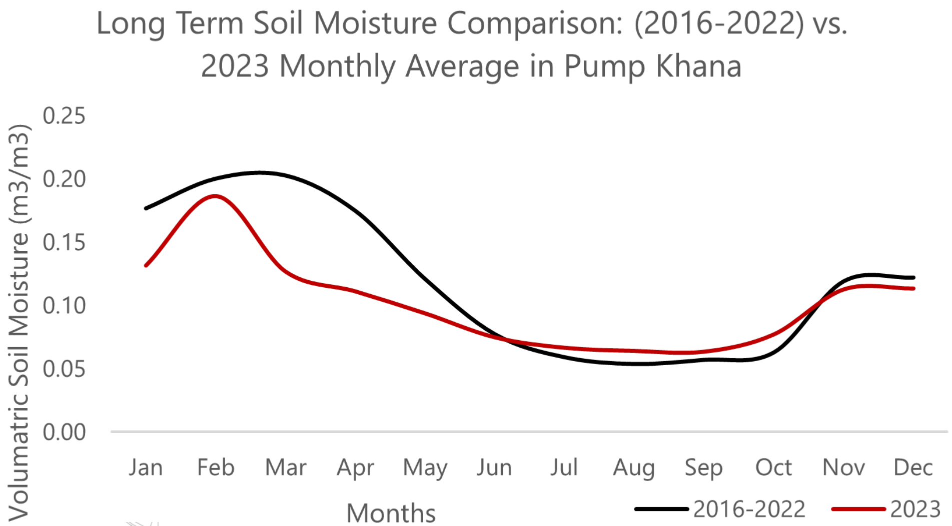


Water Sources and Availability:

According to a (2023) Manteqa Profiling by IMPACT, Pump Khana primarily relies on canals for irrigation, with deep solar-powered wells as secondary sources. Springs supply irrigation for agriculture and horticulture, with water distributed based on land area. According to FGDs participants, water in Pump Khana is more vulnerable than other natural resources like pastures. Lower Pump Khana is vulnerable due to the lack of bore wells, while upper Pump Khana is affected because the water is salty. Much of the irrigation infrastructure is not concrete but in good condition. According to FGD data, rainfed and irrigated lands in lower Pump Khana have been more affected than upper Pump Khana due to a lack of borewells. At the same time, mismanagement and borewell overuse during droughts have led to declining water levels, emphasizing the need for sustainable water management strategies to secure agricultural productivity.

Soil Moisture:

Soil moisture trends are critical for understanding climate impacts. Declines in moisture can lead to more frequent droughts, while increases may cause waterlogging and erosion. In 2023, soil moisture peaked in early February 2023 and subsided earlier and faster than the February and March peaks in earlier years (2016-2022). Lower soil moisture potentially reduces benefits for crops needing moisture closer to planting. Tracking these shifts helps identify fields, pastures, and horticultural areas most prone to soil dryness and informs adaptive strategies.

