Comparative Drought Analysis

September 2024, Afghanistan

About REACH

REACH facilitates the development of information tools and products that enhance the capacity of aid actors to make evidence-based decisions in emergency, recovery and development contexts. The methodologies used by REACH include primary data collection and in-depth analysis, and all activities are conducted through inter-agency aid coordination mechanisms. REACH is a joint initiative of IMPACT Initiatives, ACTED and the United Nations Institute for Training and Research - Operational Satellite Applications Programme (UNITAR-UNOSAT). For more information please visit our website. You can contact us directly at: geneva@reach-initiative.org and follow us on Twitter @REACH_info.

SUMMARY

According to a 2018 World Bank report, roughly 70% of the population of Afghanistan live in rural areas where the majority of livelihoods rely on agriculture and livestock, signaling that large parts of the population of Afghanistan are particularly vulnerable to drought. Drought and its impacts have played a major role in driving needs in Afghanistan. Alongside the triple-dip La Niña event that began at the end of 2020 and continued until 2023, Afghanistan experienced one of the most severe droughts in its history. The impact of the drought, combined with other natural disasters, COVID-19, armed conflict, and the collapse of the representative government in August 2021, has led the country into humanitarian crisis.

The drought has exacerbated food insecurity, affected livelihoods, and limited access to water in Afghanistan. It has also acted as a push factor for displacement within the country. According to the Whole of Afghanistan Assessment (WoAA) conducted by REACH in 2023, about 67% of households reported being affected by drought in the 12 months preceding the data collection. Over the three consecutive dry years from 2021 to 2023, agricultural drought was reported to have severely impacted on food security. According to WoAA data, the percentage of the population experiencing poor food consumption increased from 38% in 2021 to 42% in 2022, and decreased in 2023 to 28%, as drought conditions improved. The percentage of households with acceptable food consumption never exceeded 30% during these years.

In addition, according to the Humanitarian Situation Monitoring (HSM) Key Informant survey conducted in September 2023, approximately 58% of key informants reported drought as the primary cause of displacement in their settlements over the six months preceding the data collection.

The Comparative Drought Analysis (CPDA) conducted in Afghanistan during the first and second quarters of 2024 aims to fill information gaps, at the province level, on the impact of drought on communities' food security, livelihoods, displacement, WASH (water, sanitation, and hygiene), and health. It also aims to provide insights into the environmental impacts of drought through remote sensing data. Specifically, the study will enhance the development of drought severity monitoring systems, allowing for real-time monitoring of drought severity in Afghanistan

The methodology and scope of this study were developed by REACH and endorsed by WFP Afghanistan. The study uses free available remote sensing-driven climate data to examine the characteristics of meteorological indicators during dry and wet years. In addition to remote sensing climate data, already available assessment data collected by REACH and other actors in Afghanistan are utilized as well.

Remote sensing data included CHIRPS, MODIS, FEWS NET, Era5, Sentinel-2, and other sources used to calculate drought indicators. Assessment data collected by various organizations over different years were combined and analyzed to monitor changes in related sectors. Data from REACH's WoAA, a nationwide multi-sectoral household survey, were used extensively. Additionally, data from other assessments, including Humanitarian Situation Monitoring (HSM) by REACH, Vulnerability Assessment and Mapping (VAM) by WFP, seasonal calendars from FEWS NET, and acute watery diarrhea cases from WHO, were integrated into the analysis.

Drought indicators in this study were derived from remote sensing data, as access to meteorological ground station data collected by government departments was not accessible. Therefore, the results of the drought indicator analysis have limitations. Additionally, freely available climate datasets have coarse precision, which, while suitable for large-scale geographic scopes, is limited for localized studies.

Nationwide Multi Sectoral Needs Assessment data in Afghanistan is only available since 2021. Accordingly, this limits the ability to track the evolution of needs in communities before that year. Most

of the alignment between drought remote sensing data and WoAA assessment data is found between 2021-2022, when the multi sectoral needs data for admin1 level (provinces) is available and at the same time drought condition overshadowed the whole country.

Key Findings

Since 1999, corresponding to the scope of this study, Afghanistan has experienced several drought events with varying severity and geographical impact. Dry weather in Afghanistan is significantly influenced by La Niña events in the eastern Pacific Ocean. Additionally, climate change and global warming contribute to the severity and impact of droughts on communities, particularly by diminishing permanent glaciers and snowpacks. The impacts of drought vary based on the type of drought, topography, and livelihood of the affected areas. Typically, meteorological drought impacts are visible in the upper river basins or mountainous regions of the country, including the Central Highlands and northwestern provinces. Additionally, rainfed and agro-pastoral livelihoods are more sensitive to meteorological drought.

At the beginning of the 21st century, from 2000 to 2002, the country experienced a multi-year drought. Another multi-year drought occurred recently from 2021 to 2023. During these extended drought periods, the country faced hydrological droughts as a result of prolonged meteorological droughts. Hydrological droughts impacted the entire country, but irrigated livelihoods, mostly in the lower and flat parts of the river basins, were more severely affected.

Droughts in Afghanistan have damaged agriculture and livestock, which has further led to increased food prices. In addition, in agro-pastoral communities during drought years, the value of livestock decreased, negatively affecting the purchasing power of these communities. Overall, droughts have disrupted the supply and demand of commodities in the communities.

Drought has emerged as a driver of food insecurity and a deterioration of coping strategies in the country by damaging food sources. The number of people consuming less food increased during drought years. Furthermore, the number of households practicing emergency livelihood coping strategies increased considerably during these years. Although community resilience varies based on the livelihoods practiced, provinces practicing agro-pastoral livelihoods found particularly central highland region, and those provinces with more drought-resistant livelihoods such as forest-based livelihoods in the southeastern region, have shown more stability during drought conditions.

The number of households using unprotected water sources increased generally across the country as droughts extended. Additionally, the number of households traveling longer distances to access water also increased. The incidence of acute watery diarrhea saw a substantial increase during drought years. Water scarcity seems to relate to the type of drought: communities in upper river basins report more challenges in accessing water during meteorological droughts, while lower river basin provinces report more water scarcity during prolonged droughts when hydrological droughts occur.

CONTENTS

List of Acronyms

AWD	Acute Watery Diarrhea
CHIRPS	The Climate Hazards Group InfraRed Precipitation with Station data
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
FEWS NET	Famine Early Warning Systems Network
FLDAS	FEWS NET Land Data Assimilation System
GIS	Geographical Information System
GRAS	GNSS Receiver for Atmospheric Sounding
HH	Household
HSM	Humanitarian Situation Monitoring
JMMI	Joint Market Monitoring Initiative
KI	Key Informant
LCSI	Livelihood Coping Strategy Index
MODIS	Moderate Resolution Imaging Spectroradiometer
MSNA	Multi Sectoral Needs Assessment
NDVI	Normalized Difference Vegetation Index
OCHA	Office for the Coordination of Humanitarian Affairs
SPI	Standard Precipitation Index
VAM	Vulnerability Analysis and Mapping
VCI	Vegetation Condition Index
WFP	World Food Program
WHO	World Health Organization
WoAA	Whole of Afghanistan Assessment

Geographical Classifications

Region:	Smaller unit than admin0, contains multiple provinces (admin1)
Province:	Primary administrative division in Afghanistan. Overall Afghanistan dived to 34 provinces. According to OCHA administrative division provinces are equal to Admin1 level.
District:	Sub province administrative division. Afghanistan divided to 401 District/ admin2 units according to OCHA.
River Basin:	The area of land drained by a river and its tributaries[1]. In this study sub river basins from FAO that divided Afghanistan in 21 sub river basins/watersheds is used.

[1] AQUASTAT Glossary, FAO, 2020- https://www.fao.org/aquastat/en/databases/glossary/

Figures:

Maps

Introduction

Afghanistan, according to the 28th United Nations Climate Change Conference (COP28), ranked fourth on the list of countries most at risk of a crisis (INFORM Risk Index 2023).[2] In addition the majority of the population in Afghanistan live in rural areas and rely on agriculture and livestock. These figures characterize Afghanistan as sensitive and vulnerable to climate change shocks, and specifically to drought. Furthermore, drought is one of the common disaster types in Afghanistan, and in the last two and half decades the data shows it has occurred with varying severity and geographic coverage.

Livelihood distribution in Afghanistan is based on the availability of natural resources. Irrigated agriculture, agro-pastoralism, rainfed agriculture, and forestry are the general types of livelihoods in Afghanistan. Drought directly affects livelihoods in Afghanistan by reducing or diminishing water resources that are needed for agriculture and livestock.

The purpose of this compatative drought analysis is to have a comprehensive understanding of drought in Afghanistan and its impact on communities, and to study communities' vulnerability levels to drought. By using the available free remote sensing climate data and existing assessment datasets, it aims to achieve an in-depth knowledge of drought impacts on communities' access to food, water, sanitation, health, livelihoods, and to study how drought acts as a push factor for displacement in the country.

Previous studies on drought in Afghanistan usually relied only on environmental datasets alone due to limited available data on multisectoral needs, making the usage of granular assessment data on different sectors difficult. Therefore, REACH, as a humanitarian data actor in Afghanistan, with the support of WFP, aims to use the available assessment datasets that have been collected by REACH or other actors and combine them with remote sensing datasets to gain an in-depth understanding of drought impacts on communities across the country. Moreover, the findings of this stage of the analysis are going to be used for designing a drought severity monitoring framework, which facilitates the monitoring of drought severity in the country in a real-time manner.

This report provides a detailed description of the methodology in Chapter 2. In the methodology, the data sources, analysis methods, and frameworks used in this study are explained. In Chapter 3, the key findings of the analysis are explained, including:

1. Annual drought evolution in Afghanistan
2. Impact of drought on food security
3. Impact of drought on access to water
4. Impact of drought on health, wash, and displacement

[2] UNOCHA, https://www.unocha.org/news/afghanistan-alarming-effects-climate-change

METHODOLOGY

The overall objective of the comparative drought analysis is to develop a comprehensive drought analytical framework that provides insights into the impacts of drought on community livelihoods and food security. This framework will utilize freely available remote sensing climate data, alongside assessment datasets collected from various organizations operating in Afghanistan. These datasets will enhance the investigation into the effects of drought on food security, access to water, displacement, and disease within affected communities.

In addition to the drought analytical framework, the insights gained from this study will inform the development of a drought severity monitoring framework. This framework aims to facilitate real-time drought monitoring, allowing for timely responses to mitigate the adverse effects of drought on vulnerable populations

Remote Sensing and GIS Data

Remote sensing climate data played a crucial role in this assessment. Precipitation conditions and meteorological drought were assessed using the Standardized Precipitation Index (SPI) and monthly average precipitation extracted from CHIRPS satellite products.[3] Daily precipitation data were also included to study flash droughts in rainfed areas. In Afghanistan, precipitation occurs as rainfall and snowfall, making snow conditions essential for drought studies, especially for meteorological droughts. Snow water equivalent data from NASA FEWS NET Land Data Assimilation System (FLDAS) was therefore utilized in this assessment.

For studying agricultural drought conditions, soil moisture data derived from remote sensing through NASA FEWS NET Land Data Assimilation System (FLDAS) was analyzed in 15-day intervals, averaging soil moisture data twice each month from planting to harvest. To assess the impact of drought on vegetation and crop production, the Vegetation Condition Index (VCI), provided by UN-SPIDER and derived from MODIS satellite's Normalized Difference Vegetation Index (NDVI), was employed.[4]

To study the impact of heatwaves on vegetation, anomaly extreme temperature events were analyzed using ERA5 daily temperature data. Additionally, surface water area for monitoring hydrological drought was measured by sentinel 2 satellite data.

Assessment Data

Whole of Afghanistan Assessment (WoAA): The WoAA, conducted by REACH since 2019, is the only nationwide multisectoral needs assessment, disaggregated at the admin1 level. Initially focused on displacement groups in 2019 and 2020, it expanded to include the general population from 2021[5] to 2023. For this comparative drought analysis, WoAA data from 2021 to 2023 was utilized to monitor the impact of drought on food insecurity, water access, and the Livelihoods Coping Strategies Index (LCSI).

Humanitarian Situation Monitoring (HSM): Conducted quarterly by REACH since January 2022, the HSM involves Key Informant (KI) interviews at the admin2 level. HSM provides timelier and more granular data compared to WoAA, though its use is limited in sectoral needs analysis due to its KI-based nature. In the comparative drought analysis, HSM data on drought-driven displacement was used to assess how drought acts as a catalyst for community displacement.

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[3] USGS and CHC - CHIRPS, https://www.chc.ucsb.edu/data/chirps.
[4] UNSPIDER, https://www.un-spider.org/
[5] WoAA 2021 only covers 22 provinces from 34 provinces due to access limitation for data collection.

Joint Market Monitoring Initiative (JMMI): Initiated in 2020 by REACH and partner organizations, the JMMI collects monthly data on the prices of food and non-food items. In the comparative drought analysis, the cost of the food basket was calculated based on JMMI data for flour, oil, and sugar prices.

WFP VAM: The World Food Programme (WFP) has been collecting Vulnerability Analysis and Mapping (VAM) data since 2007. Initially limited to main city centers until 2020, data collection expanded to each district on a monthly basis thereafter. VAM data helps analyze price changes between dry and wet years. In the comparative drought analysis, it provides the pastoral terms of trade (the amount of wheat grains purchasable with the price of a one-year-old female sheep).

Seasonal Calendar: FEWS NET provided seasonal calendars for Afghanistan's provinces, used in the comparative drought analysis to contextualize agricultural drought calculations.

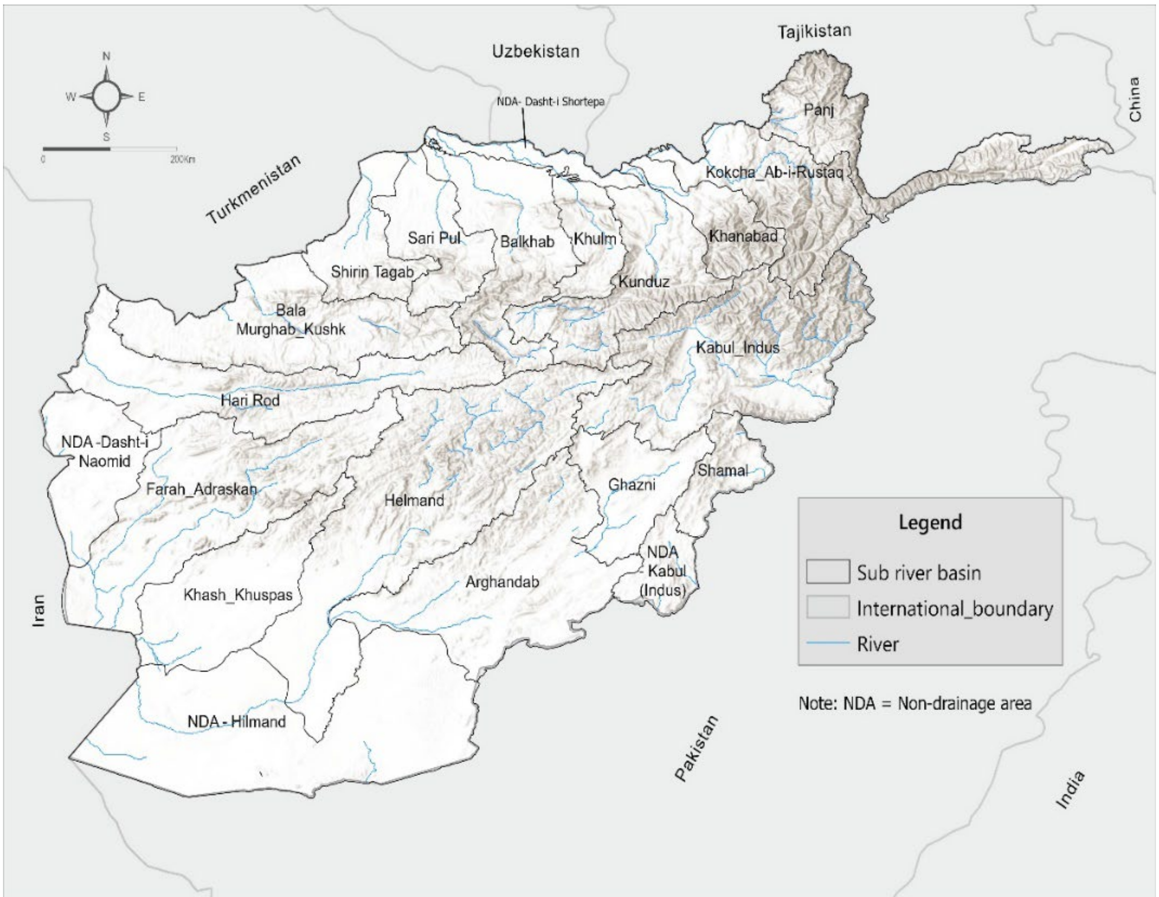
Livelihood Zones: Mapped by FEWSNET in 2011, Livelihood Zones for Afghanistan are used to contextualize drought analysis based on different livelihood zones.

Landuse: Land use shapefile created by FEWS NET in 2011 used for studying impact of agriculture drought on Irrigate, Pasture, and Rainfed lands.

Analysis Units:

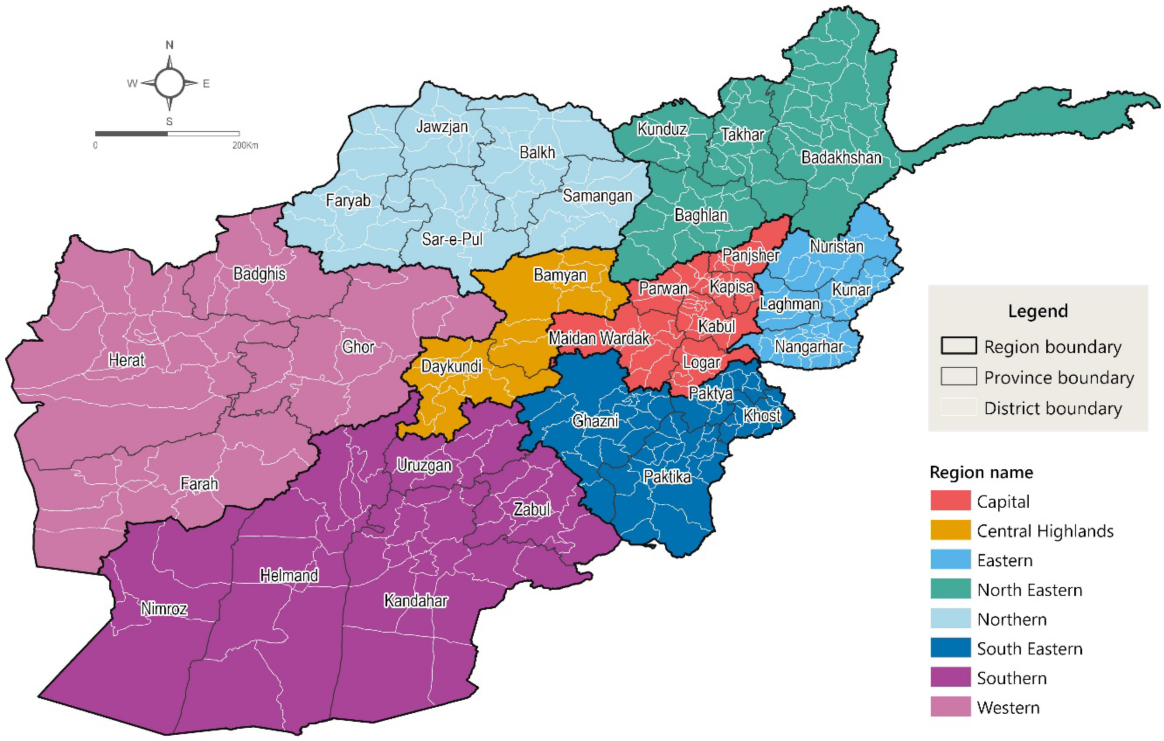
Sub River Basin Analysis: Climate Parameters from Remote Sensing Data analysis are associated with the 21 river sub basins based on FAO-provided river basin data. This approach is ideal because climate parameters vary significantly between river basins. The results are then translated to admin1 and admin2 to facilitate integration with other assessment results reported at these levels.

