CHASHMA-SAR

Afghanistan Climate & Water Risk Bulletin

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20	30/34	3	7
ALER provinces (VHI + Precip)	provinces SPI-3 < −1.0 drought	provinces Severe drought	SW provinces dust onset

Finding of this issue: Platform analysis of 5 indices (VHI, Precip_Anom, SPI-3, ECMWF IFS, SWE) as of 23 May 2026 reveals drought hardening into the spring wheat harvest window. **10 provinces record VHI ALER (40–55)**, with Badghis (50), Faryab (51), and Herat (51) under stress during grain-fill. SPI-3 indicates moderate-to-severe drought in **30 of 34 provinces**; Badakhshan (−1.64), Nuristan (−1.56), Panjsher (−1.48) reach Severe class. Snowmelt complete — SWE <1 mm across 26 provinces. **ECMWF 15-day forecast dry (<25 mm in 32 provinces)**: drought persists into harvest. Dust season onset confirmed in 7 SW provinces.

Multi-Hazard Index Status — All 34 Provinces (Ranked Worst-First)

VHI: NORM>65|WATC 55–65|ALER 40–55|CRIS<40 · Precip_Anom: NORM>−20|WATC −20to−50|ALER −50to−100 mm · SPI-3: NEAR>−1.0|MOD −1.0to−1.5|SEV<−1.5 · SWE: NORM<1|WATC 1–5|ALER 5–15|CRIS>15 mm · ECMWF: NORM<25|WATC 25–75 mm

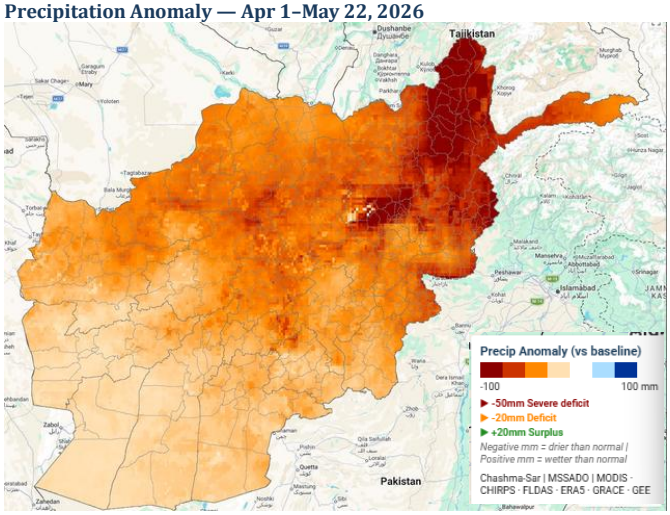
Province	VHI	Drought	Precip Anom (mm)	Deficit	SPI-3	Drought Class	SWE (mm)	ECMWF 15d (mm)	OVERALL
Badakhshan	74	NORM	-94	ALER	-1.64	SEV	1.9	61	ALER
Nuristan	79	NORM	-77	ALER	-1.56	SEV	0.9	3	ALER
Panjsher	74	NORM	-78	ALER	-1.48	SEV	2.9	3	ALER
Takhar	58	WATC	-70	ALER	-1.32	MOD	24.0	24	ALER
Kunar	65	WATC	-79	ALER	-1.32	MOD	0.2	3	ALER
Baghlan	56	WATC	-62	ALER	-1.05	MOD	6.3	15	ALER
Parwan	56	WATC	-81	ALER	-0.92	MOD	3.4	3	ALER
Nangarhar	59	WATC	-52	ALER	-1.04	MOD	0.3	4	ALER
Kapisa	58	WATC	-52	ALER	-1.05	MOD	0.4	2	ALER
Badghis	50	ALER	-35	WATC	-0.91	MOD	0.7	0	ALER
Faryab	51	ALER	-41	WATC	-0.97	MOD	0.6	0	ALER
Hirat	51	ALER	-21	WATC	-0.84	MOD	0.2	0	ALER
Samangan	51	ALER	-47	WATC	-1.13	MOD	2.4	11	ALER
Ghor	51	ALER	-29	WATC	-0.82	MOD	0.7	1	ALER
Daykundi	51	ALER	-38	WATC	-1.24	MOD	0.4	1	ALER
Uruzgan	52	ALER	-28	WATC	-1.27	MOD	0.6	0	ALER
Wardak	53	ALER	-39	WATC	-1.03	MOD	1.2	2	ALER
Sar-e-Pul	54	ALER	-47	WATC	-1.03	MOD	3.1	4	ALER
Kabul	54	ALER	-37	WATC	-1.03	MOD	0.4	0	ALER
Kunduz	55	WATC	-42	WATC	-1.05	MOD	0.3	18	ALER
Laghman	64	WATC	-50	WATC	-0.97	MOD	0.3	1	WATC
Khost	69	NORM	-48	WATC	-1.27	MOD	0.1	1	WATC
Balkh	59	WATC	-34	WATC	-1.11	MOD	0.3	7	WATC
Jawzjan	53	ALER	-32	WATC	-1.02	MOD	0.1	2	WATC
Bamyan	57	WATC	-42	WATC	-0.98	MOD	2.8	4	WATC
Logar	56	WATC	-39	WATC	-1.18	MOD	0.8	3	WATC
Ghazni	56	WATC	-25	WATC	-1.02	MOD	0.3	1	WATC
Kandahar	57	WATC	-11	NORM	-1.10	MOD	0.0	0	WATC
Paktya	56	WATC	-33	WATC	-0.96	MOD	0.7	2	WATC
Zabul	56	WATC	-16	NORM	-0.86	MOD	0.2	0	WATC
Hilmand	60	WATC	-7	NORM	-0.96	MOD	0.0	0	WATC
Farah	60	WATC	-6	NORM	-0.48	NEAR	0.0	0	WATC
Paktika	59	WATC	-20	WATC	-0.87	MOD	0.0	0	WATC
Nimroz	72	NORM	-1	NORM	-0.48	NEAR	0.0	0	NORM

