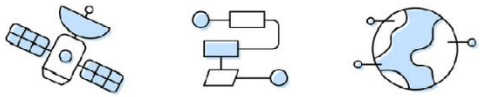
CHASHMA-SAR

Afghanistan Multi-Hazard Climate & Water Intelligence Platform

USER MANUAL

Version 1.0 · March 2026



Field	Value	Quick Access
Platform	Chashma-Sar Multi-Hazard Climate & Water Intelligence	**Scan to launch**  No login · Free
Version	v1.0 (March 2026)	
Scale	National · 34 Provinces · 400+ Districts	
Indices	48 indices · 7 categories	
Access	Free · Browser-based · No login required	
Platform URL	https://chashma-490208.projects.earthengine.app/view/chashma-sar	
Website	chashma-sar.com	
Developer	Chashma-Sar Consulting Co. & MSSADO	
Contact	b.rahmani@chashma-sar.com; chashmasar.consulting@gmail.com	

CHASHMA-SAR
CONSULTATION - ENGINEERING

Google Earth Engine

Platform is permanently free. Professional services (custom analysis, GCF/GEF evidence packages, situation reports, training) require a service contract.

Quick Access — How to Open the Platform

Use any of the three methods below. No account, no installation, no cost.

Method 1 — Scan the QR Code

Point your phone or tablet camera at the QR code on the cover or below. The platform opens in your browser immediately.

Scan with any smartphone camera · Opens in any browser · Works on iPhone, Android, tablet

Method 2 — Paste the URL into any browser

Copy the address below and paste into Chrome, Firefox, Edge, or Safari

https://chashma-490208.projects.earthengine.app/view/chashma-sar

The platform opens immediately — no Google account, no login, no software to install.

Method 3 — Via the Chashma-Sar website

Visit **chashma-sar.com** and click the "Launch Platform" button. The website also has video tutorials, User Manual download, and professional services.

Chapter 1 — Interface Overview

The Chashma-Sar platform runs entirely in your browser — no installation, no login, no cost. It has three main areas: the left control panel, the map canvas, and the time series chart below the map.

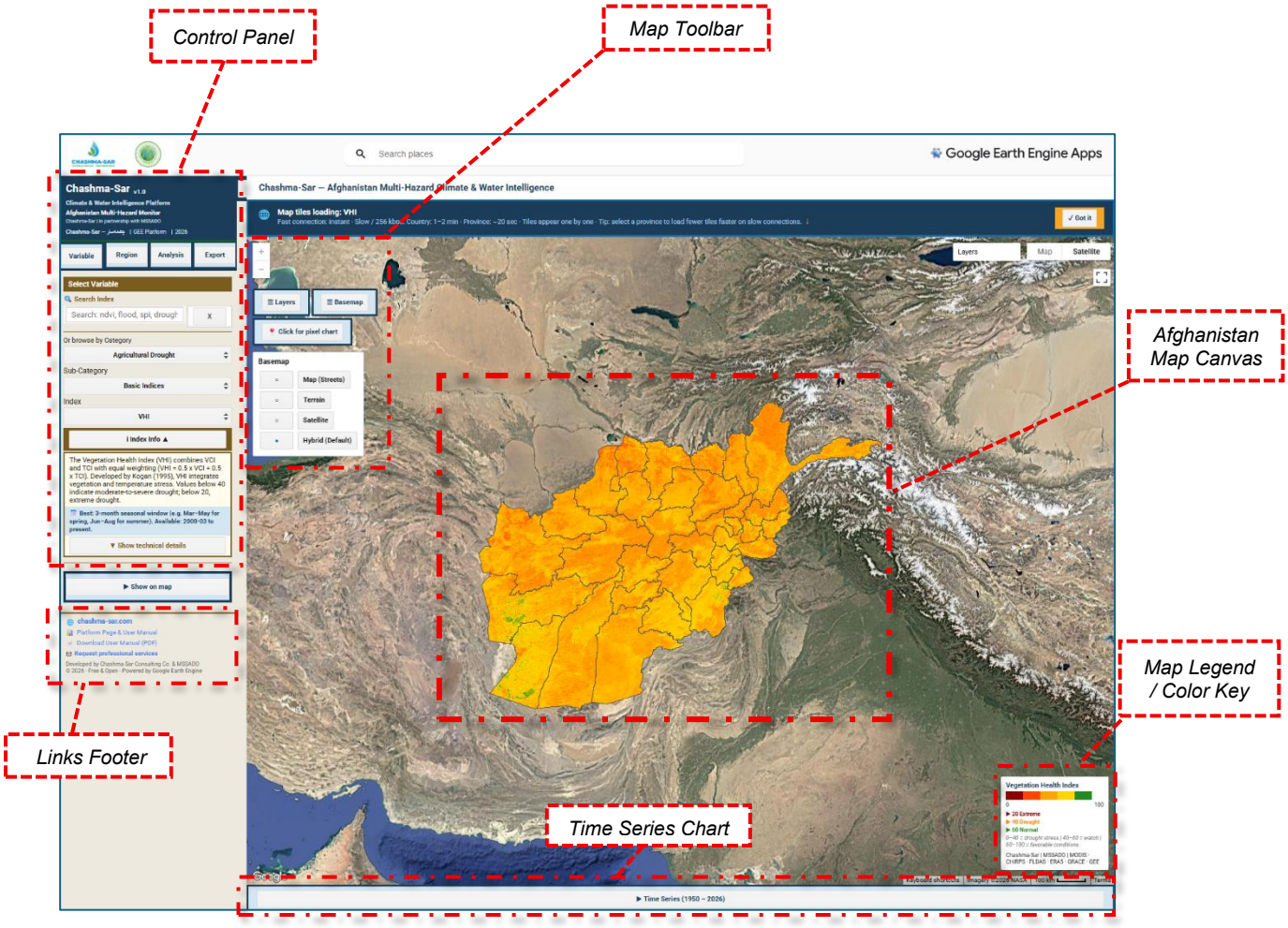


Figure 1: Chashma-Sar interface: (A) left control panel with 4 tabs, (B) Afghanistan map canvas, (C) map toolbar, (D) links footer.

1.1 The Four Tabs

Tab	Function
Variable	Select category, sub-category, and index. Use the Search Index bar for fast lookup. Click "Show on Map".
Region	Select Country / Province / District. Set date range. Use Quick Date buttons. Add overlay date for comparison.
Analysis	Generate time series charts, province ranking, and district statistics.
Export	Download PNG map, copy CSV to Excel, export GeoTIFF for ArcGIS/QGIS.

1.2 Index Search Bar

The search bar at the top of the Variable tab lets you find any index instantly by name or abbreviation. Type at least 2 characters and matching results appear immediately.

How to use the Search Bar:

1. Click the Variable tab.

2. Click inside the 'Search: ndvi, flood, spi, drough...' box.

3. Type any index name or keyword (e.g. 'vhi', 'flood', 'drought', 'snow').

4. Up to 6 matching results appear — each showing the index key and its category tag.

5. Click any result to instantly select that index — all dropdowns update automatically.

6. To clear the search, click the × button to the right of the search box.

Tip: Category tags are colour-coded — green = Agricultural, amber = Meteorological, blue = Hydrological, forest = Climate Change, orange = Physical Hazards, purple = AHP Composites, navy = Forecast.