Map 1: Afghanistan 21 Sub River Basins Map



Admin Levels for Reporting Final Analysis Results: The final analysis results are reported at either admin1 or admin2. These admin levels are part of the Common Operational Datasets provided by OCHA and are therefore used widely by many actors, enabling easier cross-comparison with other datasets and information systems.

Map 2: Afghanistan Regions and Admin Boundaries Map



Drought Analysis

Meteorological Drought

Meterological drought is generally defined as a period of unusual precipitation deficit, in relation to the long-term average conditions for a region.[6]

Afghanistan's Precipitation Season: The main precipitation season in Afghanistan is the first half of the year, from December to May, which includes the winter and spring months.

Monitoring Winter Precipitation: To detect any deficit in winter precipitation, the Standardized Precipitation Index (SPI-3) was calculated for the December to February period.[7] To monitoring spring precipitation conditions during the spring season, the SPI-3 was calculated for the March to May period.[8]

Beside the SPI data, the monthly average precipitation from CHIRPS satellite calculted for each sub-river basins.

Analysis Unit: The analysis for both the winter and spring SPI-3 was conducted at the sub-river basin level.

Hydrological Drought

Hydrological drought is associated with the effects of prolonged periods of precipitation deficit and reduced surface or sub-surface water. For instance, reduced streamflow in rivers and creeks, reservoir and lake level lowering as well as groundwater level lowering. [9]

Snow water equivalent data from the USGS FEWS NET data explorer was utilized to assess hydrological drought. Decreasing snow water equivalent is linked to water availability in the river basin, and communities may face water deficits when it decreases drastically.

Sentinel-2 satellite imagery NDWI was used to map surface water, focusing only on the main river lines and some natural reservoirs to avoid miscalculation. The time interval for the surface water area mapping was chosen from mid-May to mid-June, in this time duration mostly the rivers flow charges from snow packs and springs, reduction in surface water can be a important indication of the drought. In addition, soil water content of below root level zone was taken from GRACE satellite data.

Agricultural Drought

Agriculture drought occurs when a meteorological drought leads to a soil moisture deficit that limits water availability for natural vegetation and crops. [10]

Vegetation Condition Index: The MODIS Vegetation Condition Index (VCI) provided by the UN-SPIDER model was used to assess agricultural drought. The VCI areas were categorized into five levels: Extreme, Severe, Moderate, Mild, and No Drought. The VCI layer was overlapped with land use data to determine the extent of drought impact on irrigated, Rainfed, and Pasture areas.

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[6] European and Global Drought Observatories, Drought Stage, https://joint-research-centre.ec.europa.eu/european-and-global-drought-observatories_en

[7] SPI-3: Three months averaged precipitation for the target year compared to the long-term precipitation of the same months (1982 – 2024).

[8] NASA, Standardized Precipitation Index (SPI)

[9] European and Global Drought Observatories, Drought Stage, https://joint-research-centre.ec.europa.eu/european-and-global-drought-observatories_en

[10] European and Global Drought Observatories, Drought Stage, https://joint-research-centre.ec.europa.eu/european-and-global-drought-observatories_en

Challenges and Limitations

Geographically, Afghanistan is a large and diverse country with varying climatic conditions, which makes it challenging to provide sufficient granularity for climate indicators at the administrative levels for which assessment datasets are available, specifically at the admin1 level. To achieve precise calculations of climate indicators, sub-river basins or watersheds are used for the climate indicators analysis, and the results are then applied to the overlapping admin1 regions. During the integration process, to avoid underestimating drought severity—especially in cases where an admin1 region overlaps with several sub-river basins—the river basin with less than 25% area of overlap is first excluded, and then the worst-case scenario is chosen.

In this study, remote sensing data with different spatial resolutions, ranging from 10 meters to several kilometers, were utilized. In mountainous areas, particularly in the central highlands, the capital region, and northwestern and eastern regions, the use of low spatial resolution raster data for agricultural drought estimation makes it challenging to obtain precise results, as vegetation parcels are often too small to be accurately captured by coarse satellite data. To address this challenge in mountainous provinces, satellite data with higher resolution were used. However, this process is more time-consuming and less consistent compared to using lower resolution data, as platforms such as UNSPIDER and GIOVANNI predominantly use low-resolution raster data, which can be more easily fed into drought monitoring systems.

In this study, all data for assessing drought severity and occurrence were sourced from remote sensing. Due to limited coordination between the de facto government of Afghanistan and INGOs, acquiring ground station data from relevant government departments proved challenging. As a result, it was not possible to use ground station data. However, efforts were made to address this gap by utilizing remote sensing data for similar purposes, such as calculating surface water to monitor river flow fluctuations and measuring below-root-zone soil water content to estimate groundwater quantity.

Although this research aims to study drought from 1999 to 2023, a lack of assessment data before 2021—specifically data on multisectoral needs in the country—limited the analysis to overlaying drought data with assessment data from 2021 onwards. While Annual Multi-Sectoral Needs Assessments (MSNA) have been conducted in Afghanistan by REACH since 2019, the sample sizes for 2019 and 2020 only included displaced groups and did not reflect the situation of other population groups. Additionally, data from 2021 to 2023 are available only at the provincial (admin1) level, preventing further analysis at the admin2 level.

As previously mentioned, this study focuses on the years 2021 to 2023 due to the availability of assessment data. During this period, Afghanistan faced not only drought but also other significant shocks, including COVID-19, conflicts, regime changes, and natural disasters. The lack of independent studies on the impact of each of these shocks on communities made it challenging to attribute all observed changes solely to drought. Therefore, this study takes a comparative approach by examining drought years alongside wet years to better understand the effects.

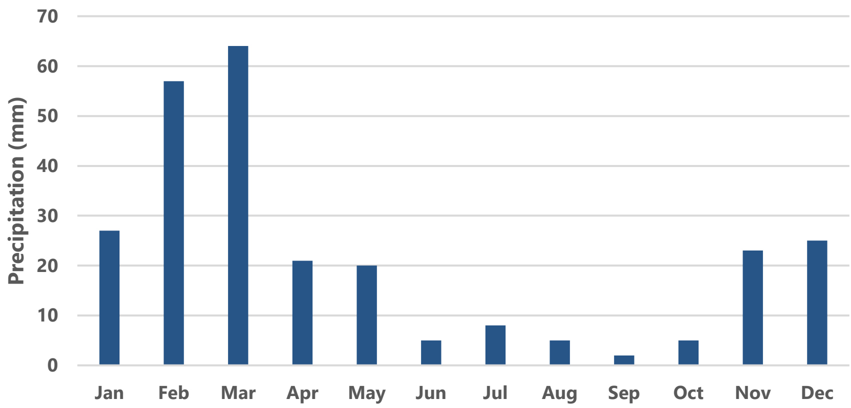
FINDINGS

Drought Annual Evolution in Afghanistan

Drought in Afghanistan results from deficits in both snowfall and rainfall. Livelihoods in the country are influenced by meteorological and climatological conditions. Snowfall during the winter season reinforces soil moisture, replenishes groundwater through infiltration, and supports permanent snowpacks that sustain river flows throughout the year. Additionally, the spring rainfall period supports rainfed crops and pasture growth. Therefore, a comprehensive drought monitoring system should incorporate all of these indicators to provide a more accurate assessment of drought conditions.

In Afghanistan, the sufficient precipitation season extends from the end of the fall of the previous year to the end of the spring of the current year. The most critical months within this period are from January to March, during which, according to long-term precipitation data, February and March are typically the months with the highest precipitation.

Figure 1: Average Monthly Precipitation (1999 – 2023) - CHIRPS



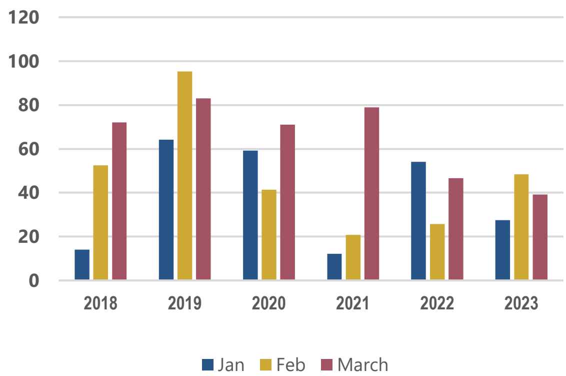
Precipitation in Afghanistan generally occurs in two seasons. The first season spans from December to the end of February, coinciding with the coldest months of the year (January and February). During this period, precipitation is primarily in the form of snowfall.

Following the cold months of January and February, another period of precipitation occurs from March to May. Except in high-altitude upper basins, this precipitation generally falls as rainfall.

In 2021, precipitation during January and February was extremely low (figure 2). Although precipitation levels were high in March, the lack of precipitation earlier in the year led to a meteorological drought during the winter.

The impact of the meteorological drought in 2021 may be observed in the following decline in water availability. Data on snow water equivalent, surface water, and groundwater content showed a substantial reduction (figures 3, 4 and maybe more to show snow water).

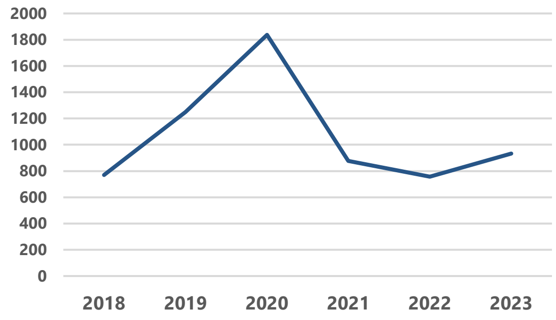
Figure 2: Mean Precipitation in mm (2018-2023) - CHIRPS



In 2022, the meteorological drought improved slightly due to increased precipitation from January to March. However, overall precipitation levels remained low, and drought conditions persisted. As a result, the prolonged drought had a more severe impact on water availability in the country.

Surface water mapping from the main river channels in Afghanistan, utilizing Sentinel-2 imagery between mid-May and mid-June from 2018 to 2023, reveals a correlation with precipitation patterns. In both 2019 and 2020, higher precipitation levels corresponded with increased surface water availability, indicating that wet conditions significantly enhance water resources. Notably, the surface water area reached its peak in 2020, while precipitation was highest in 2019. This suggests that long-term trends of drought or wetness can profoundly affect both surface and groundwater availability.

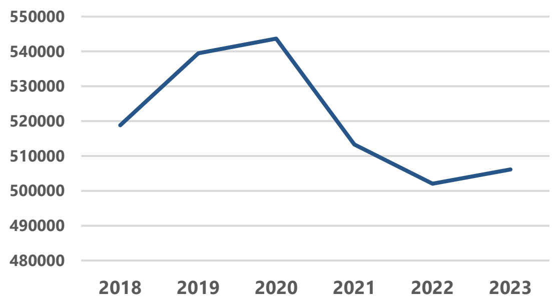
Figure 3: Surface Water from 2018 (Km^2) – Sentinel2



Moreover, the long-term impact of meteorological drought, such as over one year, is evident in groundwater content as well. The reduction in precipitation during 2021, 2022, and 2023 significantly affected below-root-zone soil water content, contributing to a decrease in groundwater levels and the drying up of springs that locally support community livelihoods.

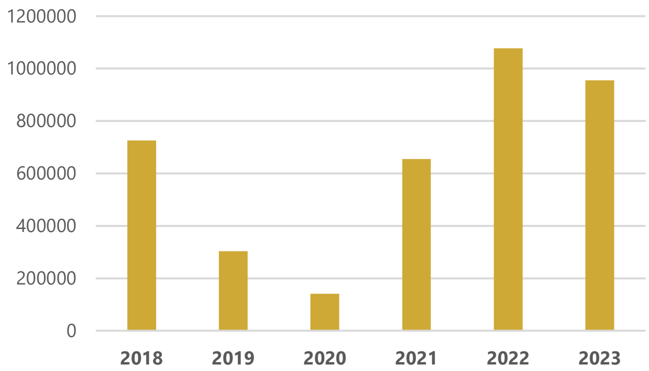
In addition, the WoAA assessment from 2021 to 2023 shows increase in the percentage of HOUSEHOLDs that travel more distance to gain water, and also use more unprotected water sources.

Figure 4 : Total amount of water content in below root zone (mm) - April to Sept - GLDAS



Another impact following the meteorological drought is agricultural drought. The irrigated areas, overlayed with the MODIS Vegetation Condition Index from 2018 to 2023, show a pattern very similar to that of precipitation.

Figure 5: Total Hectares of Irrigated Area Affected by Drought – MODIS VCI

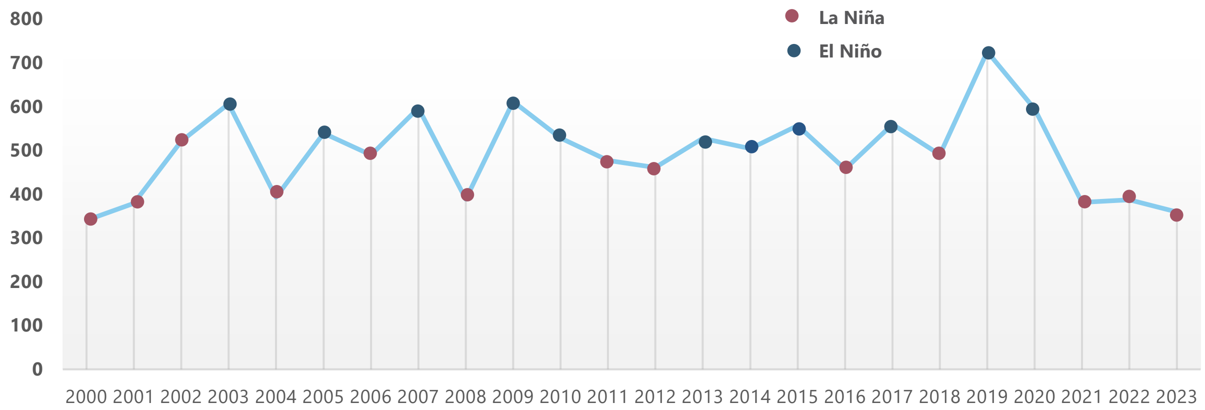


El Niño and La Niña

Generally the amount of precipitation in Afghanistan is linked to El Nino (warm) and La Nina (cool) event in the eastern tropical Pacific. Precipitation data acquired from CHIRPS satellite shows this relationship.

Precipitation in Afghanistan is low during the La Nina event, and vice versa during the El Nino events. This relationship can be well used as an early warning signal for the actor and decision makers.

Figure 6: Annual Mean Precipitation from 2000 to 2023 (mm) – CHIRP



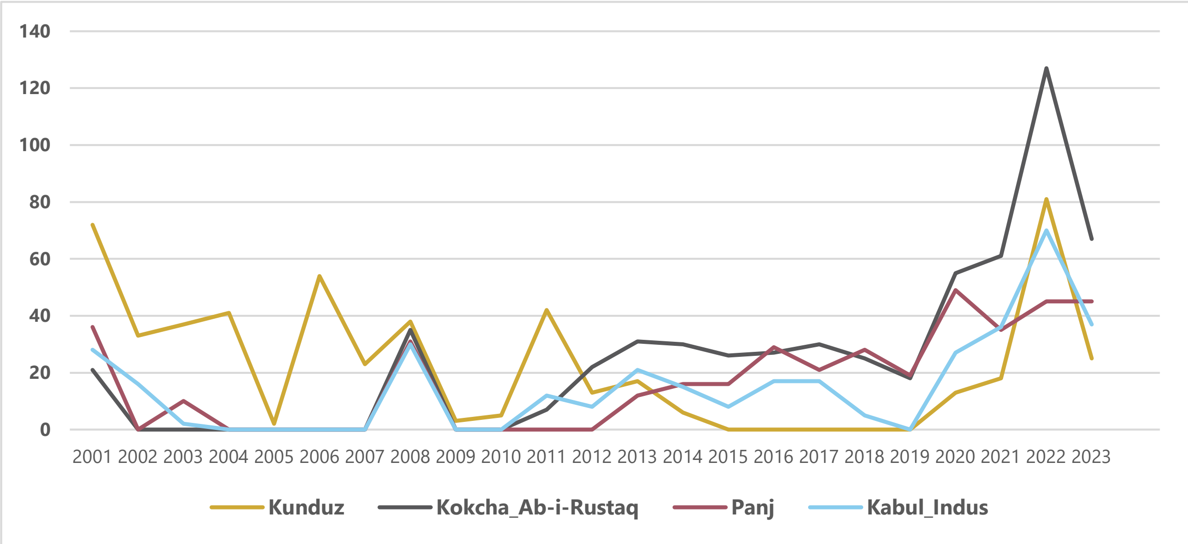
Climate Change Impacts

According to research from the University of Bristol, Afghanistan is identified as one of the most vulnerable areas to heatwaves.[11] Similarly, a study by ICIMOD found that the area of glaciers in Afghanistan has decreased by over 400 km² between 1990 and 2015.[12] Glaciers and permanent snowpacks play a crucial role as water sources and are vital for maintaining stable livelihoods in the country. Consequently, rising temperatures due to climate change accelerate snowmelt and lead to the diminishing of permanent glaciers, which in turn increases the frequency of drought events in Afghanistan.