How to read above table: Five satellite indicators are combined to assess each province. VHI measures crop and pasture health; below 55 is stress, below 40 is crisis. Precip Anom shows the rainfall deficit in millimetres against the long-term average; the more negative, the drier. SPI-3 is a 3-month drought score; below −1.0 is moderate drought, below −1.5 is severe. SWE is remaining snowpack in millimetres; below 1 mm means mountain water release is finished. ECMWF 15d is the 15-day rain forecast; below 25 mm means a dry period ahead. The Overall rating combines all five: NORM = acceptable · WATC = watch · ALER = action needed · CRIS = immediate response required.

Satellite Maps — District-Clipped Analysis (Drought & Precipitation)

All indices dynamic and district-clipped. Four-way comparison (precip deficit × SPI-3 × snowpack × ECMWF forecast) enables compound-risk identification.

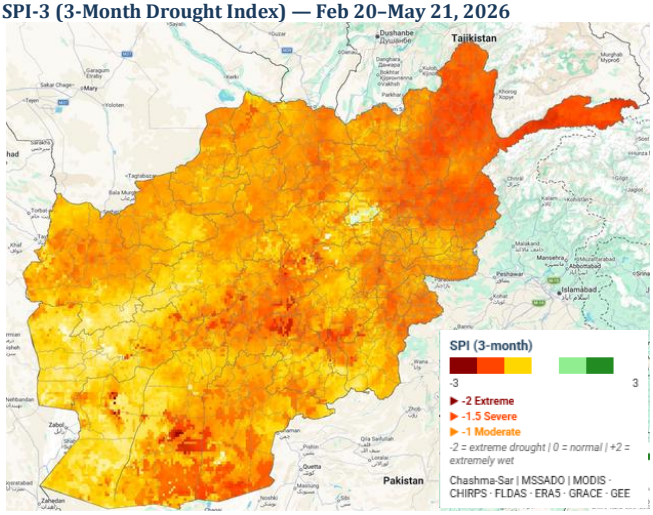
Precipitation Anomaly — Apr 1–May 22, 2026



8 provinces in ALER deficit (>−50 mm). Worst: Badakhshan (−94 mm), Parwan (−81 mm), Kunar (−79 mm), Panjsher (−78 mm), Takhar (−70 mm), Baghlan (−62 mm). National moisture deficit persists despite localised convective events.