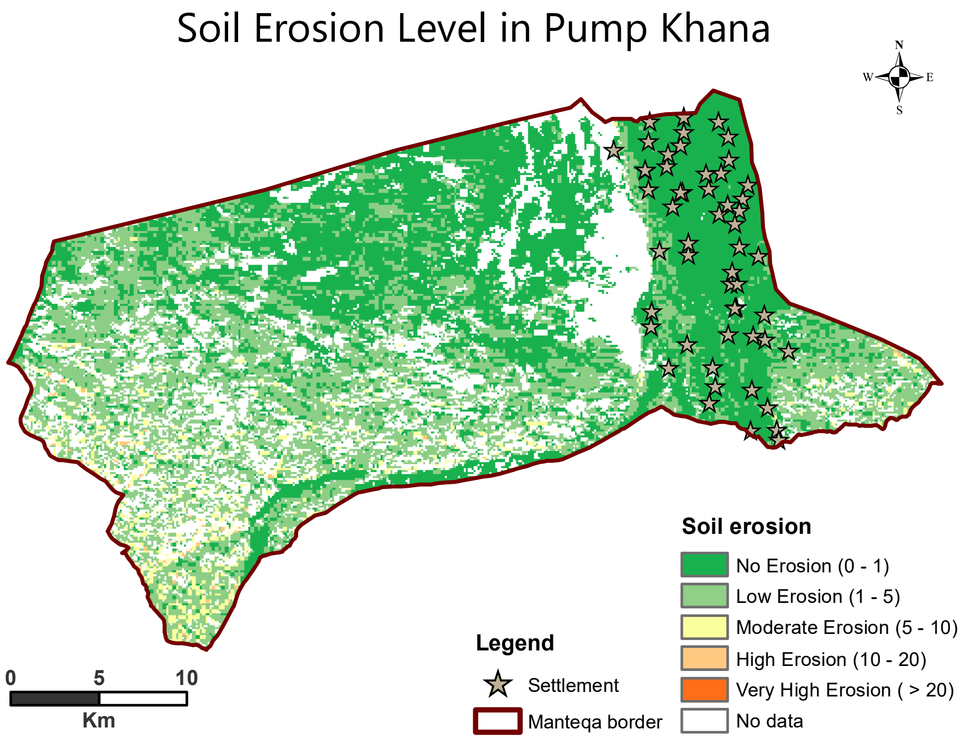


Soil Erosion:

Soil erosion ([GloSEM 1.3]) in Pump Khana is generally low, with moderate erosion concentrated in the southwest and parts of the southeast. Within these regions, smaller pockets of moderate erosion, marked in yellow, are becoming visible.

The villages, represented by stars, are fortunately located in areas with no significant soil erosion. However, the northwest and southwest regions, where most horticultural activities take place—experience low to moderate erosion. This can impact pastures and rainfed agricultural areas.

Factors such as intensive farming, deforestation, and overgrazing contribute to soil vulnerability. To prevent further degradation, sustainable land management practices are crucial, particularly in areas prone to heavy rainfall and runoff.



Mapping Drought Effect on Natural Resources in Pump Khana

Impact on Agro-pastoralism

Production/Crop Health:

Drought significantly reduces crop growth, particularly on infertile rainfed lands, leading to sparse vegetation, poor yields, and lower income for farmers. Weak crop growth and the spread of plant diseases impact market prices and agricultural sales. To adapt, farmers are shifting to drought-resistant crops like chickpeas, wheat, and barley, though high costs limit access to drought-resistant seeds. Residents also report a shift toward organic fertilizers, which require less water, and shifting to new crop varieties like pistachio and walnut.

Pastoralism:

According to FGDs participants, drought has severely impacted pastures, leading to sparse grass and vegetation, which affects livestock health. Animals face poor nutrition and heightened disease risks, reducing their market value. This decline in livestock quality and numbers in drought periods weakens income and food security for agro-pastoral households that depend on pastures for fodder.

Agriculture

Pump Khana's reliance on irrigation water means that cultivation is restricted to select areas. Remote sensing shows a decrease in cultivated cropland, with a slight increase in built-up areas. The reliance on borewells in certain parts of the manteqas heightens the risk of water storage depletion during drought periods, posing challenges to sustaining agriculture.

Water availability heavily influences agricultural practices, with crops like wheat, barley, and alfalfa, which require less water, being prevalent. Wheat, a staple, remains dominant, reflecting both its cultural importance and the practical adaptation to Pump Khana limited water resources.

Cropping Calendar (Jawzjan Province)

Fruit Crops: Apricots, apples, grapes, almonds and pistachios grow from February to March and are harvested by July and August, making them moderately drought resistant. Melons, watermelons, almonds, walnuts and pistachio harvested from May to August and face greater drought risk. Walnuts, with a March to September growing season and an October harvest, are highly vulnerable to late summer drought.

Vegetable Crops: Winter vegetables (September/October to February) are less affected by drought. Summer crops like Pumpkin (June to November) are highly drought-sensitive due to their summer harvest. Late summer vegetables (July to December) face moderate drought risk, avoiding peak heat.

Cereals and Cash Crops: Fall-season wheat (October to June & July), and spring season wheat (February to June/ July and barley (December to July) are vulnerable to late-season drought, with fall wheat more vulnerable as it is an early crop. Sesame, due to its short growth period from May to July/ August, is less affected. Saffron, planted in August is less drought-sensitive due to its early harvest in the following months of September and October.

Basic Needs and Community-Level Impact

Financial constraints hinder the ability of Pump Khana's communities to respond to drought periods, e.g. through buying fodder or water to sustain livestock, or to start businesses for alternative income sources. Drought-related crop failures and livestock health issues further decrease household income, impacting food security, community celebrations, and social well-being, while rainy years bring essential opportunities for surplus production and community resilience.