Data on daily snow depletion provided by USGS and FEWS NET shows that Kabul Indus, Panj, Kokcha Ab Rostaq, and Kunduz sub river basins which contain the most snowpacks, experienced the worst early snow depletion during recent years (2020 – 2023) since 2000. Particularly the Panj, and Kokcha, sub river basins which is the origin of Amu River branches experienced faster snow depletion since 2010. Although drought and lack of snow fall played important role in exposing snowpack to early depletion, but the impact of climate change on the glaciers in the river basin also can't be ignored.[13]

[11] University of Bristol - 2023, The most at-risk regions in the world for high-impact heatwaves
[12] ICIMOD – 2021, Glaciers in Afghanistan.
[13] FEWS NET, USGS, Early Warning - https://earlywarning.usgs.gov/fews/ewx/index.html?region=casia

Figure 7: Number of Days Snow Depleted Earlier than Average Near Depletion Date – FEWS NET



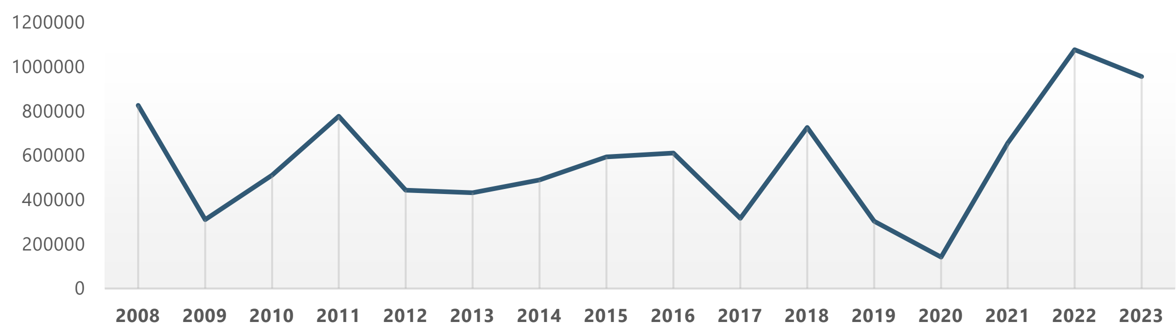
Drought Impact on Food Security

Afghanistan, where the majority of its population relies on livelihoods that are highly vulnerable to drought, has consistently faced natural hazards that contribute to deteriorating food security. Specifically, drought, as a slow-onset shock, adversely affects agriculture and livestock, impacting food availability and income sources, while further challenging the resilience of communities.

Impact of Drought on Agriculture

Drought has affected agriculture in Afghanistan in various years and with differing levels of severity. Agriculture and livestock are the primary livelihoods for approximately 70% of the population. Failures in agriculture subsequently lead to food insecurity and contribute to socio-economic drought.

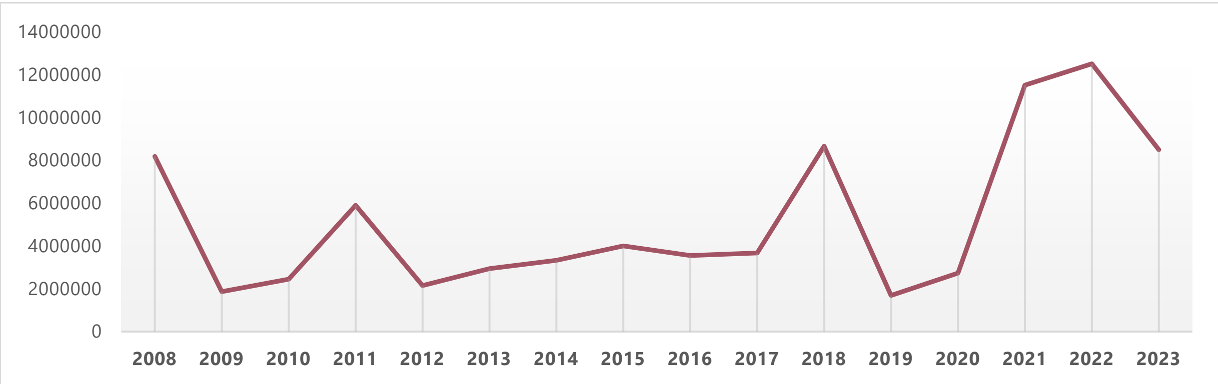
Figure 8: Total Hectares of Irrigated Area Affected by Drought from 2008 to 2023 – MODIS



The pattern of affected rangeland areas, as depicted in the graph below, follows a similar trend. The only notable difference is the lag in the recovery of irrigated areas from previous drought years. For example, in 2019, despite good precipitation levels across the country, the irrigated areas do not show best growth as it supposed due to high precipitation, while rangelands experienced their best condition that year. The impact of the drought in 2018 was still visible on the irrigated areas in 2019. Following 2019, in 2020, when the country experienced a normal wet year, the irrigated areas showed the best condition from 2018 to 2023.

In 2021, the amount of rangeland areas affected by drought was significantly higher than that of irrigated areas. The substantial reduction in precipitation during that year adversely impacted rangelands; however, the irrigated areas may have demonstrated resilience due to the two wet years preceding it in 2019 and 2020. This resilience allowed irrigated areas to maintain slightly better conditions despite the drought conditions that prevailed in 2021.
From this pattern, it can be inferred that rangelands require less time to recover than irrigated lands after a drought year. Additionally, rangelands are highly sensitive to precipitation deficits. While irrigated lands are also sensitive to changes in precipitation, their recovery is significantly influenced by the conditions of the preceding years. This means that the resilience of irrigated areas is not solely dependent on current precipitation levels but also on the cumulative effects of prior wet years.

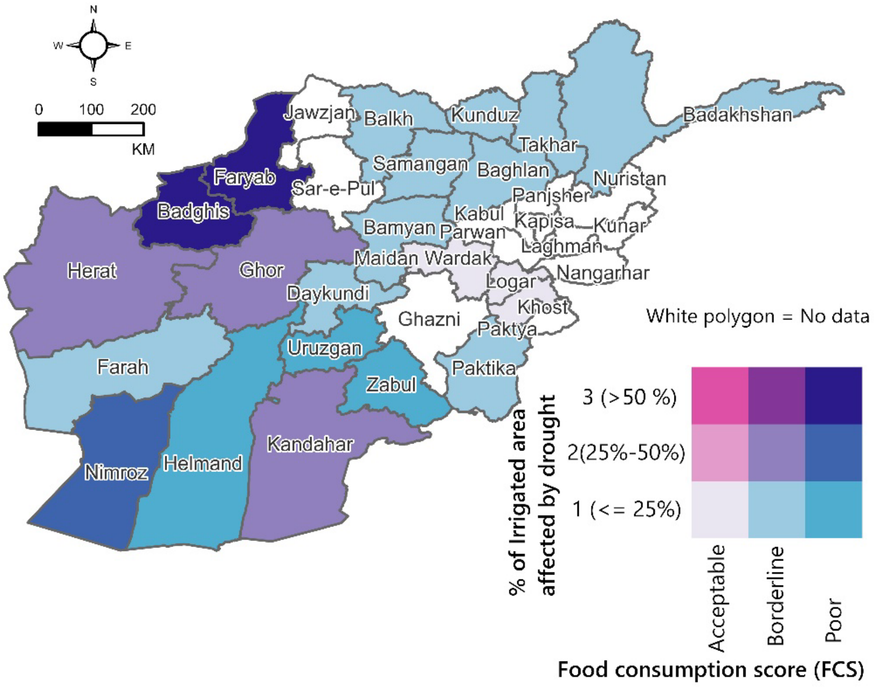
Figure 9: Total Hectares of Affected Rangeland Due to Drought from 2008 to 2023 - MODIS



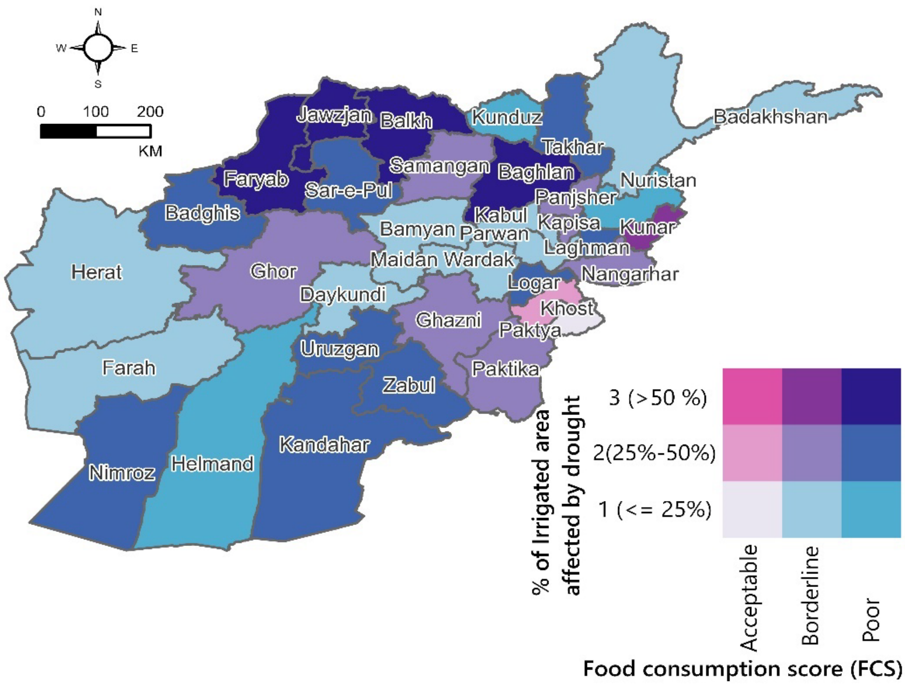
Data on Food Consumption Scores (FCS) from the WoAA assessment and The Agriculture drought affected provinces calculated from MODIS satellite Vegetation condition index product 1 month prior to the harvest time in each provinces (Wheat harvest time), indicate that provinces where agriculture has been significantly affected by drought tend to experience poor food consumption level. However, other factors also influence food consumption, such as food prices and policy changes, such as the ban on opium cultivation, which predominantly affects the southern part of the country.

In 2021, data showed that in the northwestern part of the country, two provinces, Badghis and Faryab, which were extremely affected by agricultural drought, had poor Food Consumption Scores (FCS). In 2022, as drought conditions overshadowed provinces in the northeastern regions, more provinces exhibited poor FCS. Additionally, southern provinces, which primarily relied on irrigated livelihoods, were also significantly impacted by drought and experienced reduced food consumption. Provinces in the central part of the country, which mostly practice agro-pastoralism, were affected by drought but still maintained better FCS levels.

Map 3: Provinces 2021 - Agriculture Drought and Score FCS Combined

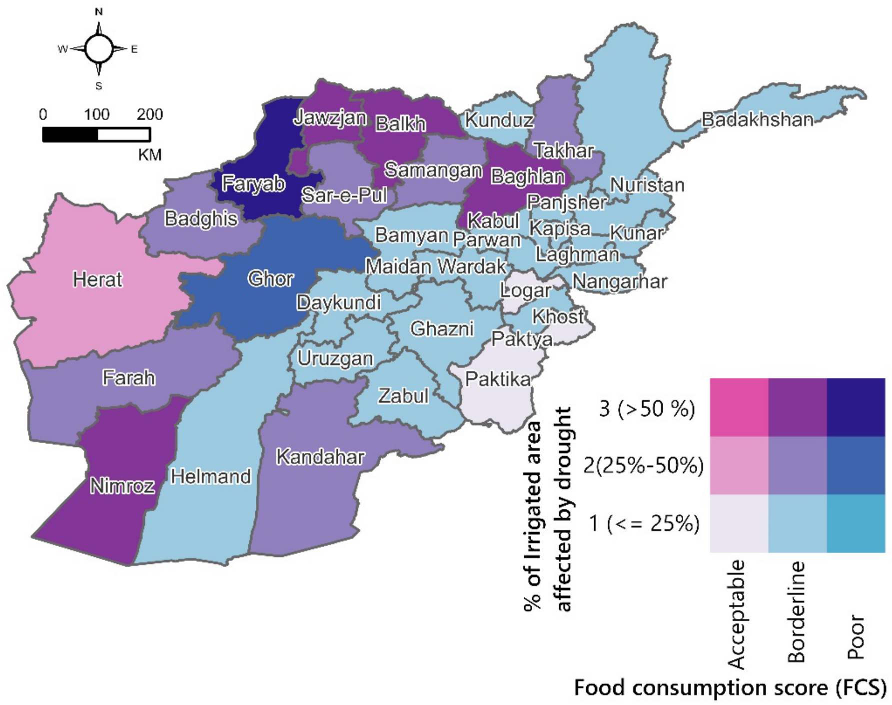


Map 4: Provinces 2022 Agriculture Drought and FCS Score Combined



In 2023, improvements in drought conditions were observed in the southern, western, northeastern, and some provinces of the northern regions, as well as in the overall capital, southeastern, and central highland regions. Although the food consumption score (FCS) improved in some northern provinces compared to 2022, the impact of drought on agriculture remained unchanged. In this context, as previously mentioned, the food basket prices in 2023 saw a significant reduction, which contributed positively to overall food consumption across the country.

Map 5: Provinces 2023 agriculture drought and FCS score Combined



Impact of Drought On Rainfed Agriculture

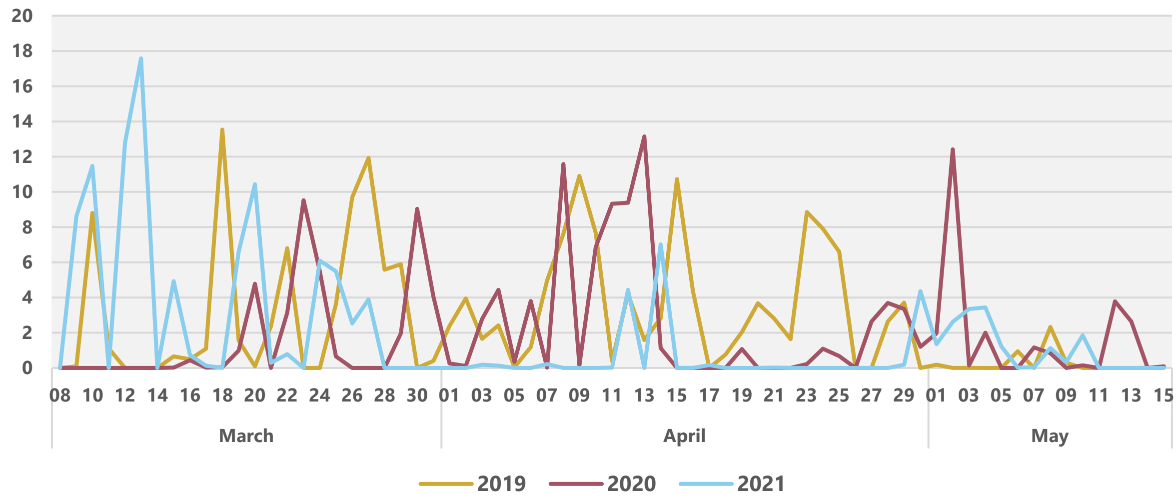
As the name implies, rainfed agriculture relies on rainfall water. The vegetation condition in rainfed zones indicates high sensitivity to delays in precipitation, with even a two-week delay significantly impacting rainfed agriculture.

Rainfed livelihood in Afghanistan is mostly practiced in the northern and northeastern regions. In Samangan and Sar-e-Pul provinces more than half of the total population lives in rainfed agriculture livelihood zones. Additionally, in Balkh and Faryab provinces, nearly 20% of the population resides in rainfed livelihood zones. In the northeastern region, communities in Kunduz, Takhar, Baghlan, and Badakhshan provinces, and in the western region, especially in Badghis, practice rainfed agriculture as a supporting livelihood. Across the central highlands and other regions, rainfed agriculture is practiced to varying extents.
Rainfed agriculture, and consequently rainfed communities, are among the most vulnerable groups to meteorological drought in the country.

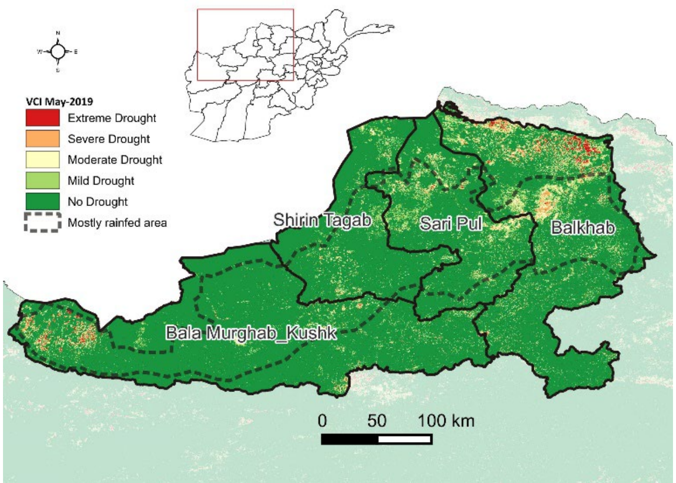
According to the AGORA Crop Calendar, the planting of rainfed crops occurs during February and early March in the northern provinces, with harvest typically taking place in June. From the time of planting until near harvest, which includes the months of March and April, consistent precipitation plays a vital role in the successful growth of the crops. Conversely, a delay of more than two weeks or a deficit in the amount of precipitation can lead to crop failure.

For example, the daily precipitation data for the Sari Pul sub-river basin from 2019, 2020, and 2021, covering the months of March to May, is depicted in Figure 10 (the neighbouring sub river basins experienced almost similar precipitation trend). In 2019 and 2020, daily precipitation occurred consistently. However, in 2021, while precipitation levels in March were satisfactory, there was a significant reduction in April, and the precipitation occurred with delays. As a result, the vegetation condition in May 2021 deteriorated significantly.