Source: CHIRPS · ERA5-Land · Multi-source anomaly vs baseline (GEE)

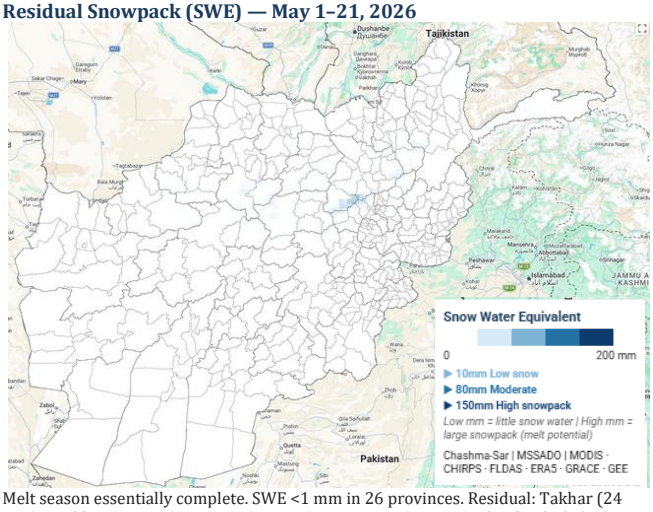
SPI-3 (3-Month Drought Index) — Feb 20–May 21, 2026



Severe (SPI<−1.5): Badakhshan (−1.64), Nuristan (−1.56), Panjsher (−1.48). Moderate (−1.0 to −1.5): 27 provinces. Near-normal: Farah, Nimroz (−0.48). McKee et al. (1993) methodology; 3-month accumulation.

Source: CHIRPS · ERA5-Land | McKee, Doesken & Kleist (1993)

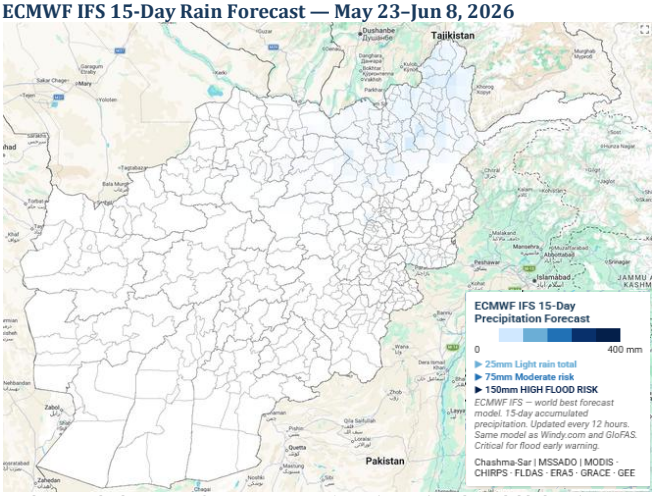
Residual Snowpack (SWE) — May 1–21, 2026



Melt season essentially complete. SWE <1 mm in 26 provinces. Residual: Takhar (24 mm), Baghlan (6.3 mm), Parwan (3.4 mm), Samangan (2.4 mm). Flood risk shifts from snowmelt to convective rain events only.

Source: NASA FLDAS · MODIS MOD10A1 | ≥500 m elevation mask

ECMWF IFS 15-Day Rain Forecast — May 23–Jun 8, 2026



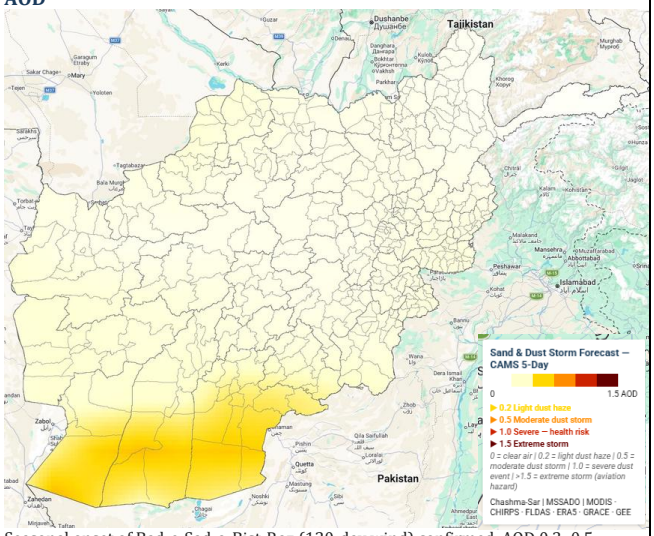
Predominantly dry — 32 of 34 provinces <25 mm (NORM). Only Badakhshan (61 mm, WATC) exceeds watch threshold. Dramatic reversal from Issue #2 wet NE forecast — drought persistence confirmed into harvest.

