# AFGHANISTAN | Drought (SPI) [1] and Protection Risks Severity Analysis

*10 October 2025*

This analysis aimed to identify districts experiencing both meteorological drought conditions and high protection risks severity, in order to prioritize areas for humanitarian attention and response.

Using a 12-month Standardized Precipitation Index (SPI) time series (Sept 2024 – Aug 2025) and the Protection Cluster's district-level severity of protection risks data, we developed a composite priority ranking highlighting where prolonged dryness coincides with severe protection conditions.

**KEY FIGURES**

**6.1M**

**POPULATION LIVING IN 65 HOTSPOT DISTRICTS**

**4.9M**

**PEOPLE EXPOSED TO PROTECTION RISKS IN 65 HOTSPOT DISTRICTS**

**3.2M**

**PEOPLE EXPOSED TO PROTECTION RISKS IN 43 HIGH PRIORITY DISTRICTS**

## Overview and Context

Afghanistan is facing a severe, multi-layered drought that is devastating farming families across the north, northwest, and northeast provinces. These communities depend on seasonal rains to grow crops and sustain their livestock, but this year the rains have failed. In many areas, fields have withered completely, and even irrigated farmland is under strain as groundwater levels fall and water becomes increasingly scarce. Livestock, an essential source of food and income, are also in danger. At the same time, communities in these drought-affected areas are experiencing high levels of protection risk severity, reduced access to essential services, and heightened exposure to violence and exploitation. This dual crisis means families are not only struggling to secure food and water but also facing growing threats to their safety and dignity.

## Map Explanation

The Inter-Cluster Coordination Team (ICCT) initially identified 65 districts as drought hotspots based on sectoral assessments and observed field impacts. To complement this, the current analysis integrates:

- **12-month Drought Severity (SPI) data**, capturing the intensity, frequency, and persistence of dry conditions between September 2024 and August 2025; and
- **Protection Risks Severity scores** from the Protection Cluster, representing exposure to threats such as violence, movement restrictions, GBV, and other protection concerns.

Out of Afghanistan's 401 SPI-assessed districts, **61 overlapped with the 65 drought hotspot districts** identified by **ICCT**, validating the spatial consistency of the model. In total, **83 districts** emerge as **High or Medium priority**, aligning strongly with but also extending beyond the **65 ICCT-identified drought hotspots**. These results highlight that drought-linked protection vulnerabilities are expanding geographically and underscore the need for a coordinated, protection-informed drought response.

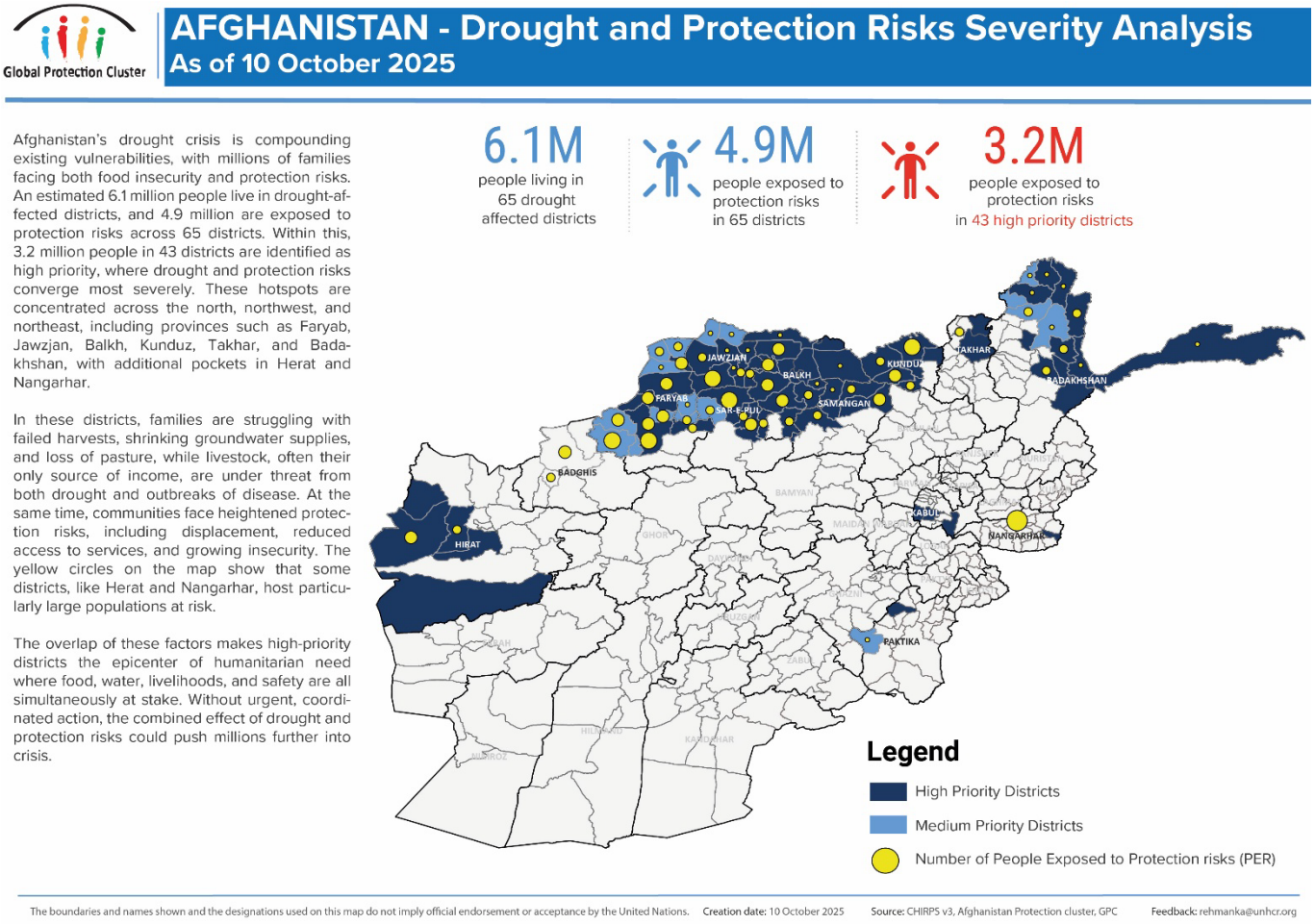
**Northern, Northwestern, and Northeastern Afghanistan** (e.g., provinces like **Faryab, Jawzjan, Balkh, Kunduz, Takhar, Badakhshan**) show the highest concentration of **high-priority districts** (dark blue).