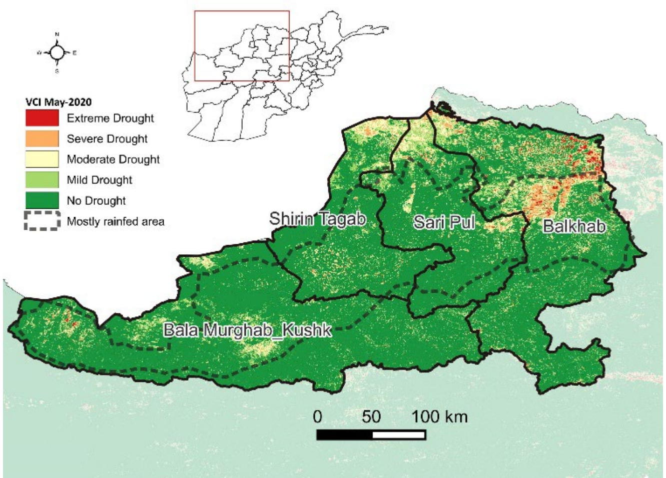
Figure 10: Daily Precipitation of Sari Pul Sub-River Basins (mm) – CHIRPS



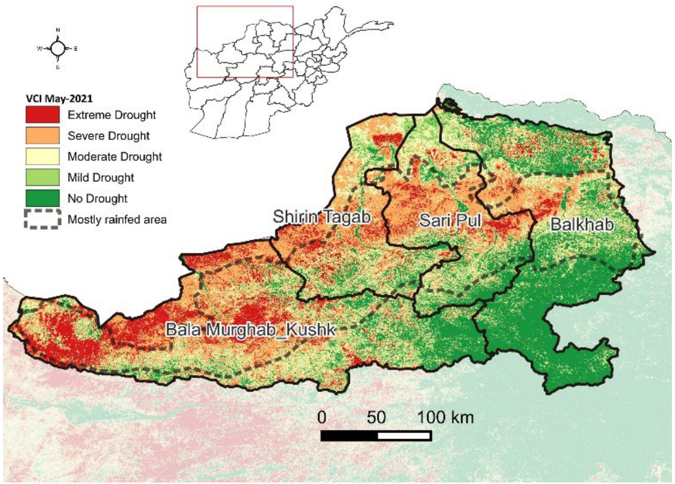
Map 6: VCI Map of May 2019



Map 7: VCI Map of May 2020

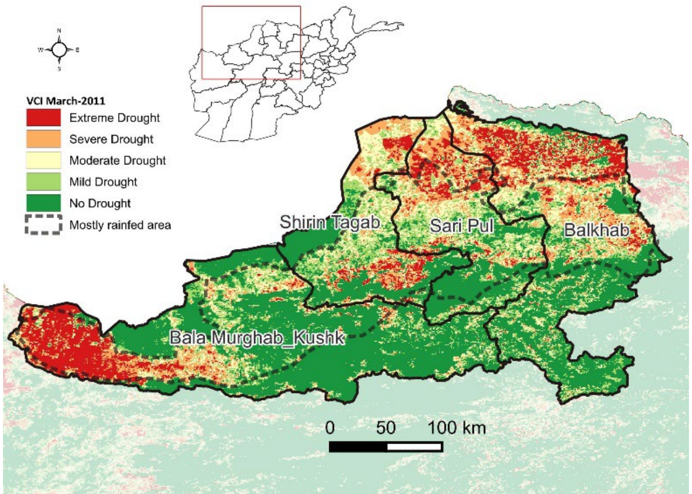


Map 8: VCI Map of May 2021



As another example in 2011, daily precipitation varied significantly between two river basins: Bala Murghab and the Balkhab sub-river basins, which predominantly cover Badghis and Balkh provinces, respectively, along with parts of neighboring provinces. In the Bala Murghab sub basin, daily precipitation in March consistently exceeded 10 mm. In contrast, the Balkhab sub basin experienced a delay in sufficient precipitation between March 7 and March 25. As a result, vegetation conditions in rainfed areas deteriorated significantly.

Map 9: VCI Map March 2011



Map 10: VCI Map May 2011

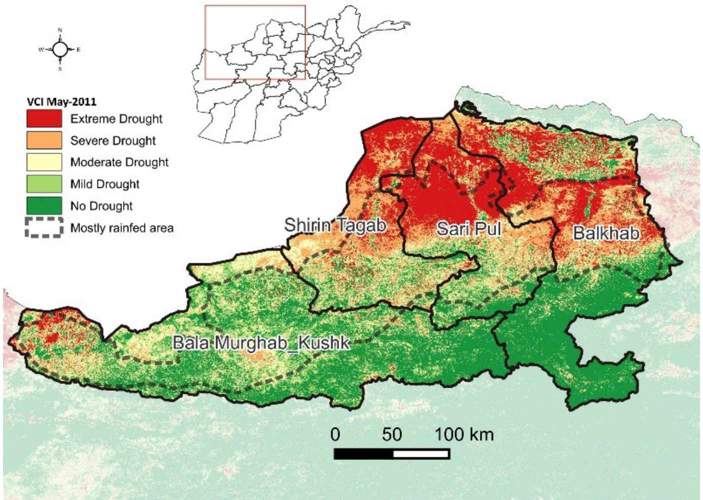
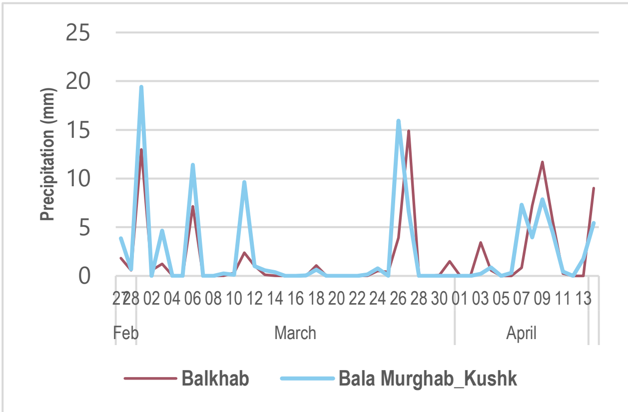


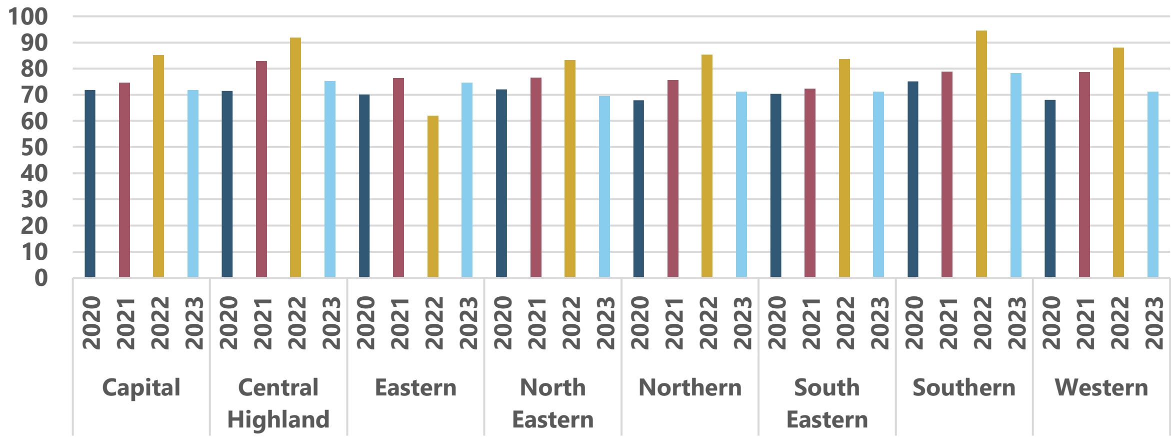
Figure 11: Daily Precipitation Balkhab and Bala Murghab sub-river basins March and April 2011 (mm)



Food Basket Variation

The rise and fall of drought shows a strong correlation with variations in the food basket. In 2020, when the country experienced an overall wet year, the price of the food basket remained at its lowest in most provinces compared to the three following years. In 2021, the country entered a dry year, affecting different parts of the country with varying severity. The severity of drought was higher in the Central Highlands, southern, and western regions compared to the eastern, northeastern, capital, and southeastern regions. Similarly, the increase in the food basket price was more pronounced in these higher-affected regions and around 80 usd.

Figure 12: Average Regional Food Basket Price from Autumn 2021 to 2023 (USD)

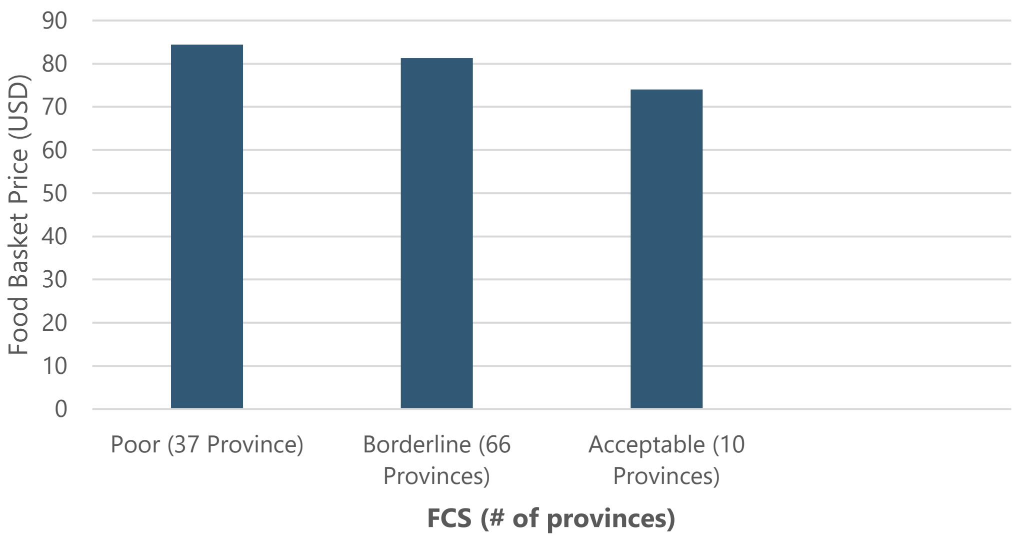


In 2022, as drought persisted into its second year and worsened in the northern and northeastern regions, the price of the food basket rose to its highest levels from 2020 to 2023. Following 2022, in 2023, as the overall drought conditions improved compared to 2021 and 2022, similarly, the food basket price decreased considerably. The Afghani currency instability in this duration also played an important role in the flactuation of food basket price, but here we tried to compare the price change in same time between different regions.

The food basket price overall shows a correlation with the food consumption score, where higher food basket prices are mostly associated with provinces falling into poor or borderline food consumption scores. Almost all provinces reporting poor consumption scores had food basket prices above $80.

The median of food basket prices based on the food consumption score from 2021 to 2023 are depicted in Figure 13.

Figure 13: Provinces Autumn (2021 – 2023) Median Food Basket Price (USD) Per FCS Level - VAM

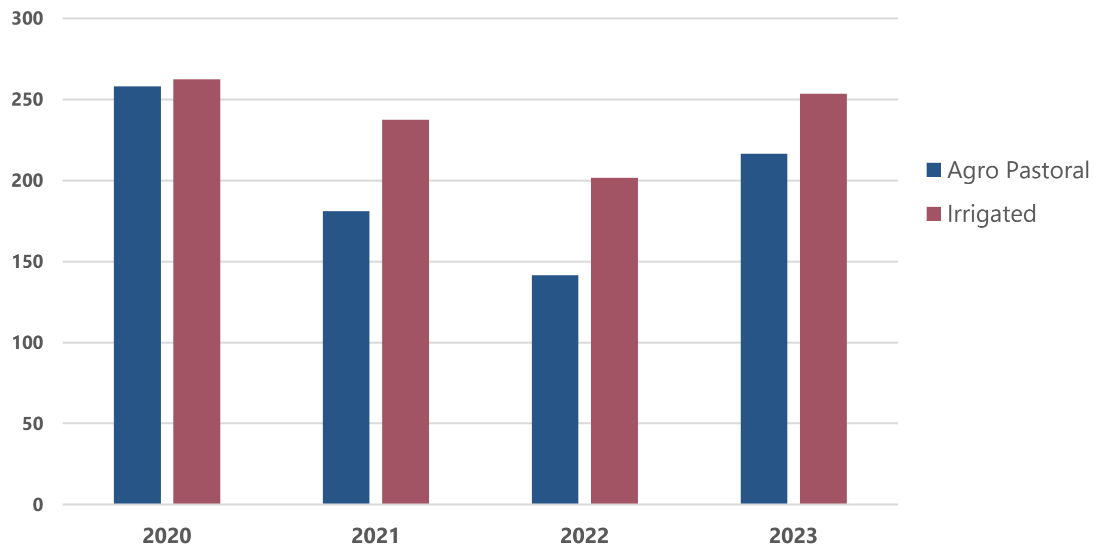


Pastoral Terms of Trade

The number of kilograms of wheat grain that can be purchased with the price of a one-year-old female sheep is another measure selected to study the impact of drought on food access, specifically for the agro-pastoral community.

The price of one-year-old female sheep from 2020 to 2023 shows a high correlation with drought conditions. Data indicates that the price of livestock decreased in all provinces in 2021 and 2022, and that provinces where the main livelihood type is agro-pastoral are more vulnerable. The value of a one-year-old female sheep significantly decreased in these provinces in 2021, and as the drought persisted into 2022, the condition worsened further. This decrease in value against wheat grain was particularly considerable in agro-pastoral livelihood provinces. In 2023, as drought conditions improved overall, the price of livestock also increased, resulting in an increase in the value of a one-year-old female sheep against wheat grain.

Figure 14: # kgs of wheat grain can be purchased by price of 1 year old female sheep during autumn season by provinces primary livelihood (2021-2023) - VAM

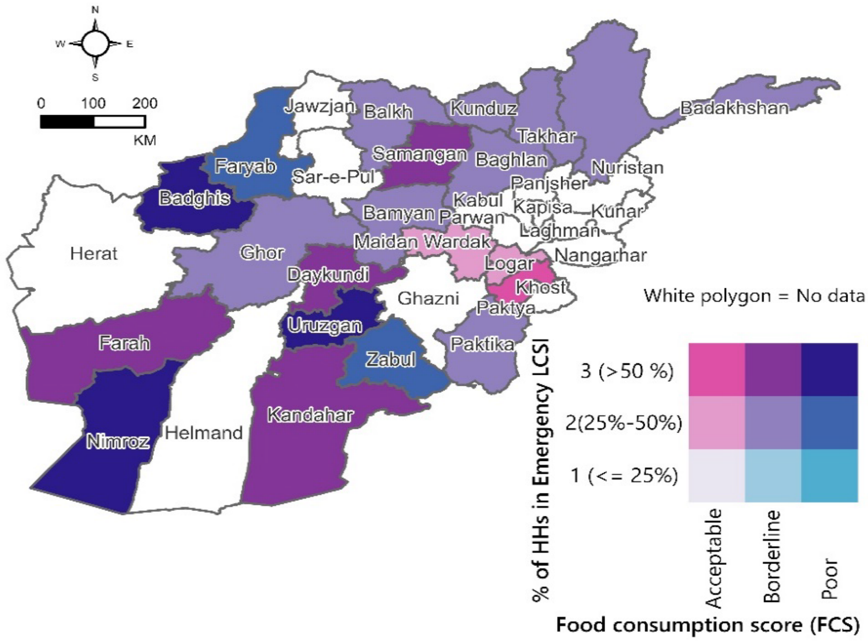


Resilience and Vulnerability to Drought

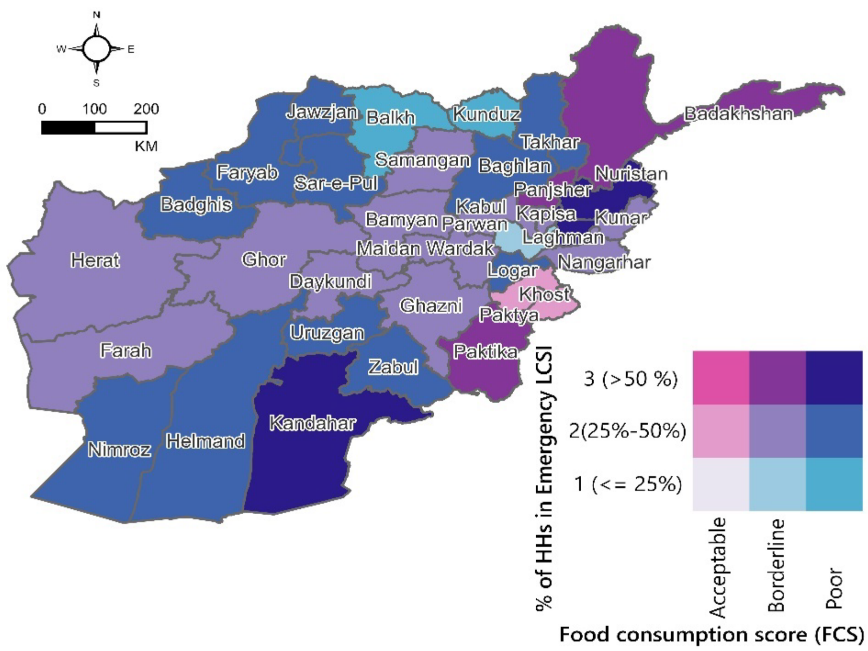
Agro-pastoral communities, including Bamiyan, Dykundi, Ghor, Farah, Badghis, Samangan, and Badakhshan, demonstrate better resilience to food insecurity during dry years. These communities show quick sensitivity to droughts; for instance, Badghis province had the worst food consumption in 2021 but showed more resilience during prolonged droughts. In 2021, which marked the onset of drought, provinces with agro-pastoral livelihoods experienced worsening coping strategies. However, as the drought conditions persisted, food consumption and coping strategies remained more sustainable compared to provinces with other types of livelihoods. This resilience is possibly due to their livelihood type, which enables them to cope better during times of famine, showing higher levels of coping strategies than other livelihood zones.

In contrast, the southern region, mostly composed of intense irrigated and farming livelihood zones includs Helmand, Kandahar, Nimroz, Zabul, and Uruzgan provinces, shows the worst resilience to food security during the dry years of 2021 and 2022. These regions reported limited access to food, and data from the Livelihoods Coping Strategies Index reveals that households have few options for coping strategies, with the majority practicing emergency coping strategies. Additionally, the government's ban on poppy cultivation in April 2022 further affected livelihoods and food security in this region

Map 11: LCSI and FCS Combined Map- Aug 2021



Map 12: LCSI and FCS Combined Map – Early 2022



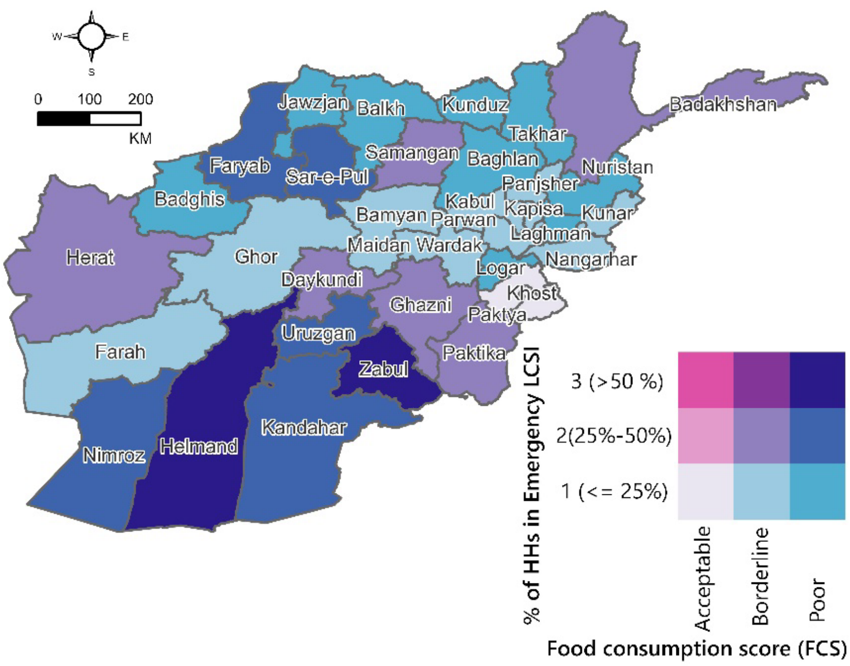
Provinces in the northern region, including Faryab, Sar-e-Pul, and Jawzjan, which mainly practice irrigated and rainfed livelihoods, show less resilience in dry conditions. households in these provinces face poor food consumption, and options for coping strategies are also limited and exhausted quickly. Although the food consumption score remained poor during the dry years, this region had slightly better conditions in practicing coping strategies compared to the southern region.