Source: ECMWF/NRT_FORECAST/IFS/OPER | total_precipitation_sfc | last step only

Compound-risk principle: Districts simultaneously flagged on ≥2 dimensions represent the highest-confidence hotspots. NW provinces (Badghis, Faryab, Herat) with low VHI + negative Precip_Anom dominate the agricultural-stress signal during the May wheat harvest window.

Forecast Maps — Sand & Dust Storm · Temperature Profile · Flood Verification

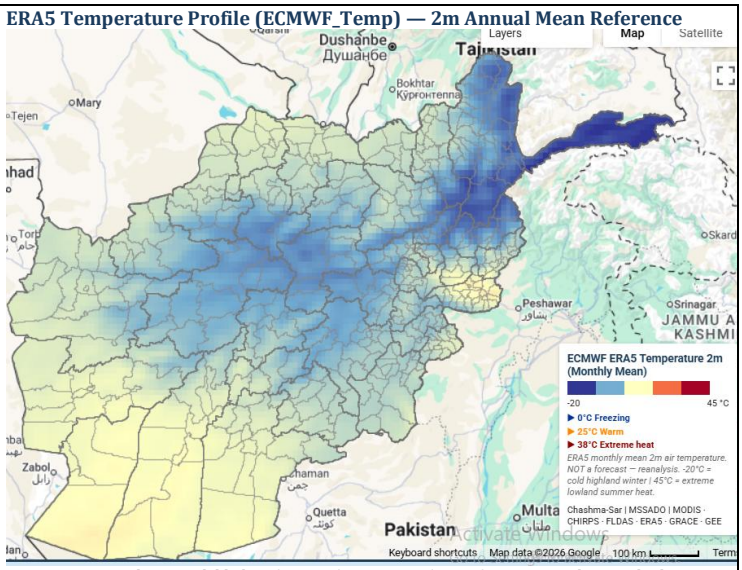
Sand & Dust Storm Forecast (SDS_Fcst) — ECMWF CAMS 5-Day Peak AOD



Seasonal onset of Bad-e-Sad-o-Bist-Roz (120-day wind) confirmed. AOD 0.3–0.5 (moderate dust storm) in Hilmand, Nimroz, Kandahar, Farah. Peak forecast cells Hilmand/Kandahar border (AOD 0.6, Severe — health advisory). Aviation and transport risk active in 7 SW provinces.

Source: ECMWF/CAMS/NRT | dust_aerosol_optical_depth_at_550nm | 8 peak forecast steps (WMO SDS-WAS hrs 96–120)

ERA5 Temperature Profile (ECMWF_Temp) — 2m Annual Mean Reference



Temperature gradient: Badakhshan (−10.9°C) to Nimroz (12.4°C). May 2026 daytime highs in SW now exceeding 35°C — compound heat + dust exposure for Nimroz, Kandahar, Hilmand. NE highland cold limits late-melt risk.

Source: ECMWF ERA5-Land | 2m temperature | ERA5_LAND/MONTHLY_AGGR

Google Flood Hub — Independent Verification (23 May 2026): Riverine warning (orange) signals active in Kabul ring (Estalef, Shakardara, Paghman) and Salang corridor — consistent with Chashma-Sar compound-risk flagging. No Extreme (red) gauge signals nationally as of 23 May. Urban flash pluvial risk remains in Kabul basin. Source: Google Flood Hub / Zürich Flood Model (independent reference only).