**Herat (west)** and **Nangarhar (east)** also stand out with **large yellow circles**, meaning very high numbers of people

[1] Standardized Precipitation Index (SPI): A statistical measure that indicates how much precipitation for a specific period deviates from the long-term average, expressed in standard deviation units. Negative SPI values represent drier-than-normal conditions, while positive values indicate wetter-than-normal conditions.
SPI values were standardized using a five-year (2019–2025) CHIRPS rainfall record rather than the traditional 30-year climatology, due to data-availability constraints. The index therefore represents short-term standardized rainfall anomalies (zSPI) rather than a full climatological SPI, but the results remain consistent for identifying relative drought severity and spatial overlap with protection risks.

exposed to protection risks.

Central and southern provinces are much less shaded, meaning they are less affected in this particular drought-protection overlap analysis.




## Key Conclusions

This predictive analysis is carried out to inform early actions and response, while more precise assessments may provide a specific picture of the situation of protection and the urgent protection needs of the population. The following key insights can be driven from the analysis:

- The **overlap of drought and protection risks** highlights where humanitarian needs are likely to be **most severe and urgent**.
- **61 districts overlapped with the 65 drought** hotspot districts identified by ICCT, validating the spatial consistency of the model, and within these districts an estimated **4.9 million people** are exposed to protection risks.
- Families in these **61 districts** are not only struggling with **failed harvests and livestock stress from drought** but are also **highly vulnerable to protection risks** (violence, displacement, loss of livelihoods, access constraints).
- The **43 high-priority districts** in **dark blue colour** (with 3.2M people exposed to risks) represent the **most critical focus areas** for humanitarian interventions, combining both immediate survival needs (water, food, fodder) and protection assistance.

# ANNEX 'A': Methodology

**Datasets Used**

| Dataset | Description | Source |
|---|---|---|
| SPI_Last12Months.tif | Multi-band raster (12 monthly bands) derived from CHIRPS precipitation data (Jan 2019 – Aug 2025). Each band represents a Standardized Precipitation Index (SPI) value for one month (Sept 2024 – Aug 2025), calculated using the five-year (2019–2025) CHIRPS record to compute the long-term mean and standard deviation for each grid cell. | Computed in-house using CHIRPS v3.0 rainfall time series and the SPI formula. |
| Afghanistan_ADM2.shp | Administrative boundaries (district level). | OCHA Common Operational Dataset (COD). |
| Protection Severity dataset | District-level protection risk severity scores (1–5). | Protection Cluster (2025 ICCT input). |

Each district's drought and protection conditions were summarized into indicators:

| Indicator | Description |
|---|---|
| neg_months_12 | Number of months (out of 12) with SPI < 0 (below-normal rainfall) |
| md_months_12 | Number of months with SPI ≤ −1.0 (moderate or worse drought) |
| min_SPI_12 | Minimum SPI value across 12 months (worst drought month) |
| ProtSeverity | District-level Protection Risks Severity (1–5) |

Based on these indicators, the following rules were applied to assign priorities:

- High Priority:
  Districts were
  - min_SPI_12 ≤ −1.5 and ProtSeverity ≥ 4, *or*
  - md_months_12 ≥ 3 and ProtSeverity ≥ 3.
- Medium Priority:
  Districts were
  - neg_months_12 ≥ 6 or ProtSeverity ≥ 3, but do not meet High criteria.
- Low Priority:
  All other districts.