Provinces such as Balkh, Kunduz, Takhar, and Baghlan, which are involved in cereal production, mixed irrigation, and intense agriculture livelihood zones, exhibit less stability regarding food availability. The food consumption score deteriorated during the dry years of 2021 and 2022; however, the level of livelihood coping strategies remained better in these provinces. These provinces show better coping mechanisms to drought compared to the southern and northern irrigated and rainfed zones.

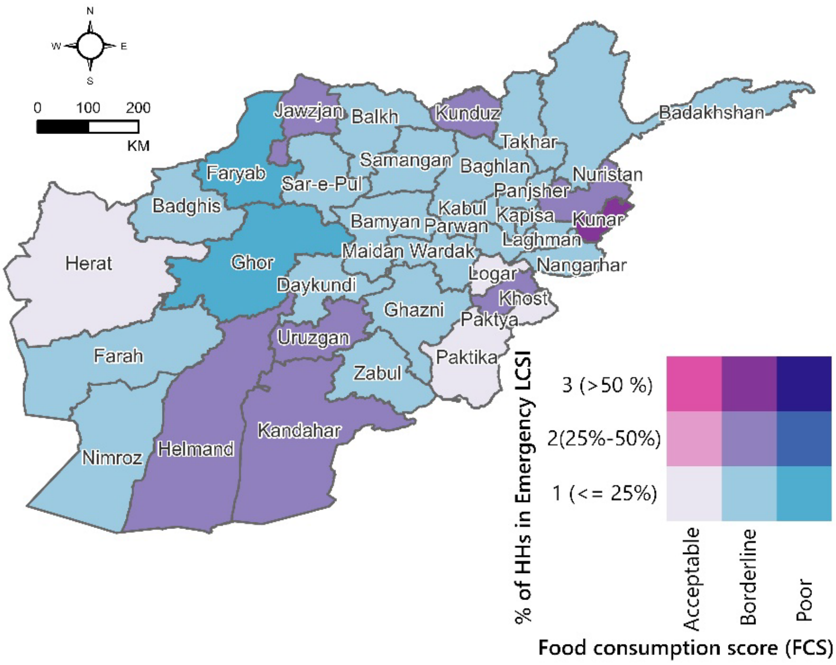
In the capital region and eastern regions, where provinces practice irrigated agriculture, vineyard and horticulture, agro-pastoral, and forestry livelihoods, overall resilience in coping strategies during dry years is observed. Logar province in the capital region, and Laghman and Nuristan provinces in the eastern regions, showed deteriorated food consumption scores during the year 2022. However, the capital region and most of the eastern region, except Nuristan, which falls in the Kabul Indus River basin, showed better water availability and infrastructure, contributing to greater resilience to drought compared to other regions.

Finally, the southeastern region, which includes Paktya, Paktika, Khost, and Ghazni provinces, mostly practicing irrigated agriculture, agro-pastoral, and forestry livelihoods, demonstrates very good resilience in food security during drought years. Specifically, Khost and Paktya remained at an acceptable level of food consumption scores in 2021, 2022, and 2023, which is unique in the whole country. In Paktya and Ghazni, households have better access to food, and the coping strategies practiced show better access to resources for coping.

Map 13: LCSI and FCS Combined Map Aug - 2022



Map 14: LCSI and FCS Combined Map – Aug 2023



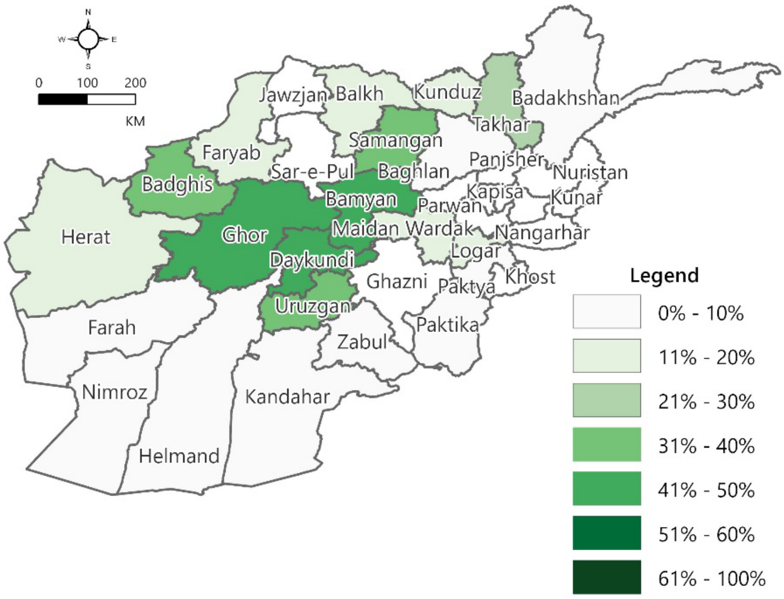
Additionally, other factors in these years, such as conflict, regime changes in the country, and other natural hazard events, may have contributed to the deterioration of food security. Moreover, food distribution by the WFP also increased during 2021 to 2023. According to a WFP report, in 2022 alone, food distribution targeted 23 million people across the country. This substantial effort likely contributed to coping strategies and improved food security in Afghanistan during these challenging times.

Impact of Drought on Access to Water

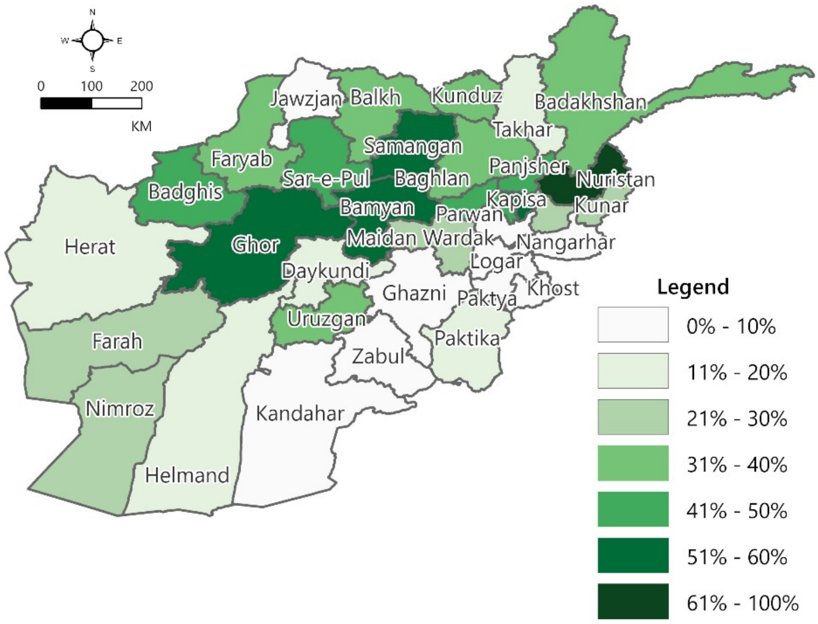
Unprotected Water Sources

During dry conditions, especially when drought escalates to hydrological drought, the use of unprotected water sources increases. Data collected through household-level surveys in the WoAA assessment shows that the percentage of households using unprotected water sources increased across the country. In 2022, when the country experienced a second consecutive drought and hydrological drought emerged, this number increased substantially. By 2023, with slight improvements in drought conditions, the usage of unprotected water sources reduced in some provinces.

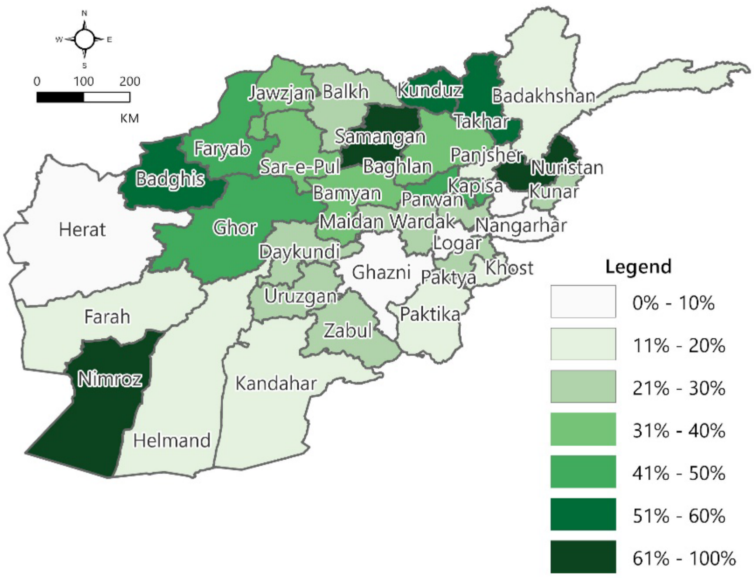
Map 15: %HHs Reported Using Unprotected Water Source in 2021 - WoAA



Map 16: %HHs Reported Using Unprotected Water Source in 2022 - WoAA



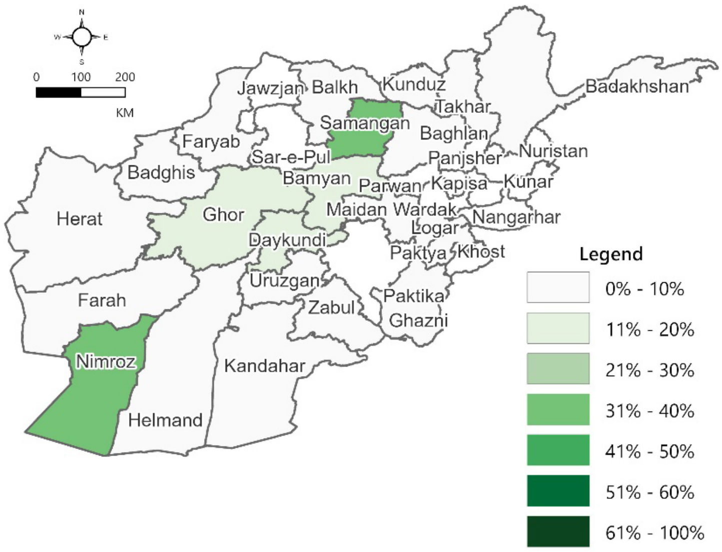
Map 17: %HHs Reported Using Unprotected Water Source in 2023 - WoAA



Water Access Travel Time:

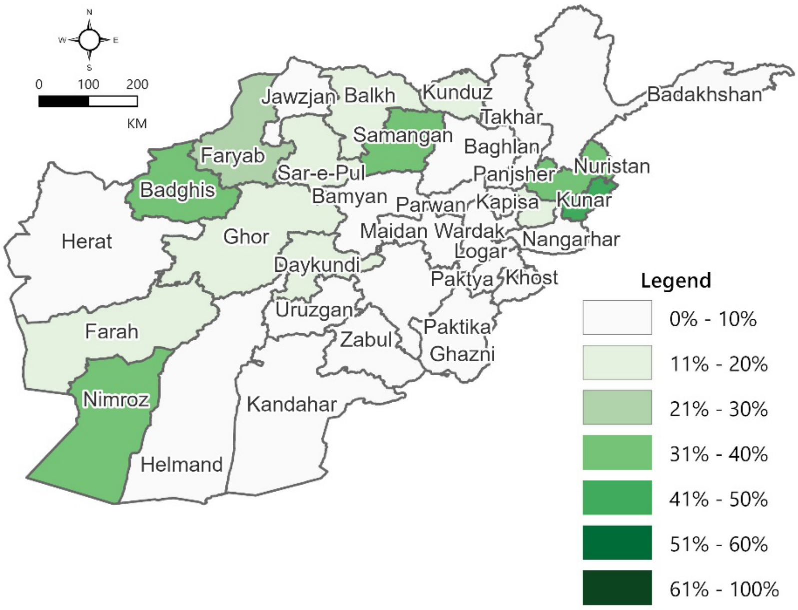
The initial impact of drought on water access challenges is more pronounced in provinces located in the upper basins. For example, in 2021, Ghor, Bamyan, and Dykundi, where most of the rivers originate, reported 19%, 15%, and 13% of households respectively needing more than 30 minutes to access water. Only Samangan and Nimroz reported higher percentages than these provinces.

Map 18: %HHs Reported Travel > 30 Minutes to Access Water Sources in 2021 - WoAA



In 2022, as the drought persisted into its second year with slight improvements in meteorological conditions but worsening hydrological conditions due to prolonged drought, the percentage of households needing to travel longer distances for water increased in other provinces, especially those in the lower basins.

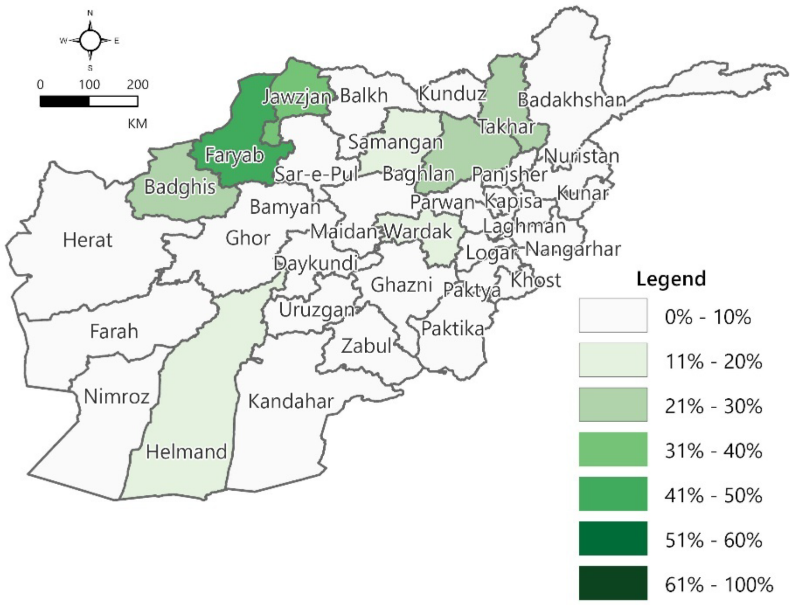
Map 19: %HHs Reported Travel > 30 Minutes to Access Water Sources in 2022 - WoAA



In 2023, the percentage of households with travel time more than 30 minutes to access water substantially decreased in the eastern and central highland regions as the drought conditions improved slightly. However, in the northern region, two provinces—Jawzjan (33%) and Faryab (42%)—showed an increase. Additionally, surface water mapping between May and June revealed a drastic deficit in the Shirin Tagab and Sari-e-Pul sub-river basins, where Faryab and Jawzjan provinces are located.

In the northeastern region, the drought conditions remained severe, even worse than in 2022. The percentage of households with travel time exceeding 30 minutes increased in Baghlan (24%) and Takhar (23%), while the situation in Badakhshan and Kunduz remained similar to 2022 levels

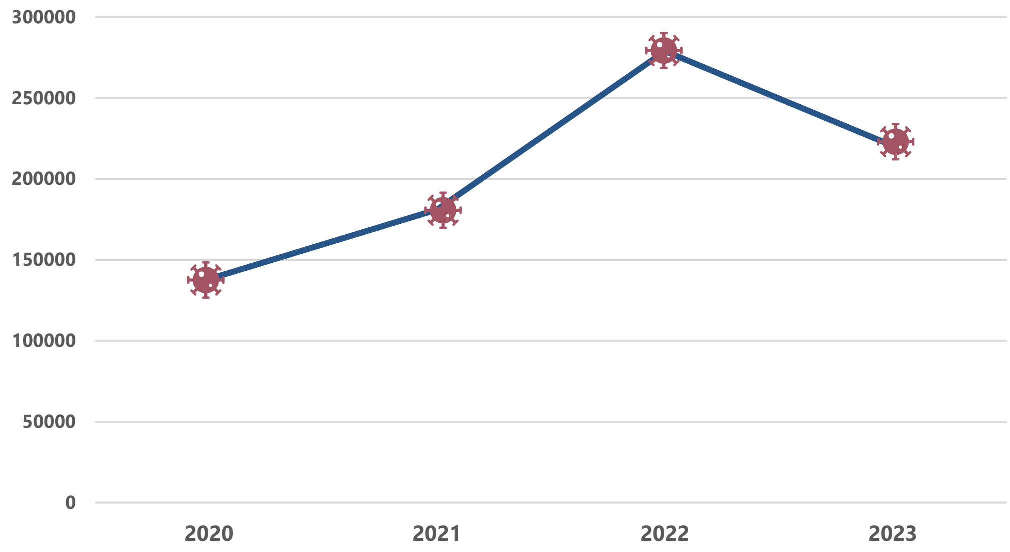
Map 20: %HHs Reported Travel > 30 Minutes to Access Water Sources in 2023 - WoAA



Drought Impact on Access to Sanitation Health/Disease Outbreak

The recorded cases of Acute Water Diarrhea (AWD) by WHO show a significant increase from 2020 to 2022. In 2020, a total of 138,076 AWD cases were reported. By 2021, this number increased to 181,053 cases, and further escalated to 278,834 cases in 2022, coinciding with severe hydrological drought conditions across the country.