Rapid Needs Assessment — Priority Provinces (Platform-Derived, May 2026)

Province	High Priority	Medium Priority	Low Priority	Total	Primary Risk Driver
Badakhshan	4	16	5	**25**	Precip ALER (−94 mm) + SPI Severe (−1.64); food pipeline risk
Nuristan	3	13	6	**22**	SPI Severe (−1.56); remote access limits response
Panjsher	2	10	5	**17**	SPI Severe (−1.48); NE deficit peak
Takhar	4	12	8	**24**	SWE collapse 24 mm + Precip ALER; harvest window critical
Baghlan	5	10	6	**21**	Residual SWE 6.3 mm; flood-to-drought transition in progress
Badghis	6	8	1	**15**	VHI ALER (50) during wheat grain-fill; yield risk HIGH
Faryab	8	5	1	**14**	VHI ALER (51); NW wheat belt deficit; 1.2M pop affected
Hirat	9	5	2	**16**	VHI ALER (51); harvest window; 240k urban pop exposed to dust
Samangan	4	7	4	**15**	VHI ALER (51) + Precip WATC (−47 mm); wheat + maize sowing
Uruzgan	4	7	2	**13**	VHI ALER (52); remote; SPI −1.27; food access constrained
Kabul	3	12	4	**19**	VHI ALER (54); urban flash risk; 5M population exposed
Wardak	3	10	4	**17**	VHI ALER (53); Kabul ring compound; 3 ALER dimensions
Kunduz	4	7	4	**15**	Precip WATC (−42 mm) + ECMWF 18 mm; late flood window
Nangarhar	3	9	8	**20**	Precip ALER (−52 mm); Jalalabad urban; rice sowing at risk
Kapisa	2	8	5	**15**	Precip ALER (−52 mm); steep terrain; flash flood exposure

Scientific Findings by Domain

Domain	Platform Evidence (This Issue)	Scientific Implication
Agricultural Drought	VHI 50–54 (ALER) in 10 provinces; SPI-3 <−1.0 in 30/34; Precip_Anom −21 to −94 mm across NW belt.	VHI <55 sustained ≥3 months correlates with measurable yield reduction (Kogan 1995). May harvest overlap — anticipatory food assessment warranted for Badghis, Faryab, Herat, Ghor, Samangan, Uruzgan.
Meteorological Drought	SPI-3 Severe (<−1.5) in 3 provinces; Moderate (−1.0 to −1.5) in 27. Near-normal: Farah, Nimroz only.	McKee et al. (1993): SPI <−1.5 = severe drought. Persistence into Jun–Jul critical for summer crop irrigation demand.
Snowmelt Transition	SWE <1 mm in 26 provinces; Residual: Takhar 24 mm, Baghlan 6.3 mm. ECMWF dry (<25 mm) in 32 provinces.	Snowmelt flood risk passed in western/southern basins. Residual SWE + dry forecast = low composite flood risk. Urban flash risk persists in Kabul ring (Flood Hub confirmed).
Sand & Dust Storm	AOD 0.3–0.6 in 7 SW provinces. Peak hours 96–120 per WMO SDS-WAS. Seasonal onset confirmed.	Onset of Bad-e-Sad-o-Bist-Roz confirmed. AOD >0.5 = WHO health advisory. Compound heat (35°C+) + dust in Nimroz, Kandahar — respiratory risk for vulnerable groups.
Data Gaps & Caveats	GRACE groundwater: last release Sep 2024 (~6-month lag). FLDAS: capped Jan 2024. MODIS: 2–4 week lag.	Bulletin conclusions rely on current-data indices only. Groundwater trends indicative only. Google Flood Hub used as reference, not integrated data.

Data Sources: VHI: MODIS MOD13A3+MOD11A2 (1 km, May 1–22) — Kogan (1995). Precip_Anom: CHIRPS+ERA5-Land anomaly vs baseline (Apr 1–May 22). SPI-3: CHIRPS+ERA5-Land, McKee et al. (1993), Feb 20–May 21. SWE: NASA FLDAS+MODIS MOD10A1, ≥500 m mask, May 1–21. ECMWF IFS: ECMWF/NRT_FORECAST/IFS/OPER, total_precipitation_sfc, last step. SDS_Fcst: ECMWF/CAMS/NRT, dust AOD at 550 nm, 8 peak steps. Temp: ERA5-Land MONTHLY_AGGR. Flood ref: Google Flood Hub, 23 May 2026.

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Historical baselines	Any index from 1981–present; anomaly vs 30-year climatology on request
Forecast integration	ECMWF 15-day + CAMS dust overlay for operational response planning
GCF / GEF evidence packages	Platform data formatted for climate finance concept notes and NDC evidence

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