**Calculation of Standardized Precipitation Index (SPI)**

The **Standardized Precipitation Index (SPI)** quantifies how much precipitation for a given period deviates from the long-term climatological average at that location. In this analysis, SPI was computed using CHIRPS monthly rainfall from Jan 2019 to Aug 2025 as the reference period to estimate mean and standard deviation values.
The resulting SPI expresses rainfall anomalies in standardized units (z-scores), enabling spatial comparison of dryness intensity across Afghanistan.
Only the most recent 12 months (Sept 2024 – Aug 2025) were used for hotspot identification to reflect current drought conditions. It is calculated as:

$$\mathrm{SPI} = \frac{P_i - \bar{P}}{\sigma_P}$$

Where:

- $P_i$ = precipitation for the month *i*,
- $\bar{P}$ = long-term mean precipitation for that month,
- $\sigma_P$ = standard deviation of precipitation for that month.

**Interpretation**

| SPI value | Interpretation | Condition |
|---|---|---|
| ≥ +2.0 | Extremely wet | Heavy precipitation |
| +1.0 to +1.99 | Moderately wet | Above normal rainfall |
| −0.99 to +0.99 | Near normal | Normal rainfall |
| −1.0 to −1.49 | Moderately dry | Mild drought |
| −1.5 to −1.99 | Severely dry | Serious drought |
| ≤ −2.0 | Extremely dry | Extreme drought |

Because the baseline period was five years, SPI magnitudes should be interpreted as relative anomalies within the recent climatic context rather than long-term historical drought intensity.

**Derivation of drought indicators**

From the monthly means, we calculated three district-level summary indicators:

| Indicator | Formula / Logic | Interpretation |
|---|---|---|
| neg_months_12 | Number of months (out of 12) with mean SPI < 0 | How many months had below-normal precipitation. Any negative SPI indicates a dry month. |
| md_months_12 | Number of months with mean SPI ≤ −1.0 | How many months had *moderate or worse drought* conditions. |
| min_SPI_12 | Minimum SPI value across the 12 months | The worst monthly drought severity experienced. Lower = more extreme dryness. |

**Examples**

- neg_months_12 = 9; 9 out of 12 months were drier than average.
- md_months_12 = 4; 4 months reached at least moderate drought (SPI ≤ −1.0).
- min_SPI_12 = −1.7; at least one month experienced severe drought.

**Integration of Protection Risks Severity**

We then joined the **Protection Risks Severity** dataset (district-level) using the ADM2 P-codes.
This dataset provides a composite protection severity score (ProtSeverity, 1–5), representing exposure to risks such as violence, GBV, child protection issues, HLP concerns, and movement restrictions.

**Composite Priority Framework**

To identify overlapping hotspots of drought and protection concerns, the following **priority criteria** were applied:

| Priority | Criteria |
|---|---|
| High | *(a)* Severe drought and high protection risk: min_SPI_12 ≤ −1.5 and ProtSeverity ≥ 4, **or**<br>*(b)* Recurrent moderate drought with elevated risk: md_months_12 ≥ 3 and ProtSeverity ≥ 3 |
| Medium | Drought or protection concerns of moderate level: neg_months_12 ≥ 6 or ProtSeverity ≥ 3 |
| Low | All other districts |

In addition, a **composite score** was computed to rank districts continuously:

- prot_score = (ProtSeverity − 1)/4 scales protection severity 1–5 ⇨ 0 - 1,
- drought_score = |min_SPI_12| / 2 (capped at 1) scales drought intensity to 0 - 1.

The weight **(0.6 Protection: 0.4 Drought)** emphasizes protection as the leading dimension.