1.3 Map Toolbar

The toolbar appears at the top-right of the map canvas:

- Layers — toggle administrative boundary overlays on/off.
- Basemap — switch between Map (Streets), Terrain, Satellite, and Hybrid (default).
- 📍 Click for pixel chart — activates pixel-level time series mode. The button turns orange when active.

1.4 Two-Phase Loading Banner

When you click "Show on Map", the platform goes through two phases:

Phase	Indicator	What It Means	What To Do
1	⏳ Amber border — "Computing: [index]"	The platform is processing satellite data on Google's servers. Speed depends on complexity, not your internet connection.	Wait. Do NOT click again. No dismiss button — it advances automatically.
2	🌐 Blue border — "Map tiles loading: [index]"	Processed tiles are streaming to your browser. Speed depends on your internet connection.	Wait for tiles to appear. Click '✓ Got it' to dismiss.

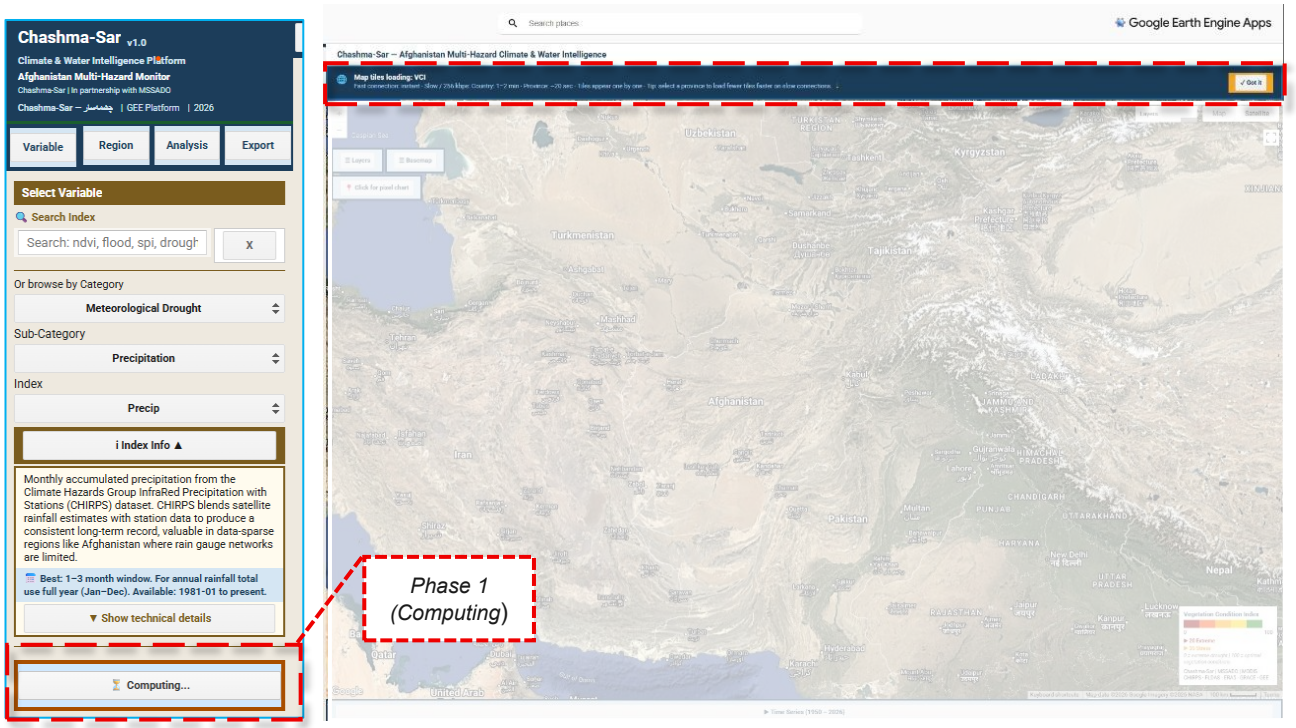


Figure 2: Two-phase loading banner: amber Phase 1 (Computing) transitions to blue Phase 2 (Map tiles loading). Click '✓ Got it' to dismiss Phase 2. Do not click Show on Map again during loading.

⚠ Slow connection note:

On 256 kbps connections: Country-level maps take 1–2 min to stream. Province-level: ~20 sec. District-level: ~5 sec. Tiles appear one by one — this is normal. Select a Province or District for significantly faster loading.

1.5 Clicking the Map

Normal mode: clicking the map shows the district + province name and coordinates in the status bar.

Click mode (Click for pixel chart): activates pixel-level time series. After clicking, a panel shows the location name (e.g. ' Gulran, Hirat (35.237°N, 61.438°E)').