Figure 15: Number of AWD Cases Reported by WHO From 2020 to 2023



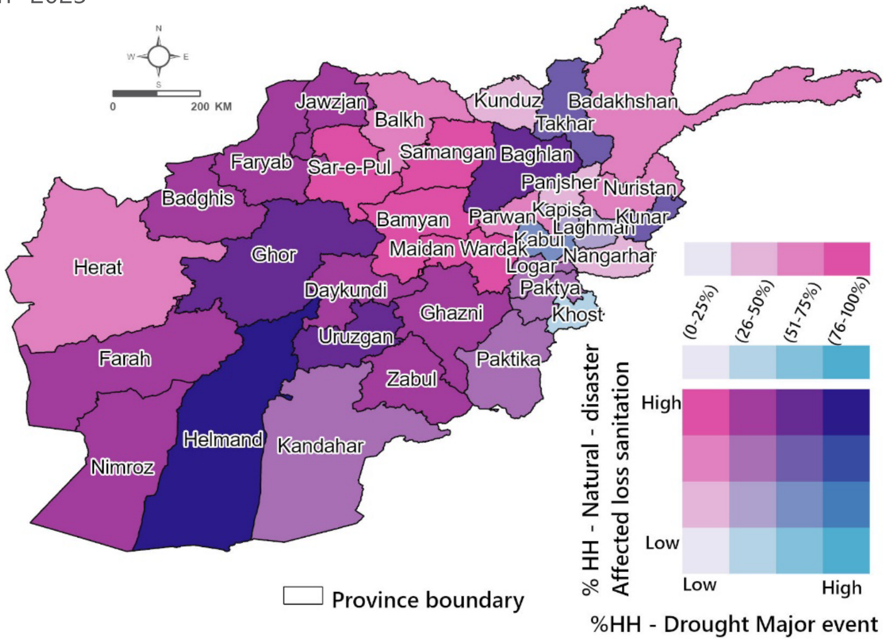
In 2023, although there was a reduction in the total number of cases compared to 2022, the figure remained higher than in 2021 and 2020, with a total of 220,365 reported cases.

Data from the Whole of Afghanistan Assessment (WoAA) in 2023 indicates that natural hazard events significantly impacted household access to sanitation in several provinces. In provinces such as Helmand, Ghor, Baghlan, and Kunar, a high percentage of households reported natural hazards as a major event affecting sanitation access. Similarly, provinces including Farah, Nimroz, Zabul, Uruzgan, Ghazni, and the northwestern regions of Faryab, Jawzjan, and Badghis also reported considerable impacts of natural hazards on sanitation access.

To define the provinces where natural hazards have limited access to sanitation while drought has a strong presence, data from WoAA on the percentage of households reporting loss of sanitation due to natural disasters and the percentage of households reporting drought as a major event experienced in the six months preceding data collection were analyzed. By combining these two indicators, an effort was made to identify the provinces where drought and other natural hazards have collectively affected populations. In addition to sanitation, limited access to healthcare due to natural hazards was examined alongside drought.

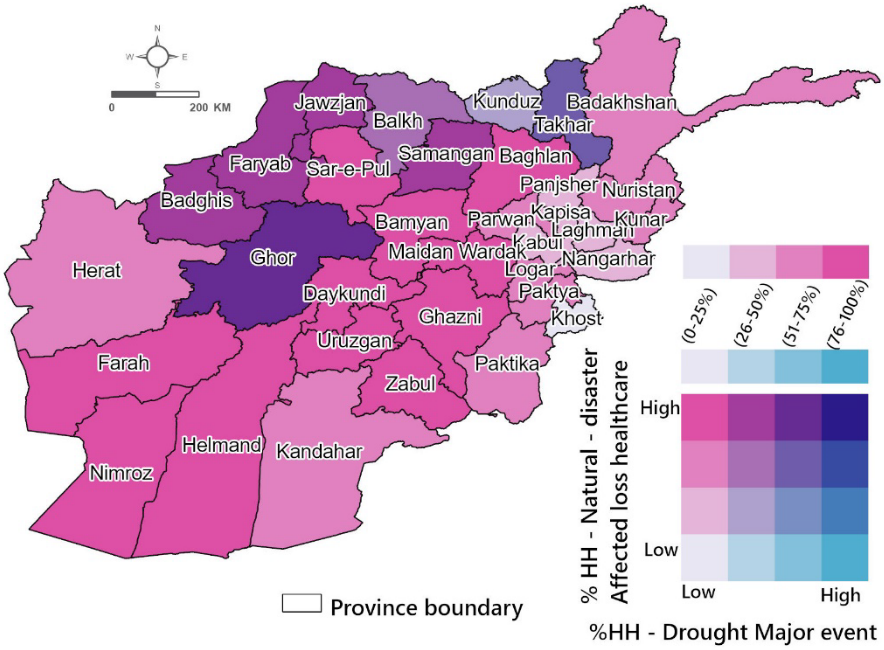
Note: In this study, due to the unavailability of independent data on the impacts of drought on community access to sanitation, health, and shelter, it was not feasible to draw explicit conclusions. However, the current findings and analysis may be helpful for relevant actors in conducting further assessments.

Map 21: Drought reported as major event HHs experienced 6 months before data collection, and the %of HHS reported Natural disaster limited access to sanitation- 2023



Data from the WoAA assessment in 2023 reveals that households in Ghor and Takhar provinces were significantly impacted in terms of access to healthcare due to natural disasters. These provinces reported high incidences of natural disasters, in the same time drought being the major event affecting many households. Additionally, provinces such as Badghis, Faryab, Jawzjan, and Samangan were also likely loss healthcare due to natural hazards, while drought maintained as major event in these provinces.

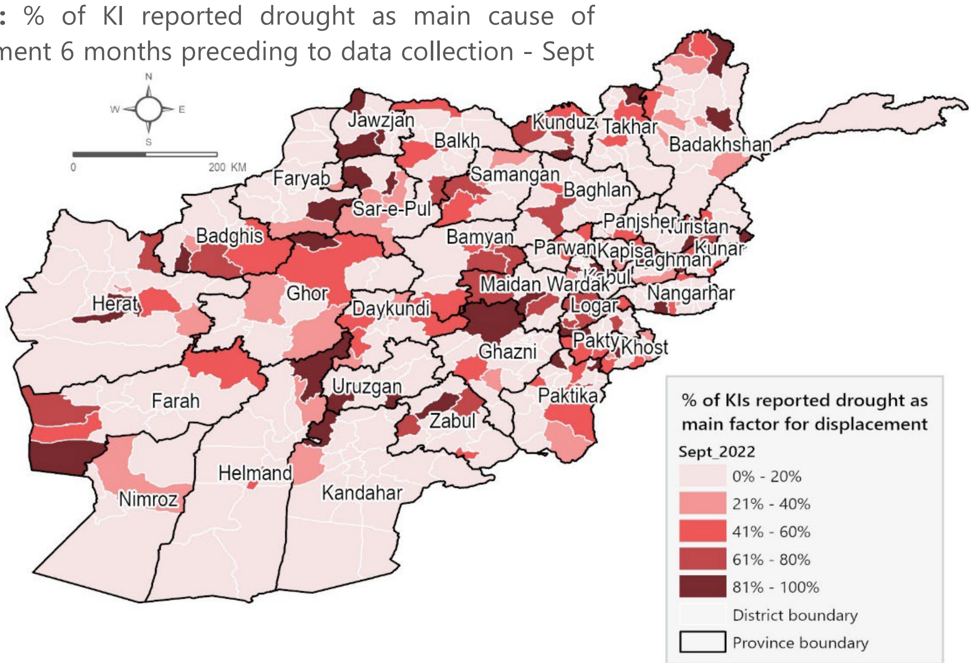
Map 22: % of HHs reported Drought as major event experienced 6 months precedent to data collection, and the %of HHs reported Natural disaster limited access to healthcare- 2023



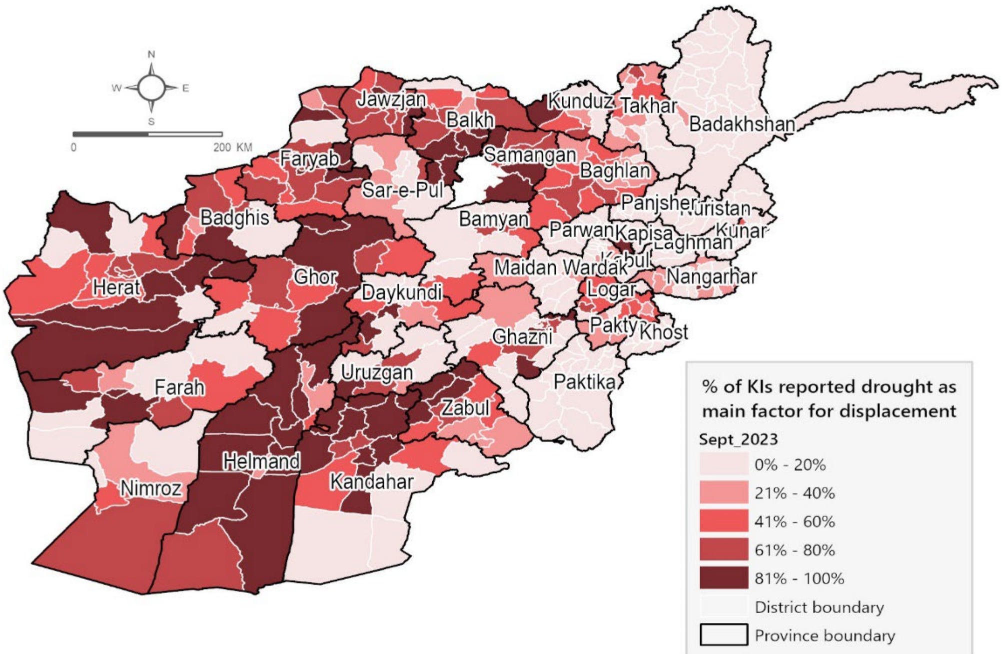
Drought Impact on Displacement.

Data from the HSM KI survey indicates that drought has emerged as a significant push factor for populations to leave their settlements in various districts. Data collected in September 2022 and 2023 from the KI survey shows that drought-driven displacement occurred in most districts. The maps illustrate that drought occurrence and severity were higher in the Southern, Western, and Northern regions.

Map 23: % of KI reported drought as main cause of displacement 6 months preceding to data collection - Sept 2022



Map 24: % of KI reported drought as main cause of displacement 6 months preceding to data collection - Sept 2023



CONCLUSION

This comprehensive study underscores the severe and multifaceted impact of drought on Afghanistan's communities, highlighting its significant influence on food security, livelihoods, water access, health, and displacement. The recurrent and severe droughts, exacerbated by the triple-dip La Niña event from 2020 to 2023, have critically disrupted agricultural productivity, livestock health, and access to essential water resources. The findings provide valuable insights for humanitarian actors and policymakers seeking to address these challenges and support effective monitoring systems.

Key Findings and Implications:

1. **Climate and Drought Evolution:**

Since 1999, Afghanistan has experienced several drought events with varying severity and geographical impact. Dry weather in Afghanistan is significantly influenced by La Niña events in the eastern Pacific Ocean. Additionally, climate change and global warming contribute to the severity and impact of droughts on communities by diminishing permanent glaciers and snowpacks.

Effective drought monitoring systems must incorporate these climate patterns, utilizing remote sensing data to provide timely and accurate information on precipitation trends and water resource availability. This integration will enable proactive responses and better preparedness for future drought events.

2. **Impact on Food Security:**

Droughts have severely damaged agriculture and livestock, leading to increased food prices and reduced food consumption. Agro-pastoral communities have seen a decrease in livestock value, negatively affecting their purchasing power. During drought years, the number of people consuming less food increased, and the number of households practicing emergency livelihood coping strategies rose considerably.

Different typologies of droughts (meteorological, agricultural, hydrological) have specific impacts on food security. Meteorological droughts directly reduce rainfall, impacting rainfed agriculture and leading to immediate food shortages. Agricultural droughts, resulting from prolonged meteorological droughts, further deplete soil moisture and crop yields. Hydrological droughts, characterized by reduced water levels in rivers and reservoirs, affect irrigated agriculture and livestock.

The food basket price is closely correlated with drought conditions, leading to increased inaccessibility of food for households and poorer food consumption levels. Understanding these typologies is crucial for designing targeted food security interventions that address the specific needs arising from each type of drought.

3. **Water Access and Sanitation:**

Prolonged drought conditions have exacerbated water scarcity, increased reliance on unprotected water sources, and heightened the incidence of waterborne diseases such as acute watery diarrhea. The number of households using unprotected water sources and traveling longer distances to access water increased as droughts extended.

The implications for water management are significant. Meteorological droughts reduce surface water availability, while hydrological droughts impact groundwater levels and river flows, leading to long-term water scarcity. Effective monitoring of both surface and groundwater resources is essential to ensure sustainable water access and to mitigate the health impacts of waterborne diseases.

The upper river basin provinces react more quickly to water scarcity than lower basin provinces. However, as drought conditions persist and transition to hydrological droughts, water scarcity becomes more pronounced in lower basin provinces, leading to increased acute water diarrhea cases.

4. Resilience and Vulnerability:

Different regions and livelihood zones exhibit varying levels of resilience to drought. Agro-pastoral communities show better coping mechanisms compared to regions relying on intensive irrigation and farming. Provinces practicing agro-pastoral livelihoods, and those with more drought-resistant livelihoods such as forest-based livelihoods in the southeastern region, have shown more stability during drought conditions.

Communities with access to multiple livelihoods display greater resilience than those with limited livelihood options. Understanding the resilience and vulnerability of different livelihood zones to various typologies of droughts is vital. For example, agro-pastoral communities may be more resilient to short-term meteorological droughts but still vulnerable to prolonged agricultural and hydrological droughts. This knowledge can guide the development of tailored resilience-building programs that enhance the capacity of vulnerable communities to cope with different types of droughts.

5. Displacement:

Drought has emerged as a significant driver of displacement, particularly in regions experiencing severe and prolonged drought conditions. Approximately 58% of key informants reported drought as the main cause of displacement in their settlements.

The implications for displacement are profound. Meteorological droughts can trigger immediate displacement due to sudden food and water shortages, while hydrological and agricultural droughts may lead to longer-term displacement as livelihoods become unsustainable. Monitoring displacement patterns in relation to drought typologies can help in designing interventions that address both immediate and long-term displacement needs.

6. Support for Monitoring Systems:

Integrated Monitoring Systems: The study supports the development of integrated monitoring systems that combine remote sensing data with ground-level assessments to provide comprehensive and real-time information on drought conditions. This approach will enable timely responses and better resource allocation to mitigate the impacts of drought.

Typology-Specific Interventions: The findings emphasize the need to recognize the distinct impacts of different drought typologies (meteorological, agricultural, hydrological). Each type of drought requires specific monitoring and response strategies to address its unique challenges effectively.

Localised Information: Enhancing localised (province-level) information on drought impacts through remote sensing and assessment data will provide more accurate insights into the severity and geographical distribution of droughts. This localized approach is crucial for addressing the specific needs of affected communities.

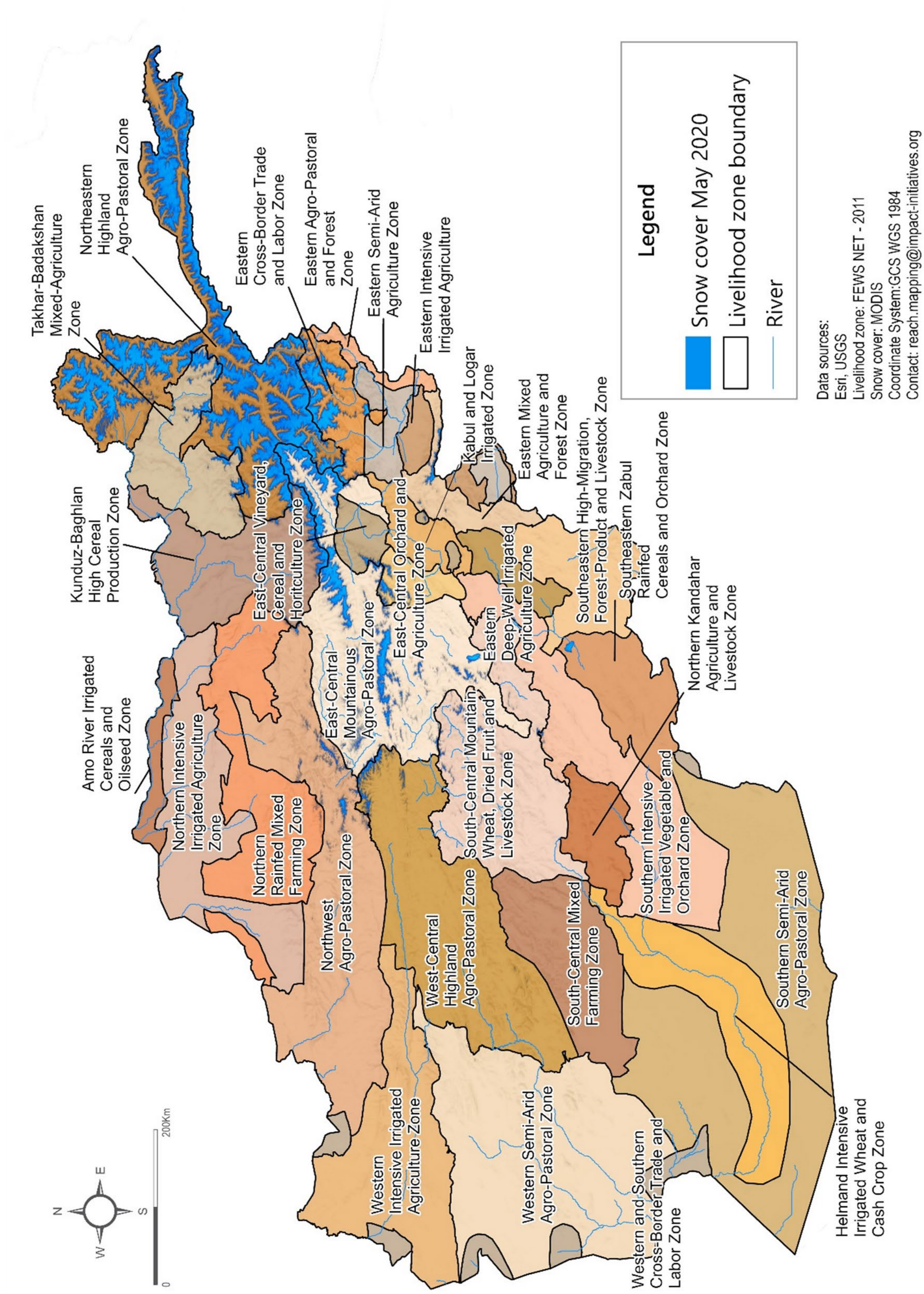
The integration of environmental indicators derived from remote sensing with existing assessment data on different sectors has provided a comprehensive understanding of the impact of droughts of varying severity and typology on communities across Afghanistan. This approach has also enhanced knowledge of climatic indicators during dry and wet years, which is essential for accurate drought monitoring.

Findings from this study will inform the development of a drought severity monitoring system for WFP by REACH in Afghanistan. This system will provide real-time monitoring of drought severity, contributing to early warning activities and enabling more effective humanitarian responses.