Human Wellbeing and Social Sphere:

FGD and KI participants noted that the economic stability of agro-pastoral communities is heavily reliant on agriculture and livestock, both of which have been weakened by drought. The resulting drop in food production reduced household access to nutritious food, in turn affecting health. Limited income also restricts families' ability to afford healthcare and medicines. As resources are redirected toward immediate survival needs, access to education for children declined, jeopardizing long-term development and resilience.
According to both FGD and KI feedback, drought has also increased tensions and conflicts over limited resources, particularly water. Competition over these scarce resources has strained community relations and public trust, and the readiness to extend charity or assistance to those most in need.

Vulnerabilities

Factors That Contribute to Vulnerability/Sensitivity to Drought

- Communities lack methods and resources to store rainwater, as well as systems to effectively manage existing stores.
- Much of the existing irrigation infrastructure is non-concreted, contributing to inefficient use of limited irrigation water.
- While some community members do have access to solar-powered boreholes, overuse during drought periods leads to dropping groundwater storage levels.
- Some community members reportedly rely on vegetation cover for fuel, putting pressure on the Manteqa's natural resources.

Factors That May Exacerbate Vulnerability to Drought

- Conflicts over the use of available water resources result in inefficient water management in the manteqa.
- The reprioritization of household expenses during droughts increases barriers to education and healthcare services, and reportedly even results in child labour.
- Community members noted limited access to financial services (e.g. loans), and lack of resources and opportunities to diversify income sources, particularly for women and sharecroppers.
- When one resource—such as water, pasture, or soil—is stressed, it creates a domino effect that destabilizes the entire system. For instance, the decline in water levels not only reduced agricultural output but also degraded soils and diminished livestock viability.

Coping, Adaptation and Gender

Coping mechanisms are strategies available to communities to offset (some of) the adverse impacts of a shock, such as selling livestock, decrease in expenses, taking livestock to other areas for water and fodder etc. Households prioritize positive coping mechanisms but resort to negative ones when these are exhausted.

Adaptation is the ability of systems, institutions, humans, and other organisms to adjust to potential damage, take advantage of opportunities, or respond to consequences. It involves long-term planning, is oriented towards sustainable livelihood security, and leads to using resources efficiently and sustainably. In FGDs, farmers and sharecroppers mentioned prioritizing initiatives to improve coordination, such as on water storage management and cold storage of produce. Women focused on strategies with more immediate outcomes, such as saving and changes in occupation.

Both farmers and women indicated using weather forecasts, likely to make more informed decisions on agricultural practices as well as household and food security-

Coping Mechanisms and Adaptive Practices Reported by FGD Participants

Coping Mechanisms	Adaptive Practices
• **Water storage and conservation efforts:** During drought periods, community members report attempts to conserve water through more efficient use of available resources. Depleting ground water levels through borewell overuse indicate that these efforts may benefit from initiatives to strengthen systematic water management mechanisms at the communal level.	• **Adjustments of agricultural practices:** Weather changes in drought periods have resulted in communities adjusting sowing periods and using mulching and greenhouses to protect plants and soils from extreme heat and dryness
• **Organic fertilizers, pesticides and herbicides:** To cope with rising prices during droughts, community members report shifting to organic fertilizers and locally available plants (e.g. Wheat and barley).	• **Drought-adapted agricultural practices:** Drip irrigation systems, land levelling and the use of drought-resistant seeds have also helped mitigate the impact of drought, but rising prices for seeds and input materials mean that these strategies are not available to all households, especially during drought periods
• **Loans and sale of assets:** Droughts have a direct financial impact and often lead to money borrowing or the sale of assets such as livestock to buy food, fodder, water (including for livestock) and other essential resources.	• **Migration:** The importance of agriculture and pastoralism for livelihoods in Pump Khana means that community members resort to migration to other locations in Afghanistan or to other countries due to drought.
• **Diet change:** Drought periods are often accompanied by changes in diets to less varied and nutritious foods, and reductions in the frequency of meals both due to financial constraints and conscious efforts to reduce expenses in times of increased market prices.	• **Unequal livelihood options:** The financial strain that drought periods cause is especially severe for population groups that have reduced options to pursue alternative livelihoods or rely on community support, such as women, IDPs, and people with disabilities.
• **Decrease in solidarity:** Communities reported dismantling food banks as they were hard to maintain during droughts, suggesting that community level safety networks that are essential for the most vulnerable breakdown in times of drought.	• **Child labour:** Households without men may resort to child labour in the absence of alternative livelihood options.