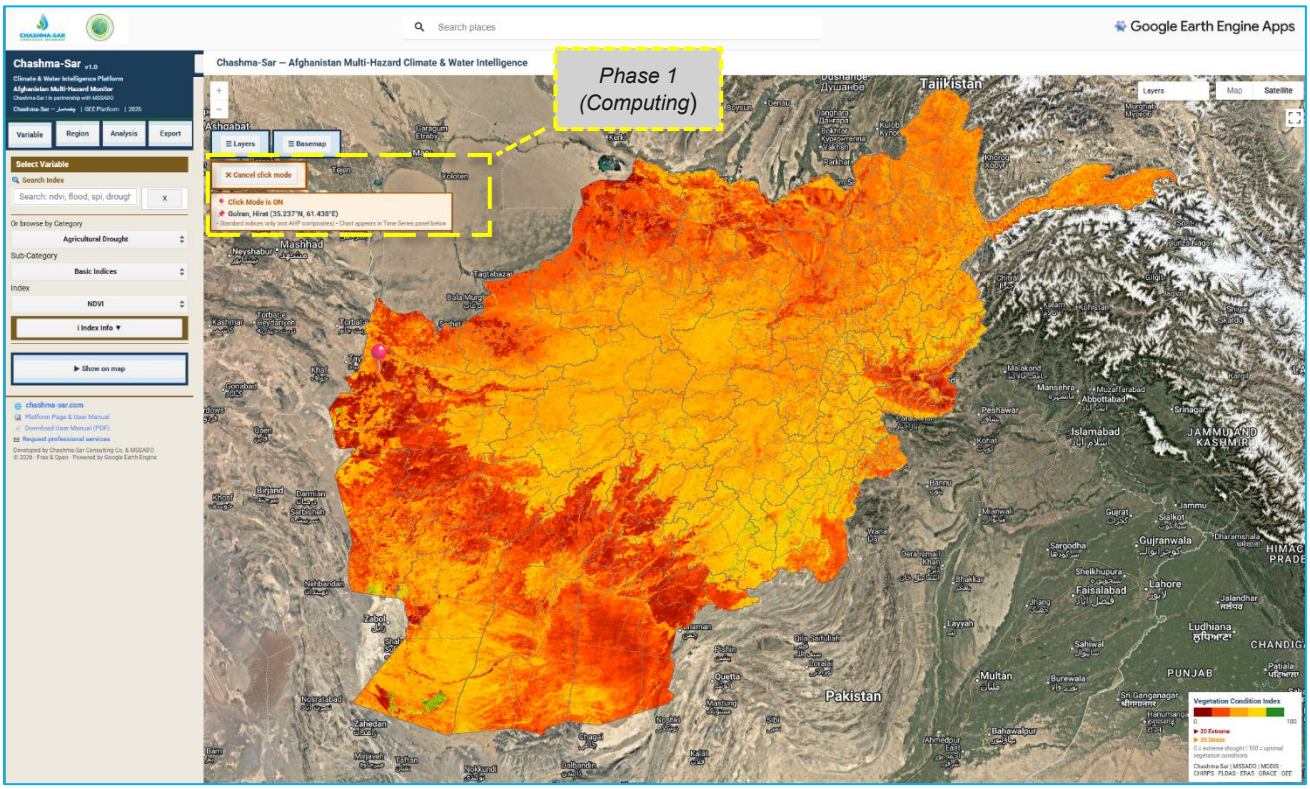


Figure 3: Click mode; the panel shows the district and province name with coordinates after each map click. A time series chart for that pixel appears below the map.

1.6 About & Links Footer and Welcome Banner

At the very bottom of the left panel there is a permanent About & Links footer with four quick-access links:

- chashma-sar.com — opens the main website.
- Platform Page & User Manual — opens the platform page with tutorials and this manual.
- Download User Manual (PDF) — direct download of this manual.
- ✉ Request professional services — opens your email client.

On first load, a welcome banner appears at the bottom-centre of the map. It auto-dismisses after 25 seconds, or click '✓ Got it' to close it early.

1.7 Quick Date Presets

Each index has a recommended date range based on its data source and optimal use case. The Quick Date buttons appear in the Region tab below the date fields and update automatically when you select a different index.

How to use Quick Date buttons:

1. Select any index in the Variable tab.

2. Switch to the Region tab — four date preset buttons appear below the End date field.

3. Click any button to instantly set the start and end dates to an appropriate window.

4. Click 'Show on Map' — the platform will compute using valid, available dates.

The buttons are tailored to each dataset — for example:

- NDVI shows: 1 month / 3 months / 1 year / 3 years (anchored to MODIS availability)
- PDSI shows: 1 year / 3 years / 5 years / 20 years (anchored to TerraClimate end date)
- GWS_Anom shows: 3 months / 1 year / 3 years / 5 years (anchored to GRACE end date)
- SeasonalFcst shows: 7-day / 16-day / 1 month (anchored to GFS rolling window)
- SWA shows: 1 month / 3 months / 1 year / 3 years (anchored to JRC 2022 end date)

Why date selection matters:

Different datasets have very different availability windows. Selecting dates beyond a dataset's coverage causes empty map errors.

MODIS collections: data available through late 2025 (2–4 week lag).

CHIRPS precipitation: very current — data available through February 2026.

ERA5-Land: available through December 2025.

FLDAS NOAH (soil moisture, SWE): ends January 2024.

GRACE (groundwater): ends September 2024.

TerraClimate (PDSI, WSI): ends December 2023.

JRC Surface Water (SWA): ends January 2022.

The Quick Date buttons always use dates within each dataset's confirmed coverage — no guessing required.

Chapter 2 — Index Reference & Category Structure

The platform has 48 indices across 7 categories. Two types of layers:

Dynamic Index	Static Layer
Changes with your date selection. All computation uses satellite data for your chosen period. Examples: NDVI, SPI-3, WSDI, FloodRiverAHP	Fixed terrain data. Does NOT change with date selection. Examples: LandslideSusc, AvalancheSusc, SeismicHazard

Category structure note:

- 'Physical Hazards' covers Flood Monitoring, Mass Movement, and Seismic Hazard.
- 'Multi-Hazard Composites (AHP)' contains only AHP composite indices: WSDI, FloodRiverAHP, NHI, ESI.
- AVI (Agricultural Vulnerability Index) is in Agricultural Drought — not in AHP.
- GWS_Anom (groundwater) is in Hydrological Drought — not in Climate Change Indicators.
- SeasonalFcst (GFS precipitation forecast) is in the Forecast category only.
- For dynamic flood risk use FloodRiverAHP (Multi-Hazard Composites → Water & Drought Risk).

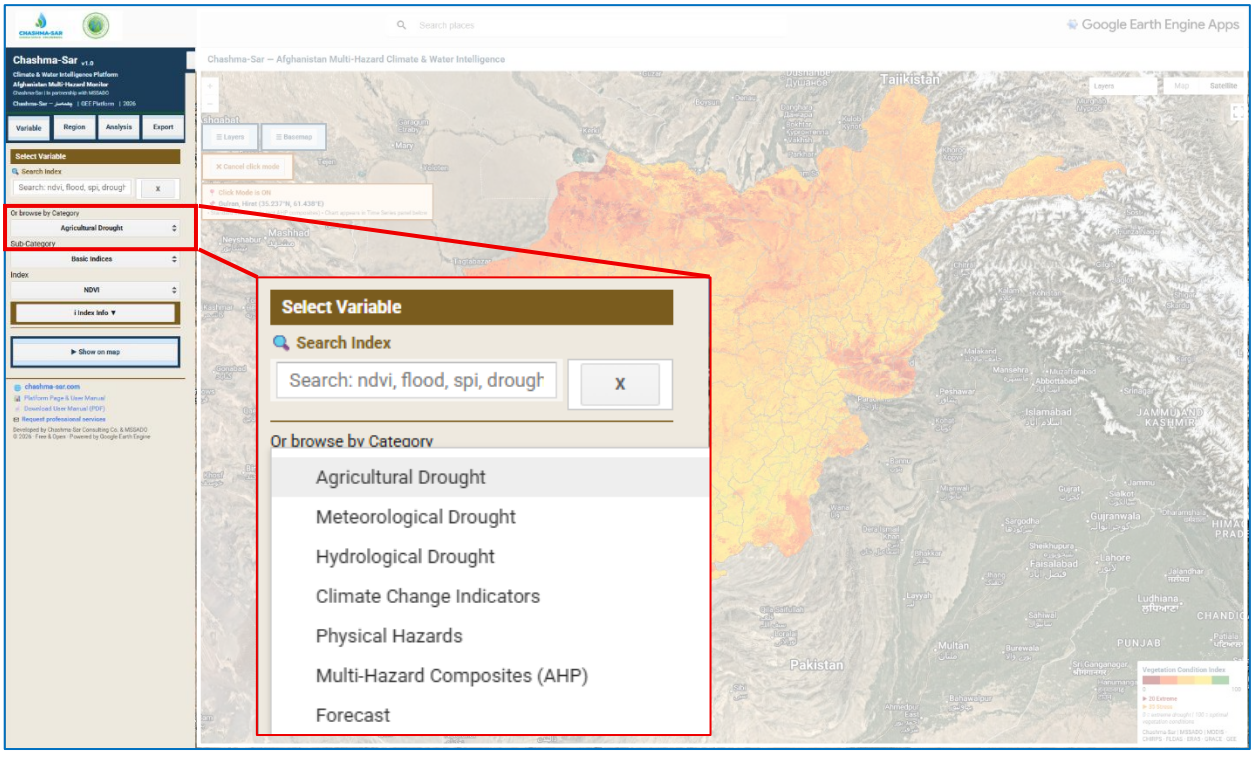


Figure 4: Category selector in the Variable tab. Click any category to reveal its sub-categories and indices.