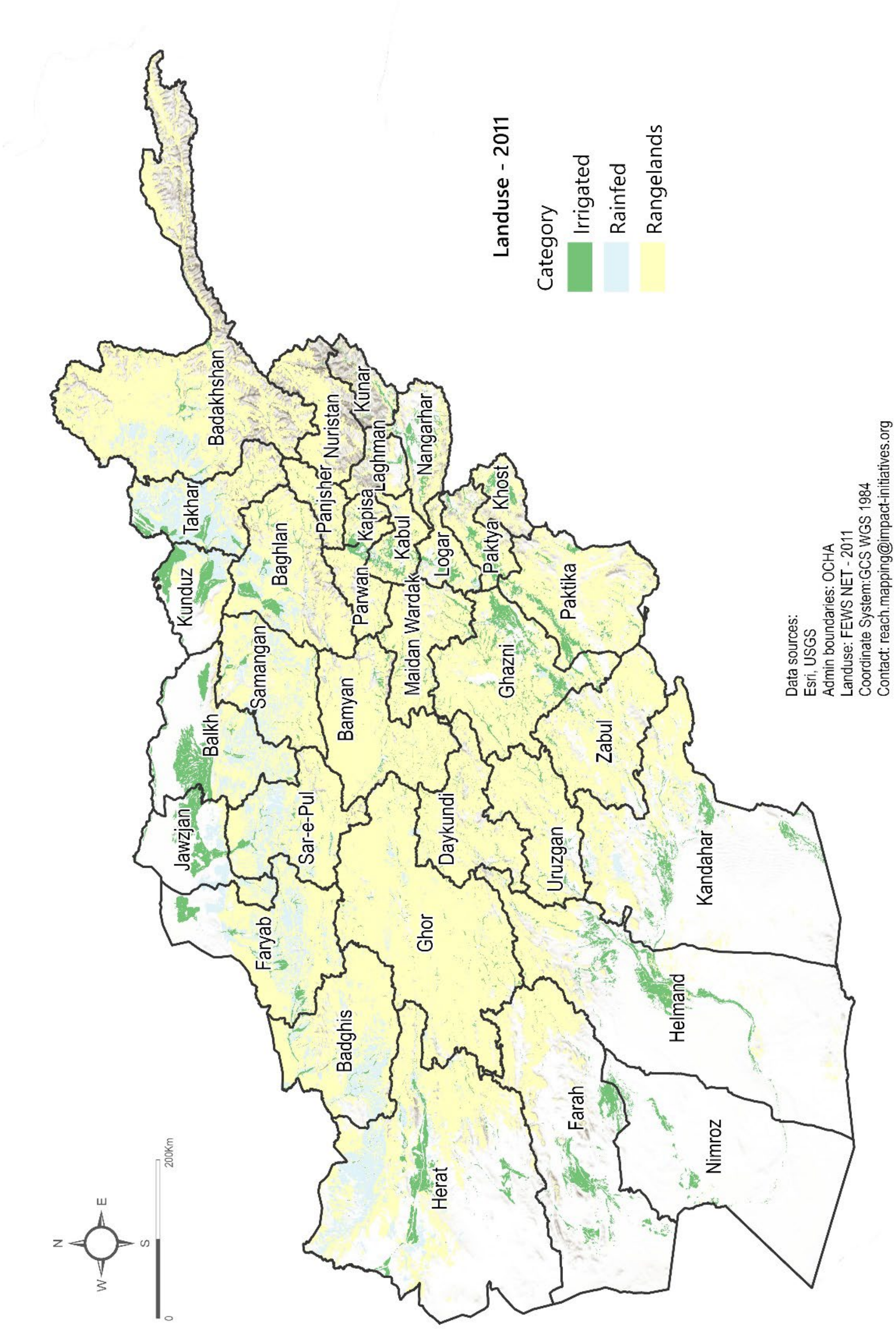
In conclusion, this study emphasises the importance of a nuanced understanding of drought impacts and the need for robust monitoring systems to anticipate and mitigate these effects. By incorporating detailed information on different typologies of droughts and their specific impacts, humanitarian actors and policymakers can develop more effective strategies to support vulnerable populations in Afghanistan.

ANNEXES

Afghanistan Livelihood Zone Map - 2011.



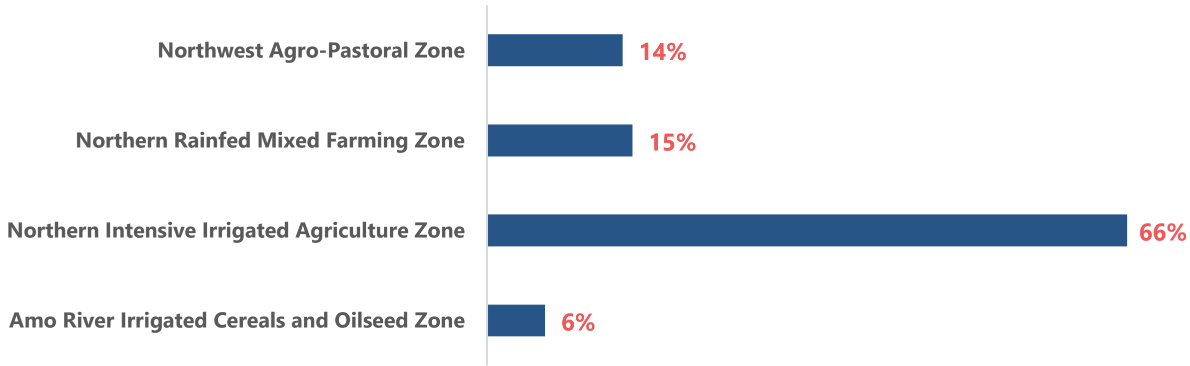
Afghanistan Land Cover Map



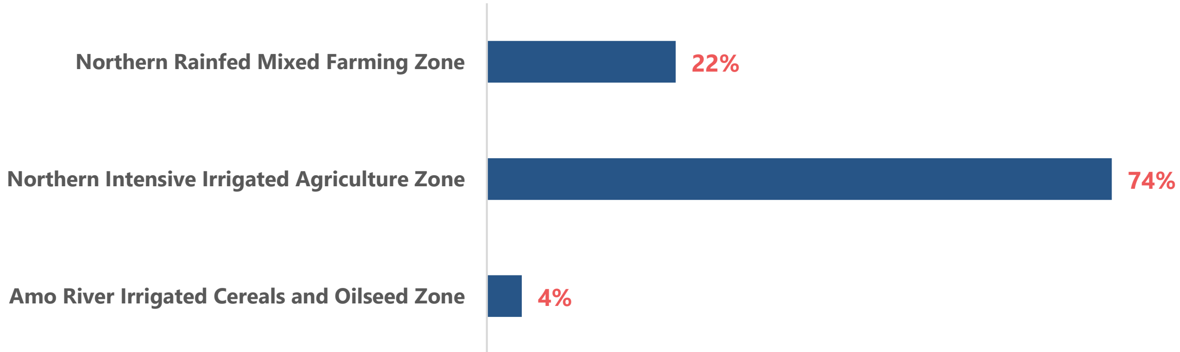
Provincial Population Distribution in Livelihoods Zone

Settlement level population calculated from worldpop raster integrated with livelihood zones FEWS NET provided the percentage of population of provinces in each livelihood zones as shown below.