Methodology Overview

The overarching objective of this exploratory assessment was to enhance understanding of, and inform, the development of sustainable and adaptive agricultural practices and natural resource management strategies to combat drought impact across five manteqas in Northwest Afghanistan.

The goal is to provide a foundational understanding of community-level resilience and vulnerability, within the context of how drought affects the local environment and livelihoods of affected populations in the selected manteqas. As such, the assessment focused on:

i. Understanding how affected communities defined 'drought' and 'drought periods' by creating a comprehensive list of community-based 'drought indicators.

ii. Evaluating community perception of the impact of drought on critical agricultural and natural resources — namely pastures, forests, fields, horticulture, and water sources — and socio-economic dynamics (such as livelihoods and family structures) to estimate the exposure of agro-pastoral communities to these adverse effects; and,

iii. Mapping the existing community-based drought resilience infrastructures and how they interact with international, national and sub-national drought resilience frameworks.

This assessment combines primary data collected through Focus Group Discussions and expert interviews with secondary geospatial data from satellite imagery and previously collected information in the relevant manteqa or district. This research was conducted in 5 manteqas where Acted promotes sustainable agro-pastoral livelihoods.

The remote sensing analysis leveraged publicly available databases, primarily Google Earth Engine (GEE), to collect information on various climatic parameters such as temperature, precipitation, and NDVI. This data helps in understanding how shifts and anomalies in climate patterns contribute to drought conditions. The data was processed using GEE's geospatial processing services. For drought assessment, MODIS Moderate Resolution Imaging Spectroradiometer Land Surface Temperature (LST) data is used to identify drought manifestations, such as vegetation health, through indices like the Vegetation Health Index (VHI). Additionally, the Standardized Precipitation Index (SPI) is applied to detect precipitation anomalies using CHIRPS (Climate Hazards Group InfraRed Precipitation with Station data) datasets. The analysis focuses on different land cover types, including croplands, forests, and rangelands, utilizing Copernicus land cover data.

The primary data was collected in July 2024. For each manteqa, two agricultural service providers, such as NGO workers and local government authorities, were purposefully sampled based on their expertise of the research topics and Manteqa. They were interviewed using a semi-structured interview tool. In Pump Khana one FGD with sharecroppers and one FGD with farmers and livestock owners were conducted. Eight participants were purposefully selected considering geographic representation, even distribution between the livelihoods of interest (agriculture and pastoralism). The inclusion of women and sharecroppers depended on access and presence of sharecroppers in the manteqa. Following data collection, a content analysis identified the main themes, trends, and factors contributing to drought vulnerability and resilience.

Please refer to the Terms of Reference for more information about Remote Sensing.

Limitations

This research uncovered factors that may negatively contribute to vegetation growth and health. However, the exact effects of drought on crop yields or pasture growth are difficult to predict, because it depends on when water or nutrient shortage occurs, vegetation's sensitivity, and human practices. The research scope is limited to natural resources and agriculture. The impact on other sectors, such as domestic water availability, and hygienic practices, are excluded from the analysis. Similarly, the cascading impact of drought on other areas such as energy consumption, migration patterns, social structures, market prices, health, etc., are not included.

Future analysis should consider the effect on ecosystems and biodiversity of drought and dry spells, and the available groundwater and surface water, which could not be included in this research. Due to the qualitative nature of the assessment, the findings are not representative of the Manteqa population. The available climate change predictions of Afghanistan should be treated with uncertainty as they are dependent on a multitude of factors, including the actual global warming rate (RRC).

Crop Calender

Crop Type	Crop	Growing Months	Harvesting Months	Drought Vulnerability
Fruits	Apricots, peach & cherry	January – March	June- July	Moderate
	Almonds	February – April	September	High (Passes through peak summer)
	Grapes	Jan - March	August	High (late season, overlaps drought)
	Melons	March - April	June - August	High (summer harvest)
Vegetables	Winter Varieties	October – January	January – February	Low (harvested in cooler months)
	Eggplant, onion	January – March	June	High
	Tomatoes	March – April	June – August	High (summer harvest)
	Other Summer Vegetables	March – April	June – August	High
	Late Varieties	July – August	October – December	Moderate
Cereals	Wheat (rainfed)	September – June	June – July	High (harvest in summer)
	Barley (Fall season)	September – October	May/ June	Moderate (early harvest)
Cash Crops	Saffron	August – September	August – September	Low (late season, sensitive crop)