2.1 Agricultural Drought

Index	Type	Sub-Category	Description
NDVI	🔄	Basic Indices	Vegetation density and health. NDVI above 0.3 = actively growing crops. Source: MODIS MOD13A3. 1 km, 2000–present.
EVI	🔄	Basic Indices	Enhanced Vegetation Index — corrects for aerosol interference and canopy background. More accurate than NDVI in dusty conditions.

Index	Type	Sub-Category	Description
VHI	🔄	Basic Indices	Vegetation Health Index = 0.5×VCI + 0.5×TCI. Values below 40 = moderate-to-severe drought; below 20 = extreme drought.
VCI	🔄	Basic Indices	Vegetation Condition Index — compares current NDVI to seasonal historical min–max. 0 = worst ever; 100 = best ever.
TCI	🔄	Basic Indices	Temperature Condition Index. Measures crop heat stress relative to the seasonal historical LST range.
NDWI	🔄	Basic Indices	Normalised Difference Water Index. Positive = moist vegetation; negative = dry or bare soil.
IDSI	🔄	Composite Indices	Integrated Drought Severity Index — AHP: VHI(0.4) + SMCI(0.3) + PCI(0.3). Values below 40 indicate drought.
PCC	🔄	Composite Indices	Percent Crop Cover. Fraction of pixels with NDVI > 0.3 (actively growing vegetation).
AVI	🔄	Composite Indices	Agricultural Vulnerability Index — food security targeting: NDVI_Anom(0.30) + SPI(0.25) + WSI(0.20) + LST_Anom(0.15) + SMCI(0.10).
NDVI_Anom	🔄	Anomaly	NDVI Anomaly vs 2000–2020 baseline. Negative values indicate below-normal greenness for the season.

2.2 Meteorological Drought

Note: SeasonalFcst (GFS precipitation forecast) is in Category 7: Forecast — not in this category.

Index	Type	Sub-Category	Description
Precip	🔄	Precipitation	Monthly accumulated precipitation from CHIRPS. 1981–present. ~5 km resolution.
SPI-3	🔄	Precipitation	3-month Standardised Precipitation Index (McKee et al., 1993). SPI < −1.0 = dry; < −2.0 = extreme drought.
PCI	🔄	Precipitation	Precipitation Condition Index. 0 = driest on record; 100 = wettest on record.
DrySpells	🔄	Precipitation	Maximum consecutive dry days (< 1 mm). 10+ days during April–June can devastate rainfed wheat.
Precip_Anom	🔄	Precipitation	Precipitation Anomaly vs the 1981–2010 WMO climatological baseline.
LST	🔄	Temperature	Land Surface Temperature (MODIS MOD11A2). Southern lowlands regularly exceed 50°C in summer. 1 km, 2000–present.
LST_Anom	🔄	Temperature	LST Anomaly vs 2000–2020 baseline. Positive = hotter-than-normal surface temperatures.
HeatIdx	🔄	Temperature	Apparent temperature (ERA5). Above 35°C = significant crop stress; above 40°C = human health hazard. Best used for summer months (Jun–Aug).
ColdSpell	🔄	Temperature	Count of months in period with mean temperature < 0°C. ERA5 reanalysis. 1950–present.

2.3 Hydrological Drought

Index	Type	Sub-Category	Description
SoilMoi	🔄	Soil Moisture	Surface soil moisture (0–10 cm). NASA FLDAS NOAH. Wilting point ≈ 0.15 m³/m³. Data to January 2024.
SMCI	🔄	Soil Moisture	Soil Moisture Condition Index. 0 = driest on record; 100 = wettest on record.
SubSoilMoi	🔄	Soil Moisture	Sub-surface soil moisture (10–40 cm). Not the same as groundwater — see GWS_Anom for long-term storage.
PSC	🔄	Snow Cover	Percent Snow Cover (MODIS NDSI). Critical indicator for predicting spring river flows. Only highland areas (above 500m) scored — flat desert areas are excluded.
SWE	🔄	Snow Cover	Snow Water Equivalent (NASA FLDAS). Liquid water stored in the snowpack — key for spring irrigation forecasting. Best viewed in winter months (Nov–Apr) for the Hindu Kush, Bamyan, Badakhshan, and Ghor highland zones.
Snow_Anom	🔄	Snow Cover	Snow Cover Anomaly vs 2000–2020. Below-normal Nov–Feb strongly predicts spring drought.
RSPI	🔄	Streamflow & Surface Water	Runoff SPI (ERA5-Land). Proxy for streamflow drought in Afghan river basins where gauge data is unavailable.
SWA	🔄	Streamflow & Surface Water	Surface Water Anomaly. Monitors Kajaki, Dahla, Salma reservoirs. JRC data ends January 2022 — use date presets to select valid dates.
GWS_Anom	🔄	Groundwater	GRACE groundwater storage anomaly. ~300 km resolution — block patterns are instrument artefacts. Use for regional trend analysis only. Data to September 2024.

2.4 Climate Change Indicators

Index	Type	Sub-Category	Description
ET	🔄	Water Stress	Actual Evapotranspiration (MODIS MOD16A2). Low ET indicates water stress. 500 m resolution.
PET	🔄	Water Stress	Potential Evapotranspiration (ERA5-Land). Rising PET trend = increasing climate-driven water demand.
WSI	🔄	Water Stress	Water Stress Index = 1 − ET/PET. 0 = no stress; 1 = maximum water stress.
PDSI	🔄	Water Stress	Palmer Drought Severity Index (TerraClimate 1958–2023). < −2.0 = moderate drought. Data ends December 2023.
AOD	🔄	Atmosphere & Dust	Aerosol Optical Depth (MODIS MOD08). AOD > 1.0 = severe dust storm. 1-degree resolution.
ARI	🔄	Atmosphere & Dust	Absorbing Aerosol Index (Sentinel-5P). Distinguishes dust from smoke. Negative = clean air; Positive = absorbing aerosol. Data from 2018.
NDDI	🔄	Land Degradation	Normalised Difference Drought Index = (NDVI − NDWI)/(NDVI + NDWI). Higher values = greater land degradation risk.
BSI	🔄	Land Degradation	Bare Soil Index — detects vegetation loss and surface exposure. Useful for desertification monitoring.
Albedo	🔄	Land Degradation	Surface albedo (MODIS MCD43A3). Low = dark surface (vegetated or wet); high = bright surface (bare, sandy).

2.5 Physical Hazards

Index	Type	Sub-Category	Description
MNDWI	🔄	Flood Monitoring	Modified NDWI — near-real-time flood extent. Positive values > 0.3 indicate flood inundation. MODIS MOD09A1. 500 m resolution.
LandslideSusc	🗺	Mass Movement	STATIC terrain-based susceptibility. Slope + elevation + rainfall. Used dynamically within the NHI composite with current rainfall weighting.
AvalancheSusc	🗺	Mass Movement	STATIC — elevation + slope angle (28–50°) + MODIS snow cover climatology (Nov–Apr). Only terrain above 2,500 m is scored.
SeismicHazard	🗺	Seismic Hazard	STATIC — fault proximity (Hindu Kush, Chaman, Herat fault systems) + topographic relief. North-east and central Afghanistan show highest values.