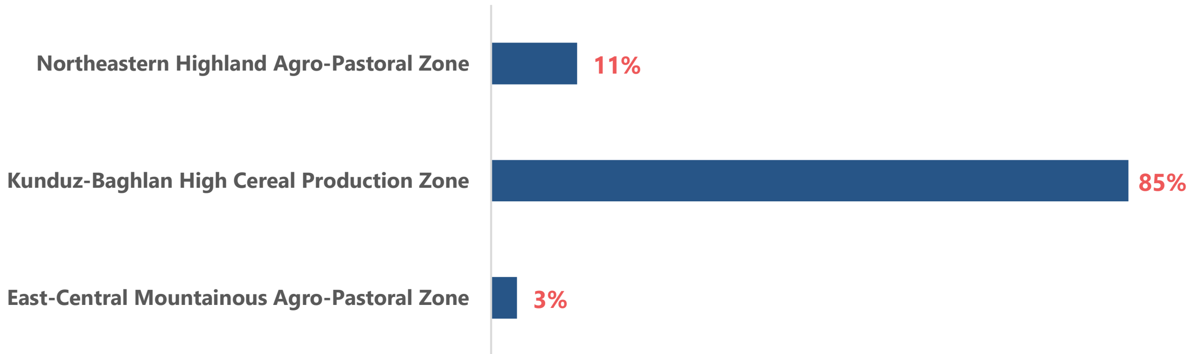
Balkh Province



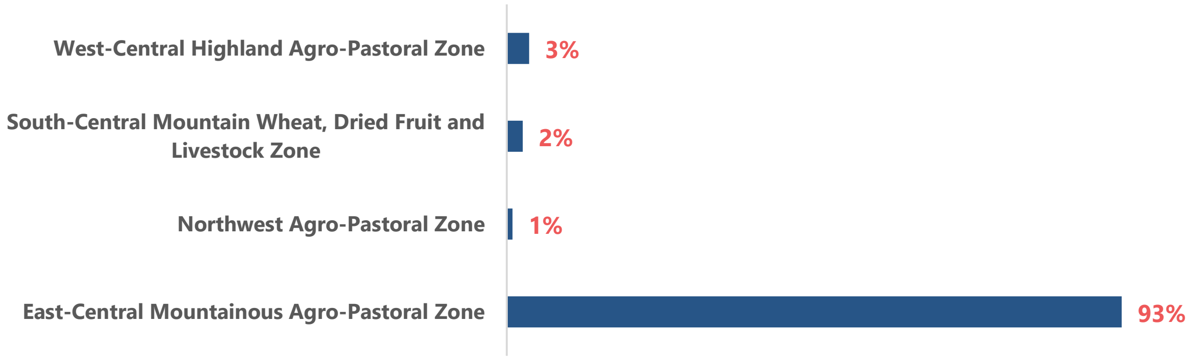
Jawzjan Province



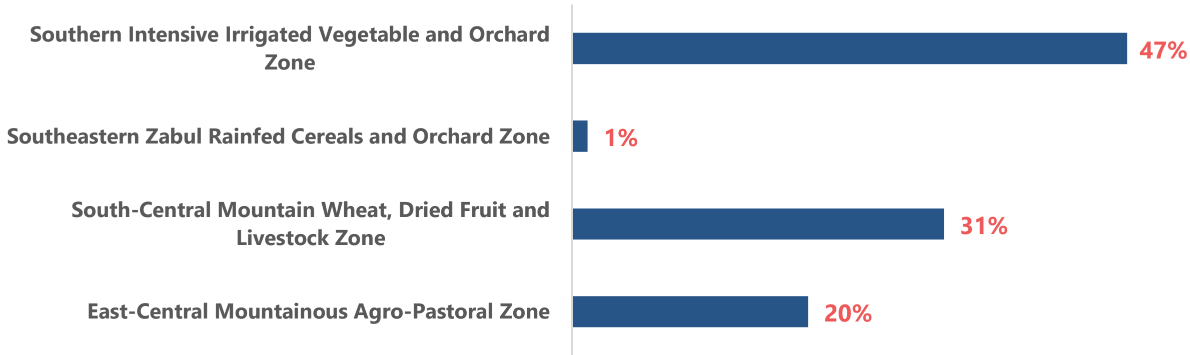
Baghlan Province



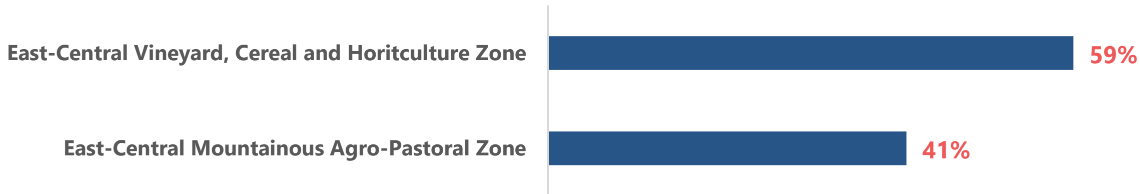
Bamyan Province



Ghazni Province

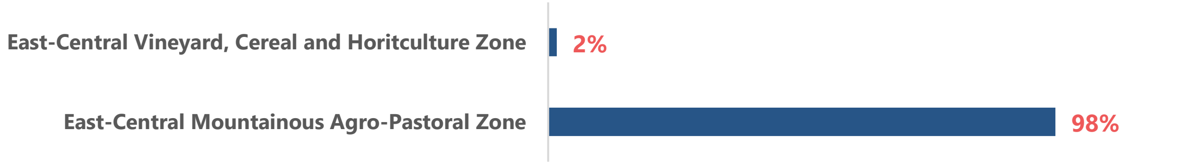


Kapisa Province

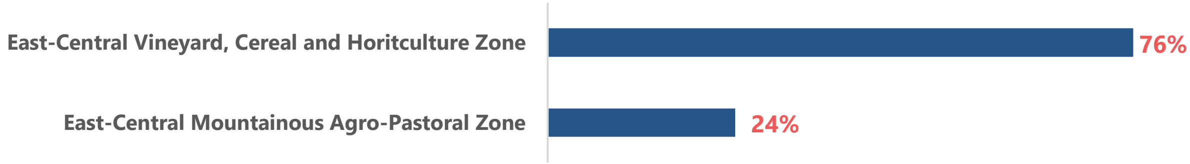


Maidan Wardak Province

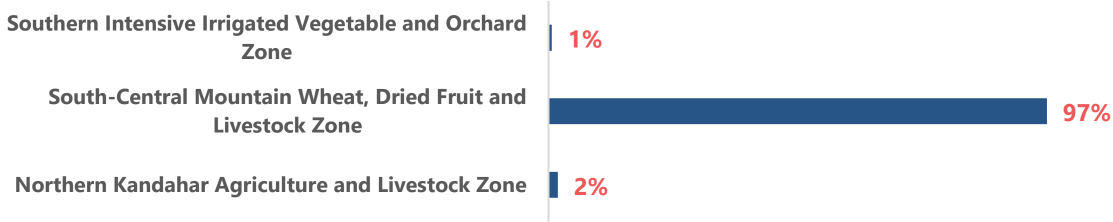
Panjsher Province



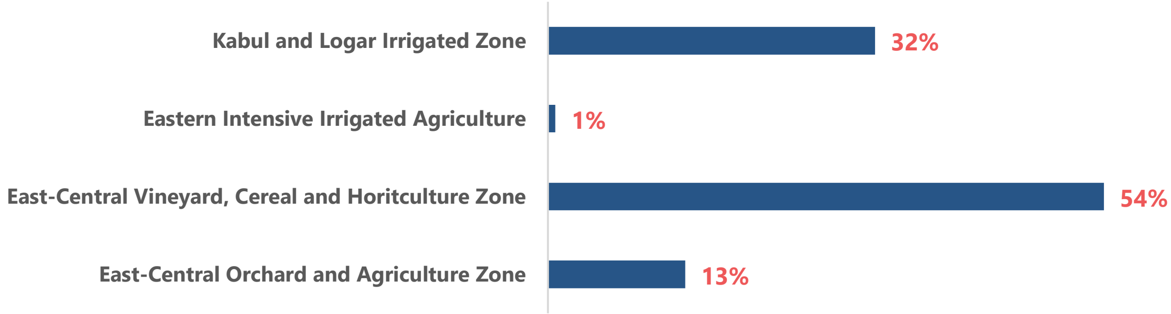
Parwan Province



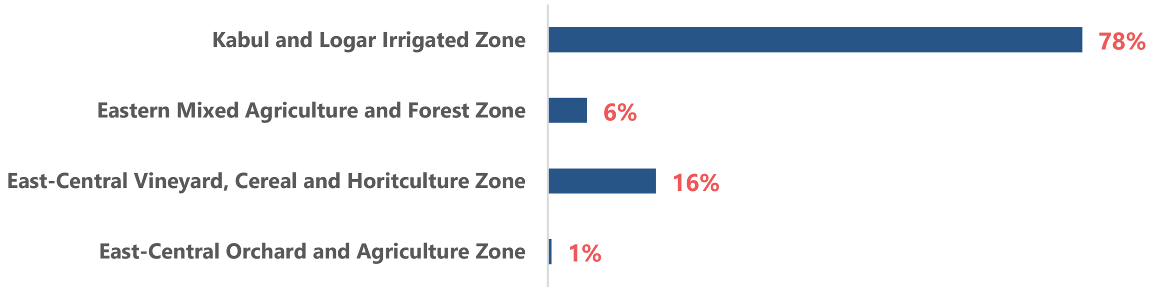
Uruzgan Province



Kabul Province

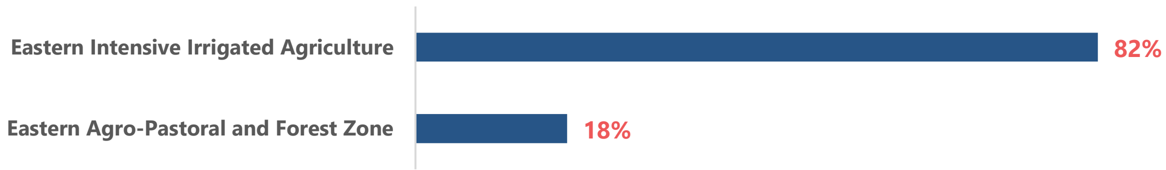


Logar Province

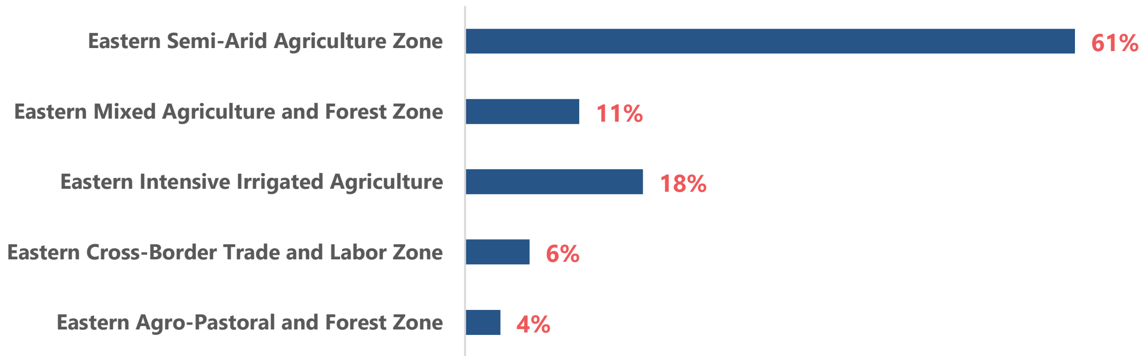


Kunar Province

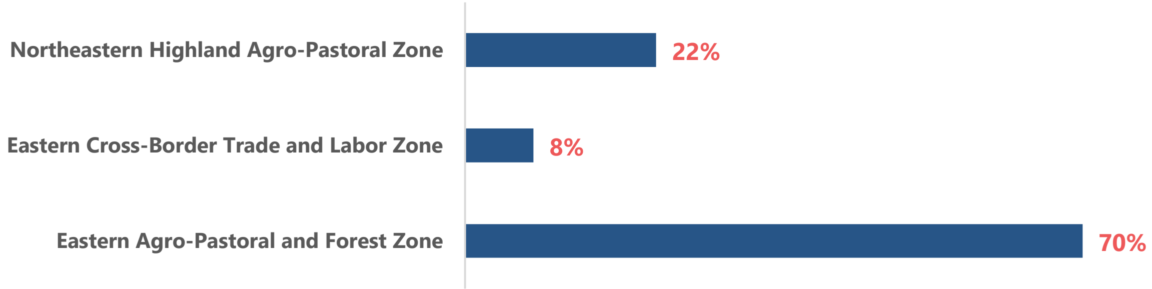
Laghman Province



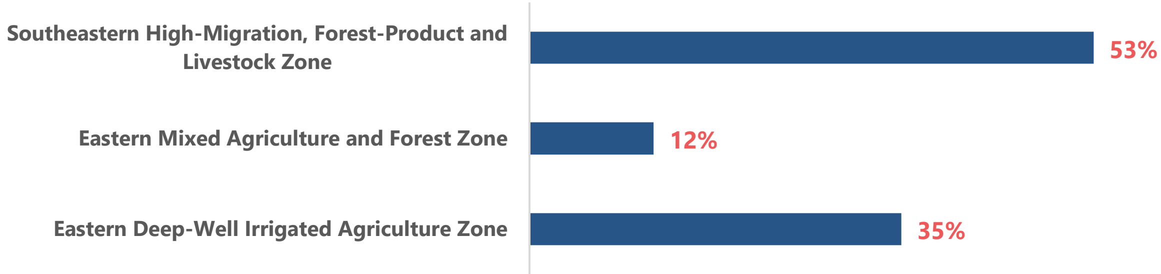
Nangarhar Province



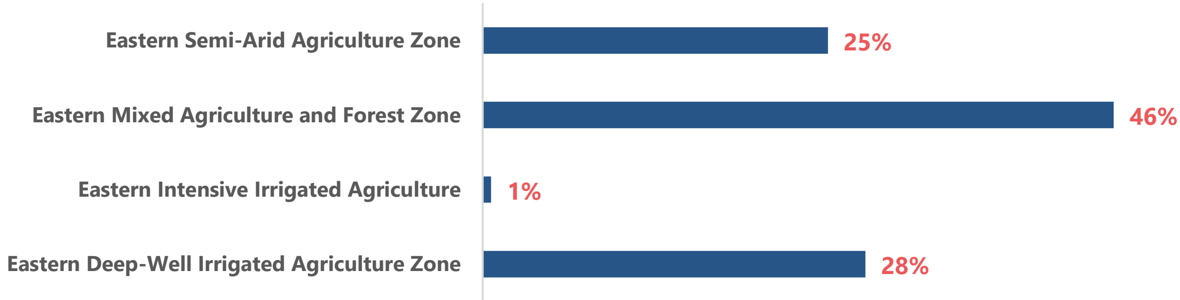
Nuristan Province



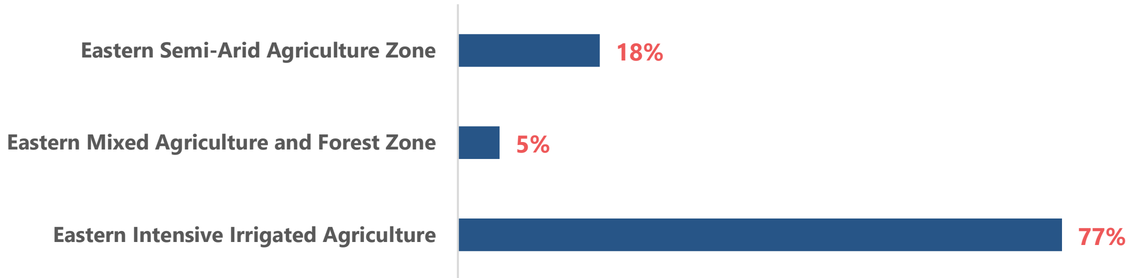
Paktika Province



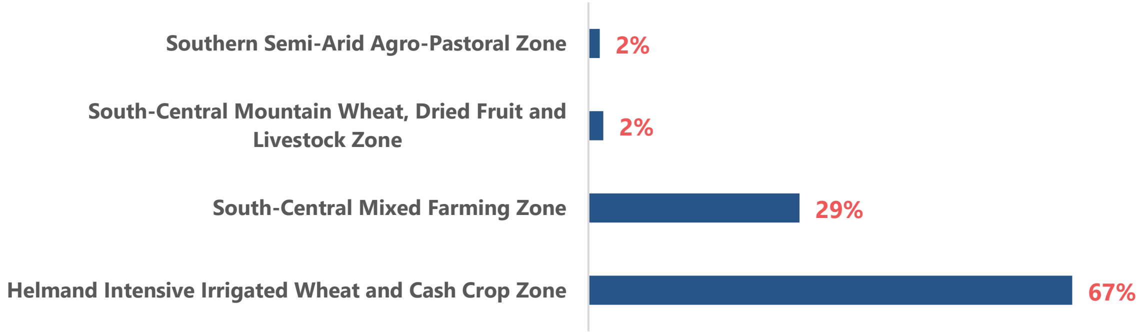
Paktya Province



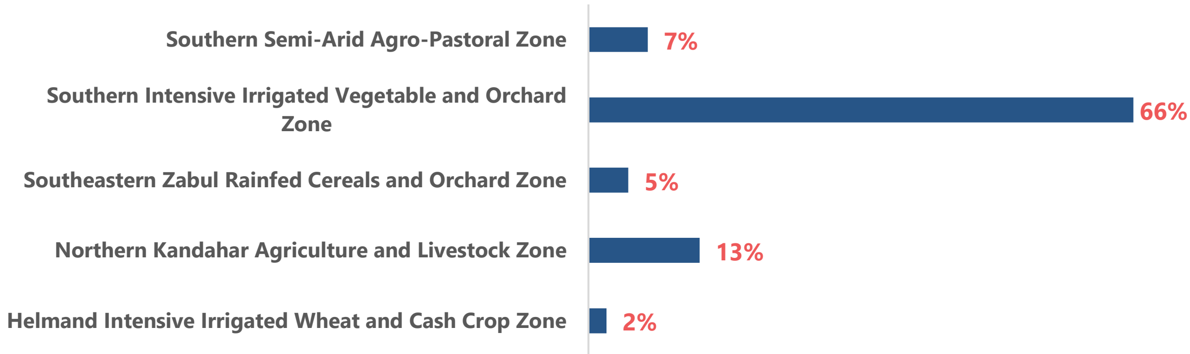
Khost Province



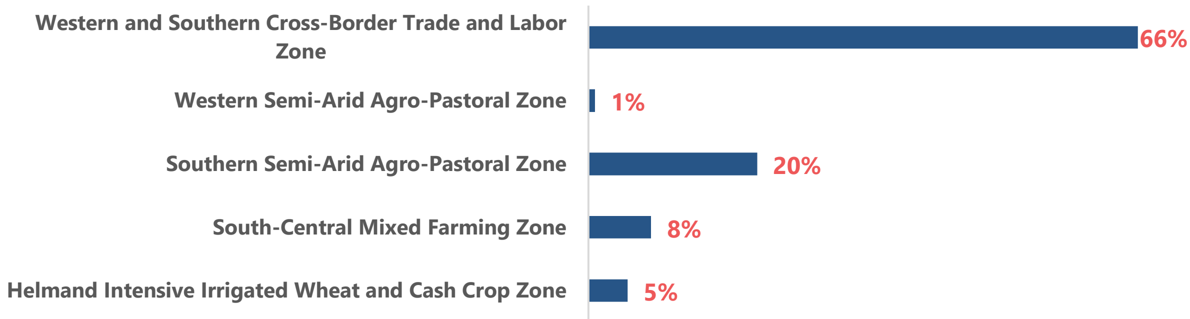
Helmand Province



Kandahar Province

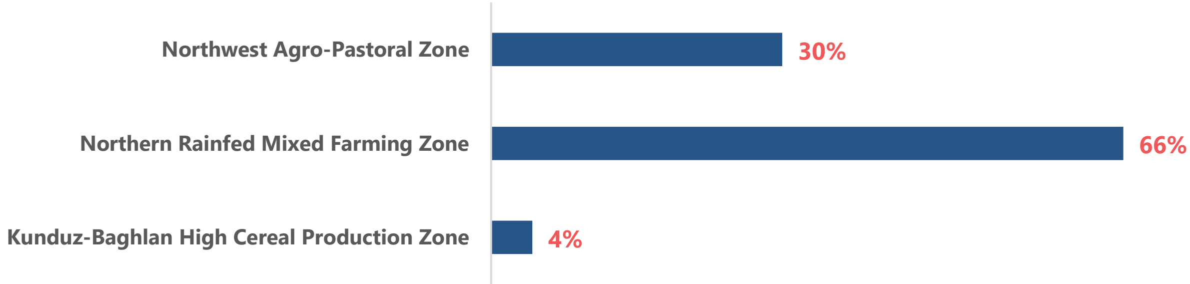


Nimroz Province

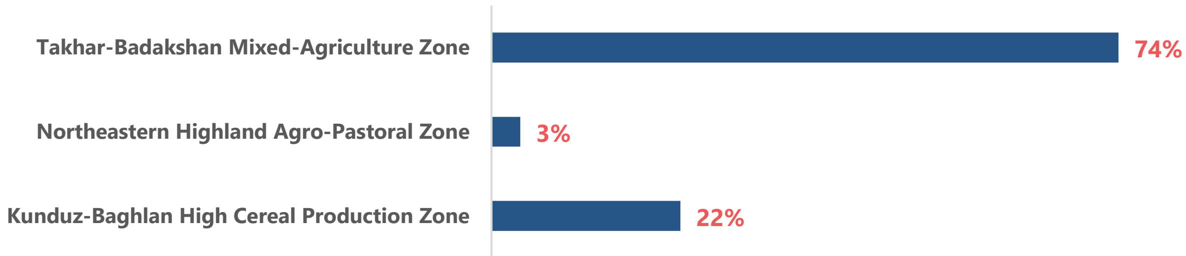


Kunduz Province

Samangan Province

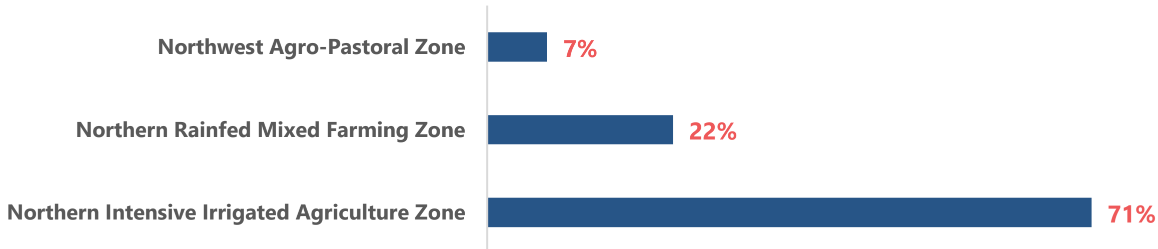


Takhar Province

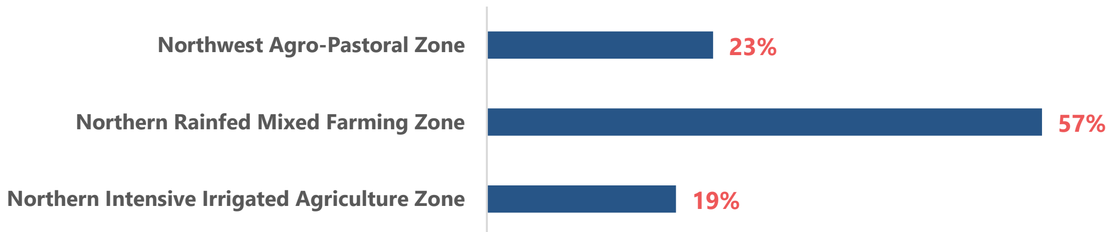


Badakhshan Province

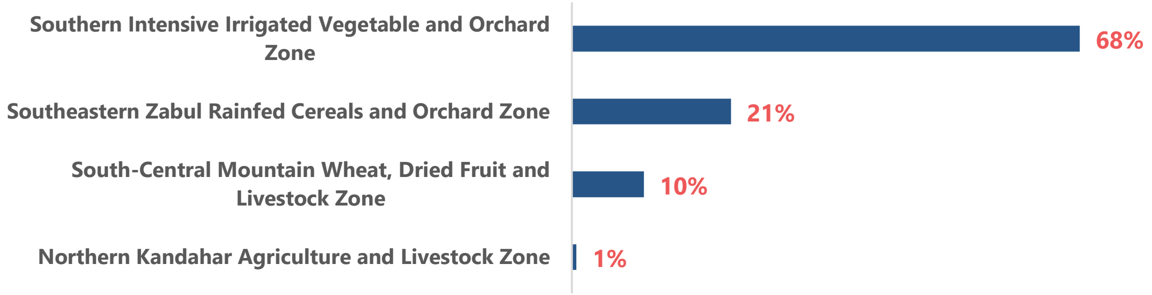
Faryab Province



Sar-e-Pul Province

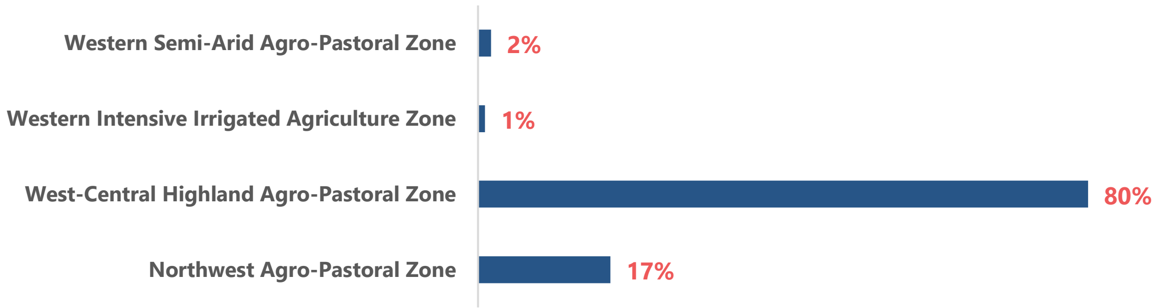


Zabul Province

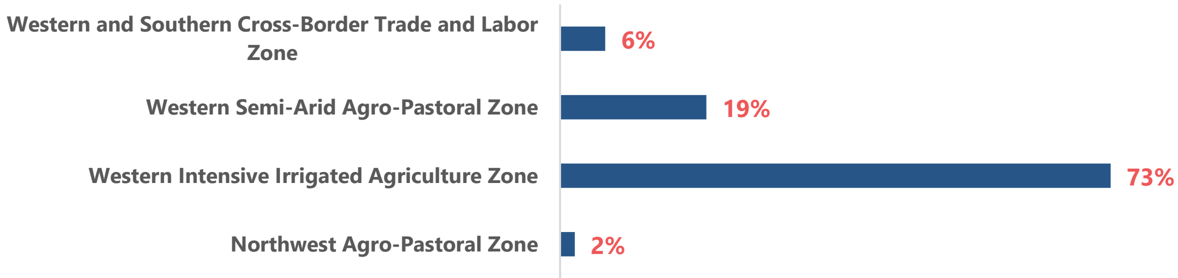


Badghis Province

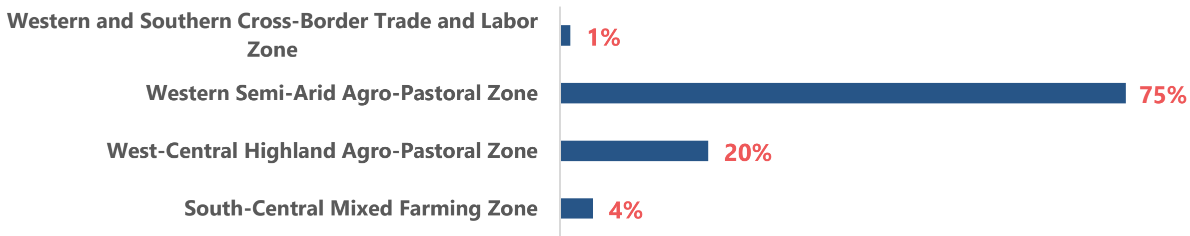
Ghor Province



Herat Province



Farah Province



Dykundy Province

Irrigated Area Affected by Drought

Estimated Irrigated Area Affected by Moderate + Sever+ Extreme level of drought using MODIS vegetation condition Index around the harvest time and the FEWS NET Land use data

Province	2023	2022	2021	2020	2019	2018	2008
Badakhshan	9%	7%	4%	5%	3%	4%	25%
Badghis	42%	31%	51%	4%	2%	52%	69%
Baghlan	51%	64%	7%	3%	6%	16%	42%
Balkh	63%	67%	17%	13%	29%	61%	72%
Bamyan	14%	20%	7%	2%	2%	5%	35%
Daykundi	9%	23%	12%	1%	2%	5%	58%
Farah	31%	17%	19%	4%	10%	26%	37%
Faryab	70%	61%	56%	3%	7%	50%	85%
Ghazni	4%	27%	13%	1%	4%	12%	11%
Ghor	34%	37%	32%	2%	2%	12%	48%
Hilmand	22%	16%	14%	2%	4%	12%	8%
Hirat	28%	18%	27%	1%	6%	24%	42%
Jawzjan	93%	86%	40%	14%	15%	71%	78%
Kabul	13%	18%	11%	3%	9%	19%	38%
Kandahar	34%	47%	49%	5%	26%	53%	45%
Kapisa	1%	38%	2%	0%	1%	2%	4%
Khost	1%	11%	2%	0%	0%	2%	10%
Kunar	3%	52%	11%	1%	0%	5%	6%
Kunduz	4%	9%	3%	3%	2%	6%	43%
Laghman	4%	27%	3%	1%	0%	2%	4%
Logar	16%	25%	11%	4%	4%	14%	9%
Maidan Wardak	6%	24%	7%	1%	1%	6%	4%
Nangarhar	5%	40%	10%	3%	2%	9%	16%
Nimroz	60%	36%	47%	12%	30%	11%	21%
Nuristan	6%	6%	4%	2%	2%	24%	
Paktika	2%	26%	17%	1%	2%	17%	0%
Paktya	6%	39%	10%	2%	2%	11%	16%
Panjsher	21%	29%	8%	6%	5%	5%	
Parwan	4%	16%	6%	2%	2%	16%	26%
Samangan	37%	34%	15%	8%	8%	18%	68%
Sar-e-Pul	41%	36%	12%	3%	4%	6%	59%
Takhar	32%	43%	11%	9%	9%	16%	27%
Uruzgan	12%	30%	20%	3%	3%	32%	16%
Zabul	11%	40%	23%	1%	8%	0	13%