# ANNEX 'B': Hot Spot Districts

| ADM2_EN | ADM2_PCODE | Priority | 2025 Population | People Exposed to Risks |
|---|---|---|---|---|
| Arghanj Khwah | AF1703 | Medium | 36,246 | 31,737 |
| Darwaz-e-Balla | AF1727 | High | 53,090 | 34,734 |
| Darwaz-e-Payin | AF1722 | High | 51,932 | 34,734 |
| Eshkashem | AF1723 | High | 41,612 | 33,108 |
| Jorm | AF1710 | High | 104,114 | 59,567 |
| Kofab | AF1721 | High | 37,266 | 35,454 |
| Raghestan | AF1714 | Medium | 68,865 | 47,480 |
| Shaki | AF1724 | Medium | 36,748 | 28,069 |
| Shighnan | AF1719 | High | 50,076 | 44,704 |
| Shuhada | AF1712 | High | 59,889 | 46,582 |
| Wakhan | AF1728 | High | 37,014 | 29,567 |
| Bala Murghab | AF3105 | | 167,386 | 109,413 |
| Muqur | AF3103 | | 46,487 | 42,807 |
| Char Bolak | AF2111 | High | 135,810 | 96,814 |
| Charkent | AF2104 | High | 62,144 | 48,599 |
| Chemtal | AF2108 | High | 137,026 | 102,853 |
| Dawlat Abad | AF2109 | High | 147,216 | 94,534 |
| Keshendeh | AF2114 | High | 78,432 | 59,166 |
| Khulm | AF2110 | High | 80,935 | 39,440 |
| Marmul | AF2105 | High | 27,602 | 18,589 |
| Sholgareh | AF2107 | High | 140,592 | 121,296 |
| Shortepa | AF2112 | High | 63,599 | 33,761 |
| Almar | AF2904 | Medium | 107,527 | 97,490 |
| Andkhoy | AF2913 | High | 124,926 | 96,409 |
| Bilcheragh | AF2905 | High | 83,130 | 64,767 |
| Dawlat Abad | AF2909 | High | 100,327 | 88,083 |
| Khan-e-Char Bagh | AF2914 | Medium | 50,136 | 42,947 |
| Khwaja Sabz Posh | AF2903 | Medium | 93,171 | 87,349 |
| Maymana | AF2901 | High | 152,841 | 131,452 |
| Pashtun Kot | AF2902 | High | 238,504 | 199,376 |
| Qaram Qul | AF2911 | Medium | 46,233 | 40,987 |
| Qaysar | AF2907 | Medium | 181,224 | 192,620 |
| Qurghan | AF2912 | Medium | 57,083 | 44,090 |
| Shirin Tagab | AF2906 | High | 129,080 | 94,886 |
| Ghoryan | AF3211 | Medium | 137,002 | 97,633 |
| Kohsan | AF3213 | | 113,893 | 89,950 |
| Zindajan | AF3205 | Medium | 89,781 | 71,801 |
| Aqcha | AF2807 | High | 94,687 | 70,525 |
| Darzab | AF2811 | Medium | 79,933 | 51,347 |
| Fayzabad | AF2808 | High | 65,843 | 43,886 |
| Khamyab | AF2806 | Medium | 22,788 | 12,958 |
| Khanaqa | AF2803 | High | 41,388 | 32,091 |
| Khwaja Dukoh | AF2802 | High | 52,933 | 51,243 |

| | | | | |
|---|---|---|---|---|
| Mardyan | AF2809 | High | 43,172 | 28,474 |
| Mingajik | AF2804 | High | 54,905 | 29,858 |
| Qarqin | AF2810 | Medium | 30,724 | 32,885 |
| Qush Tepa | AF2805 | Medium | 76,794 | 33,893 |
| Shiberghan | AF2801 | High | 273,916 | 189,997 |
| Ali Abad | AF1903 | High | 66,346 | 69,045 |
| Chahar Darah | AF1902 | High | 87,919 | 96,280 |
| Imam Sahib | AF1905 | High | 322,450 | 266,372 |
| Qala-e-Zal | AF1907 | High | 82,857 | 70,159 |
| Jalalabad | AF0601 | Medium | 337,092 | 480,532 |
| Dila | AF1216 | Medium | 31,034 | 21,069 |
| Aybak | AF2001 | High | 179,593 | 119,283 |
| Dara-e-Suf-e-Payin | AF2006 | High | 93,222 | 60,036 |
| Feroz Nakhchir | AF2004 | High | 28,186 | 19,055 |
| Hazrat-e-Sultan | AF2002 | High | 77,028 | 51,789 |
| Gosfandi | AF2206 | High | 65,454 | 51,501 |
| Sancharak | AF2205 | High | 138,912 | 90,607 |
| Sar-e-Pul | AF2201 | High | 185,592 | 176,228 |
| Sayad | AF2202 | Medium | 92,009 | 48,148 |
| Sozmaqala | AF2204 | High | 67,174 | 53,733 |
| Hazar Sumuch | AF1802 | | 31,235 | 21,613 |
| Khwaja Bahawuddin | AF1814 | High | 57,010 | 49,380 |