Static layer note:

Static terrain layers are proxy indices, not certified hazard zonation maps. Use for relative comparison and DRR planning only — not for site-specific engineering decisions.

For dynamic (date-responsive) flood risk, use FloodRiverAHP in Multi-Hazard Composites → Water & Drought Risk.

2.6 Multi-Hazard Composites (AHP)

AHP composite indices combine 3–5 satellite datasets with peer-reviewed Analytic Hierarchy Process (AHP) weights to produce 0–100 risk scores. All AHP indices are dynamic.

Note on AHP composites:

These indices combine multiple datasets — use the date presets to ensure all component datasets have available data.

WSDI and NHI are limited by TerraClimate (ends December 2023) — use the '1 year' or '3 years' preset.

FloodRiverAHP is limited by FLDAS (ends January 2024) — use the 'Flood season' or '1 year' preset.

Index	Type	Sub-Category	Description / AHP Weights
WSDI	🔄	Water & Drought Risk	Water Stress & Drought Index: WSI(0.35) + SMCI(0.25) + PDSI(0.25) + RSPI(0.15). Best date: 1–3 year window.
FloodRiverAHP	🔄	Water & Drought Risk	Riverine Flood Exposure AHP: Terrain(0.30) + River Proximity/MERIT(0.30) + Soil Saturation(0.25) + Rainfall(0.15). Best date: flood season (Mar–May) or 1-year window.
NHI	🔄	Physical Hazard Risk	Natural Hazard Index: FloodRiver(0.35) + Landslide(0.25) + Avalanche(0.20) + Seismic(0.20). Best date: 1-year window.
ESI	🔄	Climate & Environmental Risk	Environmental Stressor Index: VHI_inv(0.35) + NDVI_Anom(0.25) + BSI(0.20) + Albedo(0.20). Best date: 1-year or 3-year window.
AVI	🔄	Agricultural Drought (Composite Indices)	Agricultural Vulnerability Index: NDVI_Anom(0.30) + SPI(0.25) + WSI(0.20) + LST_Anom(0.15) + SMCI(0.10). Located in Agricultural Drought category. Best date: growing season (Mar–Aug).

2.7 Forecast

The Forecast category provides two complementary time-horizon views: a 16-day operational precipitation forecast from the NOAA GFS model, and long-term ERA5 climate reanalysis covering 1950 to the present.

Index	Type	Sub-Category	Description
SeasonalFcst	🔄	Short-Range Forecast (GFS)	NOAA Global Forecast System (GFS) 16-day precipitation forecast. ~28 km resolution. Best accuracy Days 1–7. Rolls forward daily.
ECMWF_Temp	🔄	ERA5 Climate Reanalysis	ERA5-Land monthly mean temperature reanalysis. ~11 km resolution. 1950–present. Generate a time series from 1950 to 2025 to visualise long-term temperature trends.
ECMWF_Precip	🔄	ERA5 Climate Reanalysis	ERA5-Land monthly total precipitation reanalysis. 1950–present. Best dataset for multi-decadal trend analysis and climate finance evidence packages.

Forecast vs Reanalysis:

SeasonalFcst (GFS) = future forecast — useful for operational early warning.

ECMWF_Temp and ECMWF_Precip = historical reanalysis — best for trend analysis and donor evidence packages.

For long-term climate evidence, always use ERA5 reanalysis rather than CHIRPS anomalies.

Chapter 3 — Charts & Analysis

3.1 Time Series Chart

Analysis tab → set region → set aggregation → click 'Generate time series chart'. Shows monthly values with period mean (orange dashed) and linear trend line with R² value.

Note on AHP indices:

AHP composite indices (WSDI, FloodRiverAHP, NHI, ESI, AVI) show a spatial distribution histogram rather than a monthly time series, because they combine multiple datasets that do not have a single temporal axis.

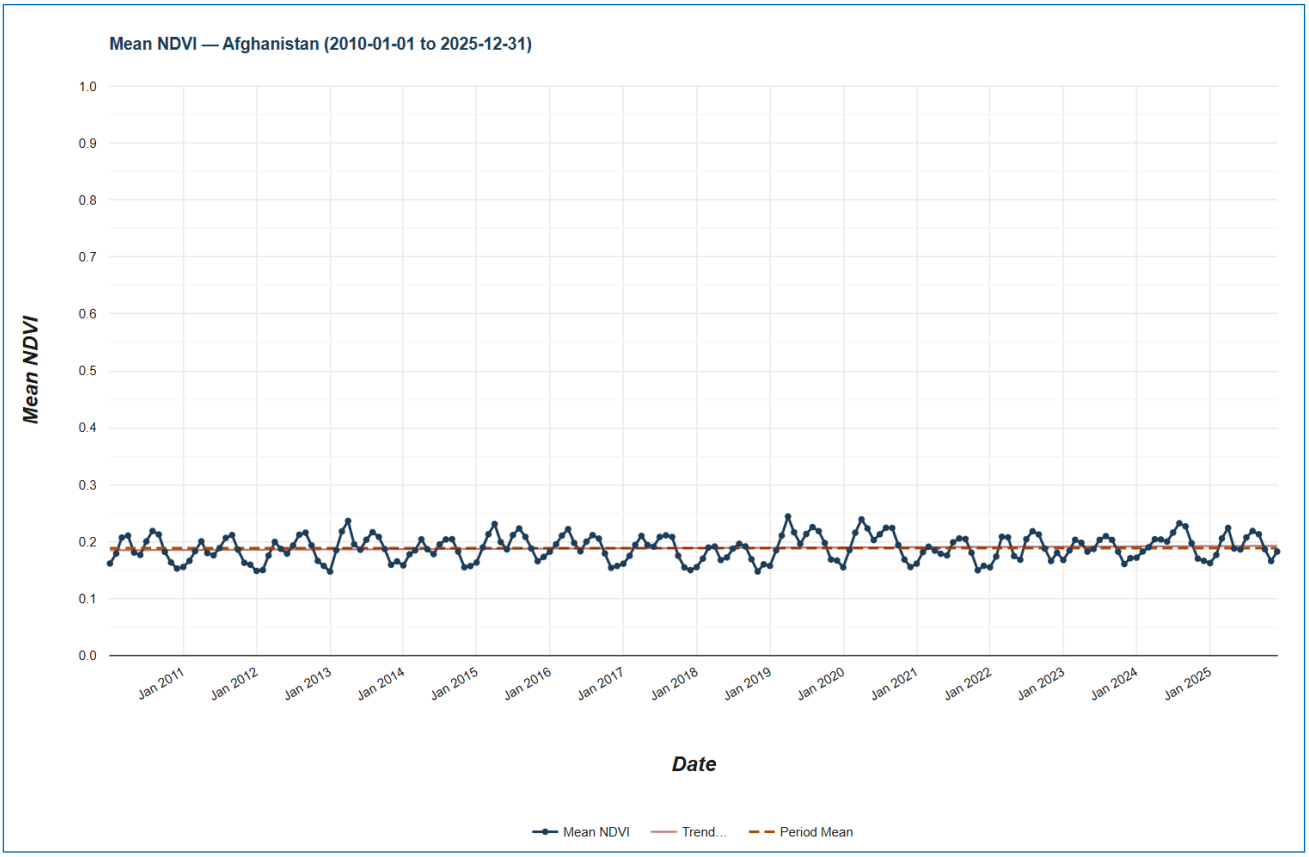


Figure 5: Time series chart: monthly NDVI for Afghanistan 2010–2024.

3.2 Pixel Chart (Click Mode)

Click ' ⚲ Click for pixel chart'. Click any map location — shows district/province name, builds a per-pixel time series. Available for standard (non-AHP) dynamic indices only.

3.3 Province Ranking

Run 'Show on Map' first. Then click 'Compute Zonal Statistics' in the Analysis tab. All 34 provinces are ranked from worst to best (takes 20–40 seconds). The result is available as CSV in the Export tab.

3.4 District Statistics

Click 'District Statistics (400+ districts)' in the Analysis tab. Takes 60–120 seconds. Available as CSV in the Export tab.

3.5 Split View / Year Comparison

Analysis tab → set Year A and Year B → click '⇔ Split view: compare years'. Both maps appear side by side. Click '✕ Exit split view' to return to single map.

Chapter 4 — Exporting Data

4.1 PNG Map Image

Export tab → Map Image → '🖼 Generate map image (PNG)'. Right-click the rendered image and select 'Save image as'.

4.2 CSV to Excel

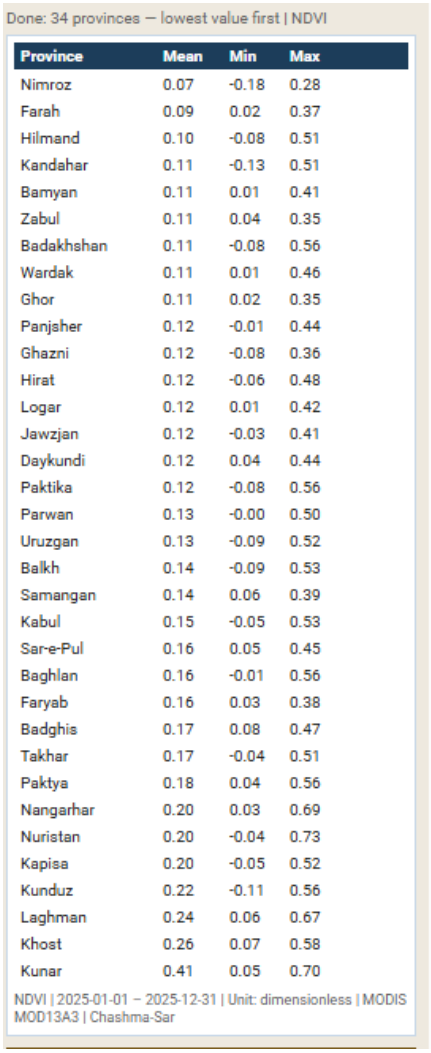
After Province Ranking or District Statistics, go to Export tab → Province Table (or District Table) → Copy as CSV.

⚠ IMPORTANT — use the raw textbox, not the visual preview:

There are TWO areas in the Export panel: a formatted visual preview table (top) and a raw textbox (below).

CORRECT: Click inside the raw textbox → Ctrl+A → Ctrl+C → Open Excel → Ctrl+V.

WRONG: Copying from the visual preview produces jumbled, unusable text.



Done: 34 provinces — lowest value first | NDVI

Province	Mean	Min	Max
Nimroz	0.07	-0.18	0.28
Farah	0.09	0.02	0.37
Hilmand	0.10	-0.08	0.51
Kandahar	0.11	-0.13	0.51
Bamyan	0.11	0.01	0.41
Zabul	0.11	0.04	0.35
Badakhshan	0.11	-0.08	0.56
Wardak	0.11	0.01	0.46
Ghor	0.11	0.02	0.35
Panjsher	0.12	-0.01	0.44
Ghazni	0.12	-0.08	0.36
Hirat	0.12	-0.06	0.48
Logar	0.12	0.01	0.42
Jawzjan	0.12	-0.03	0.41
Daykundi	0.12	0.04	0.44
Paktika	0.12	-0.08	0.56
Parwan	0.13	-0.00	0.50
Uruzgan	0.13	-0.09	0.52
Balkh	0.14	-0.09	0.53
Samangan	0.14	0.06	0.39
Kabul	0.15	-0.05	0.53
Sar-e-Pul	0.16	0.05	0.45
Baghlan	0.16	-0.01	0.56
Faryab	0.16	0.03	0.38
Badghis	0.17	0.08	0.47
Takhar	0.17	-0.04	0.51
Paktya	0.18	0.04	0.56
Nangarhar	0.20	0.03	0.69
Nuristan	0.20	-0.04	0.73
Kapisa	0.20	-0.05	0.52
Kunduz	0.22	-0.11	0.56
Laghman	0.24	0.06	0.67
Khost	0.26	0.07	0.58
Kunar	0.41	0.05	0.70

NDVI | 2025-01-01 – 2025-12-31 | Unit: dimensionless | MODIS MOD13A3 | Chashma-Sar

Figure 6: — CSV export: use the raw textbox (circled), not the visual preview above.

4.3 GeoTIFF Export

Requires a free Google Earth Engine Code Editor account. Export tab → GeoTIFF → '↓ Export GeoTIFF'. A task appears in the Code Editor Tasks panel. The file saves to 'ChashmaSar_Exports' in your Google Drive. Open in ArcGIS, QGIS, or any GIS software.

Chapter 5 — Use Case Guides

5.1 Food Security & Drought Situation Report (WFP / FAO / OCHA)

Step	Action
Index	Agricultural Drought → Basic Indices → VHI. Use Quick Date preset: 'Growing season' (Mar–Jul).
Province ranking	Compute Zonal Statistics → identify worst 5 provinces by VHI.
Cross-check	Load IDSI for same period — confirms integrated drought severity.
Export	Export PNG map. Copy province ranking CSV to Excel.
Time series	Generate VHI time series for worst province — trend line documents worsening.

5.2 Flood Early Warning & Response Planning

Step	Action
Near-real-time	Physical Hazards → Flood Monitoring → MNDWI. Use Quick Date preset: '2 weeks' or '1 month'.
AHP flood risk	Multi-Hazard Composites (AHP) → Water & Drought Risk → FloodRiverAHP. Use 'Flood season' preset.
Population context	Toggle Population Density overlay — see who is in the flood zone.
Export	PNG maps + province ranking CSV → OCHA cluster submission.

5.3 DRR Planning — Multi-Hazard Priority Assessment

Step	Action
Water & drought	Multi-Hazard Composites (AHP) → Water & Drought Risk → WSDI. Use '1 year' date preset.
Physical hazards	Multi-Hazard Composites (AHP) → Physical Hazard Risk → NHI. Same 1-year window.
Environmental stress	Multi-Hazard Composites (AHP) → Climate & Environmental Risk → ESI. Same window.
NHI breakdown	Review LandslideSusc, AvalancheSusc, SeismicHazard individually for terrain context.
Evidence package	Export all PNG maps + province rankings. Compare WSDI, NHI, ESI province rankings side by side for donor brief.

Note: The standalone MHDC (Multi-Hazard DRR Composite) flagship index has been moved to a future version of the platform while it undergoes scientific refinement. For comprehensive DRR assessment, use WSDI + NHI + ESI together as shown above. This provides the same analytical coverage with greater transparency.

5.4 Climate Finance Evidence Package (GCF / GEF / LDCF)

Step	Action
PDSI 20-year	Climate Change Indicators → Water Stress → PDSI. Use '20 years' quick preset. Export PNG + ranking.
Groundwater	Hydrological Drought → Groundwater → GWS_Anom. Use '5 years' preset.
Desertification	Climate Change Indicators → Land Degradation → NDDI and BSI. Use '5 years' preset.
Temperature trend	Forecast → ERA5 Climate Reanalysis → ECMWF_Temp. Use '30 years' preset for 1990–2019 baseline.
Evidence output	5 PNG maps + time series charts = 'Climate Baseline' chapter for GCF proposal.

Chapter 6 — Troubleshooting & FAQ

Most issues are caused by slow internet connections, GEE server load, or browser cache. Try the steps below before contacting support.

The map is blank / tiles never appear
1. Wait at least 2 minutes — on 256 kbps, country-level tiles can take 1–2 min to stream.
2. Select a Province or District instead — tiles load 4–12× faster.
3. Hard-refresh: Ctrl+Shift+R (Windows) or Cmd+Shift+R (Mac).
4. Try Chrome or Firefox — they work best with Google Earth Engine.
5. Check that JavaScript is enabled in your browser settings.

The loading banner keeps spinning and never finishes
1. Some indices (NHI, ESI, WSDI) take 30–60 seconds to compute — this is Phase 1 (amber).
2. If it spins for more than 3 minutes, the GEE server may be busy. Wait 5 min and try again.
3. Do NOT click 'Show on Map' again while it is loading — this resets the computation.
4. GEE memory may be exceeded if you have loaded many indices in sequence. Hard-refresh (Ctrl+Shift+R) and try again.

The map shows an error or appears blank after loading
1. The selected date range may be outside the dataset's availability.
2. Use the Quick Date preset buttons in the Region tab — they always select valid, available dates.
3. See Appendix A.2 for the data end dates for each dataset.
4. Dates beyond FLDAS (Jan 2024), GRACE (Sep 2024), TerraClimate (Dec 2023), or JRC (Jan 2022) will not produce data.

The time series chart shows 'No data' or is empty
1. Ensure you have clicked 'Show on Map' first — charts require a rendered layer.
2. Check your date range — some datasets have limited coverage (see Appendix A.2).
3. AHP composite indices do NOT produce a monthly time series — they show a histogram instead.
4. For district-level charts, run 'Show on Map' with district selected first.

The GeoTIFF export task is not appearing in Code Editor
1. You must be logged into a Google account with Google Earth Engine access.
2. Visit code.earthengine.google.com and sign in.
3. After clicking 'Export GeoTIFF', switch to the Code Editor and click the Tasks tab.
4. Click RUN next to the task to start the export to Google Drive.

Province ranking gives wrong / unexpected results
1. Make sure 'Show on Map' completed (blue Phase 2 banner appeared) before running Zonal Statistics.
2. Check that the date range is appropriate for the index — e.g. PDSI only covers 1958–2023.

3. Static layers (LandslideSusc, AvalancheSusc, SeismicHazard) always return the same ranking.
4. Use the Quick Date presets to ensure the date range falls within the dataset's coverage.

The platform does not open at all
1. Platform URL: https://chashma-490208.projects.earthengine.app/view/chashma-sar
2. Copy and paste this exact URL — do not type it manually.
3. GEE Apps require a modern browser (Chrome 90+, Firefox 88+, Edge 90+).
4. If behind a government firewall, earthengine.google.com may be blocked. Try a different network.

Data appears outdated / the latest months are missing
1. Use the Quick Date preset buttons — they are anchored to each dataset's last confirmed available date.
2. TerraClimate (PDSI, WSI) ends December 2023. JRC Surface Water ends January 2022.
3. MODIS and CHIRPS data are typically 2–4 weeks behind the current date.
4. For the most recent data, use CHIRPS (Precip) or ERA5 (temperature, precipitation reanalysis).

Still need help?

Email b.rahmani@chashma-sar.com; chashmasar.consulting@gmail.com with: (1) the index selected, (2) the date range, (3) your region, (4) a screenshot of the error, and (5) your browser name and version.

Response time: 2–5 working days.

Appendix A — Technical Reference

A.1 Data Collections

Dataset	GEE Collection ID	Resolution	Coverage
MODIS NDVI/EVI	MODIS/061/MOD13A3	1 km	2000–present
MODIS LST	MODIS/061/MOD11A2	1 km	2000–present
MODIS Reflectance	MODIS/061/MOD09A1	500 m	2000–present
MODIS ET	MODIS/061/MOD16A2	500 m	2001–present
MODIS Albedo	MODIS/061/MCD43A3	500 m	2000–present
MODIS Aerosol	MODIS/061/MOD08_M3	1 degree	2000–present
MODIS Snow	MODIS/061/MOD10A1	500 m	2000–present
CHIRPS	UCSB-CHG/CHIRPS/DAILY	~5 km	1981–present
ERA5-Land	ECMWF/ERA5_LAND/MONTHLY_AGGR	~11 km	1950–present
FLDAS NOAH	NASA/FLDAS/NOAH01/C/GL/M/V001	~11 km	1982–2024-01
GRACE	NASA/GRACE/MASS_GRIDS_V04/MASCON_CRI	~300 km	2002–2024-09
TerraClimate	IDAHO_EPSCOR/TERRACLIMATE	~4 km	1958–2023-12
JRC Surface Water	JRC/GSW1_4/MonthlyHistory	30 m	1984–2022-01
Sentinel-5P	COPERNICUS/S5P/OFFL/L3_AER_AI	5.5 km	2018–present
GFS Forecast	NOAA/GFS0P25	~28 km	Rolling 16-day
SRTM DEM	USGS/SRTMGL1_003	~30 m	Static
MERIT Hydro	MERIT/Hydro/v1_0_1	~90 m	Static
WorldPop	WorldPop/GP/100m/pop	100 m	2020
HydroSHEDS	WWF/HydroSHEDS/v1/FreeFlowingRivers	~90 m	Static

A.2 Data Availability & Limitations

- TerraClimate ends December 2023 — PDSI, WSI, and WSDI will not update beyond this date. Use the '1 year' or '3 years' Quick Date preset for these indices.
- GRACE resolution is ~300 km — GWS_Anom block patterns are instrument artefacts, not province boundaries. Use for regional trend analysis only.
- JRC Surface Water ends January 2022 — SWA cannot show recent reservoir changes. Use Quick Date presets to select dates within coverage.
- FLDAS ends January 2024 — SMCI, SoilMoi, SWE, and related indices have this lag. Use '3 months' or '1 year' preset anchored to 2023.
- MODIS collections have a 2–4 week processing lag. All MODIS-based indices are guarded against future dates automatically.
- Static terrain layers are proxy indices — not certified hazard zonation maps. Use for relative comparison only.
- GFS forecast accuracy is best for Days 1–7 and degrades significantly beyond Day 10.
- MODIS 1 km resolution means district-level results should be interpreted with caution for small districts.
- MERIT Hydro (FloodRiverAHP river proximity) is derived from a hydrologically-corrected DEM — not real-time river observations.

- PSC and SWE: elevation mask applied — pixels below 500 m are excluded to prevent false snow detection on desert salt flats (Sistan Basin).

A.3 Citation

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A.4 Professional Services & Contact

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For INGOs / UN	Custom analysis, embedded project budgets, early warning system design
For climate finance	GCF/GEF/LDCF climate baseline chapters, NDC evidence packages
For companies / banks	Environmental risk assessments, custom dashboards, data services

Chashma-Sar is free to access and explore. Structured training, custom deliverables, and professional engagements require a service contract. Contact b.rahmani@chashma-sar.com to discuss your organisation's needs.

Appendix B — Glossary

Technical terms used in the Chashma-Sar platform and this manual.

Term	Definition
AHP	Analytic Hierarchy Process — a multi-criteria decision-making method that assigns peer-reviewed weights to combine multiple indicators into a single composite score.
Albedo	The fraction of solar radiation reflected by a surface. Values range from 0 (perfectly absorbing, e.g. water) to 1 (perfectly reflecting, e.g. fresh snow).
Anomaly	A departure from a reference period average (baseline). Negative anomaly = below normal; positive anomaly = above normal.
AOD	Aerosol Optical Depth — a measure of how much sunlight is blocked by atmospheric particles (dust, smoke). Higher values indicate denser aerosol load.
CHIRPS	Climate Hazards Group InfraRed Precipitation with Station data — a high-resolution (5 km) daily rainfall dataset from UC Santa Barbara, covering 1981–present.
DRR	Disaster Risk Reduction — the systematic effort to reduce disaster losses through prevention, mitigation, and preparedness.
ERA5	ECMWF Reanalysis v5 — a global climate reanalysis dataset produced by the European Centre for Medium-Range Weather Forecasts, covering 1940–present at ~31 km resolution.
ET	Actual Evapotranspiration — the combined water loss from soil evaporation and plant transpiration that actually occurs given available moisture.
EVI	Enhanced Vegetation Index — a satellite vegetation index that improves on NDVI by reducing atmospheric and soil background interference.
FLDAS	Famine Early Warning Systems Network (FEWS NET) Land Data Assimilation System — a NASA soil moisture and hydrology model covering 1982–2024.
GCF	Green Climate Fund — the UN's primary climate finance mechanism for developing countries.
GEE	Google Earth Engine — a cloud computing platform for planetary-scale geospatial analysis using satellite imagery.
GEF	Global Environment Facility — an international partnership that provides grants for environmental projects.
GFS	Global Forecast System — NOAA's operational weather forecast model, running at ~28 km resolution with 16-day forecasts.
GRACE	Gravity Recovery and Climate Experiment — NASA satellite mission that measures groundwater storage changes via gravitational anomalies. ~300 km resolution.
IPC	Integrated Food Security Phase Classification — a global standard for measuring food insecurity severity (Phases 1–5).
JRC	Joint Research Centre — the European Commission's science and knowledge service. The JRC Global Surface Water dataset maps surface water at 30 m resolution since 1984.
LDCF	Least Developed Countries Fund — a GEF-administered fund supporting climate adaptation in the world's poorest countries.
LST	Land Surface Temperature — the temperature of the Earth's surface as measured by satellite thermal sensors (MODIS). Distinct from air temperature.
MERIT Hydro	Merit Hydro — a hydrologically-conditioned Digital Elevation Model (Yamazaki et al. 2019) providing pre-computed upstream drainage area at ~90 m resolution. Used for river channel identification in FloodRiverAHP.
MHDC	Multi-Hazard Drought Composite — planned flagship integrated risk index for v2.0 of the platform. Currently under scientific refinement.

Term	Definition
MODIS	Moderate Resolution Imaging Spectroradiometer — NASA sensors on Terra and Aqua satellites providing daily global coverage at 250 m–1 km resolution since 2000.
NDDI	Normalised Difference Drought Index = (NDVI − NDWI)/(NDVI + NDWI). Combines vegetation health and moisture to detect land degradation.
NDVI	Normalised Difference Vegetation Index = (NIR − Red)/(NIR + Red). Values range −1 to +1; > 0.3 typically indicates actively growing vegetation.
NDWI	Normalised Difference Water Index — measures vegetation water content or open water extent depending on the band combination used.
PCI	Precipitation Condition Index — standardises current rainfall between the historical minimum (0) and maximum (100).
PDSI	Palmer Drought Severity Index — a long-term drought index using temperature and precipitation to estimate soil moisture balance. < −2.0 = moderate drought.
PET	Potential Evapotranspiration — the amount of water that would evaporate/transpire if water supply were unlimited. Indicator of atmospheric water demand.
PNG	Portable Network Graphics — a lossless image file format used for map exports.
PSC	Percent Snow Cover — the fraction of a pixel covered by snow, derived from MODIS NDSI (Normalised Difference Snow Index). Elevation-masked above 500 m.
QGIS	Quantum GIS — a free, open-source Geographic Information System.
RSPI	Runoff SPI — Standardised Precipitation Index applied to ERA5-Land surface runoff as a proxy for streamflow drought.
SMCI	Soil Moisture Condition Index — standardises current soil moisture between historical minimum (0) and maximum (100).
SPI	Standardised Precipitation Index — a probability-based drought index comparing current precipitation to the historical distribution (McKee et al., 1993). SPI −1 = dry; −2 = extreme drought.
SRTM	Shuttle Radar Topography Mission — NASA Digital Elevation Model at ~30 m resolution, collected in 2000.
SWA	Surface Water Anomaly — change in surface water extent relative to a reference period, based on JRC monthly water data. Data ends January 2022.
SWE	Snow Water Equivalent — the depth of liquid water that would result from melting a column of snowpack. Key indicator for spring streamflow forecasting. Measures snowpack only — not reservoir storage.
TCI	Temperature Condition Index — measures crop heat stress relative to the seasonal historical range of Land Surface Temperature.
VCI	Vegetation Condition Index — compares current NDVI to seasonal historical minimum and maximum (0 = worst ever, 100 = best ever).
VHI	Vegetation Health Index = 0.5×VCI + 0.5×TCI. Combines vegetation condition and thermal stress. < 40 = drought; < 20 = extreme drought.
WASH	Water, Sanitation and Hygiene — a humanitarian sector concerned with access to clean water and sanitation services.
WSI	Water Stress Index = 1 − ET/PET. Values near 1 indicate severe water stress; values near 0 indicate no stress.
WSDI	Water Stress & Drought Index — AHP composite: WSI (0.35) + SMCI (0.25) + PDSI (0.25) + RSPI (0.15).