



The FEWS NET Land Data Assimilation System (FLDAS): Earth System Modeling to Support Famine Early Warning

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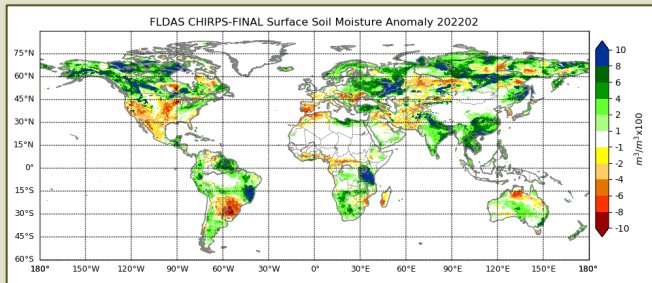
⁷ ASRC Federal Data Solutions, Sioux Falls, SD

⁸ University of California Santa Barbara Climate Hazards Center, Santa Barbara, CA

Frontiers in Hydrology Meeting 2022

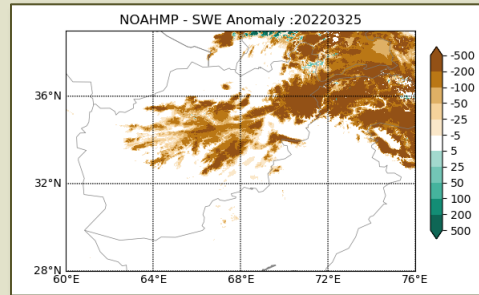
FLDAS Land Surface Modeling and Forecasting Products

FLDAS-Global



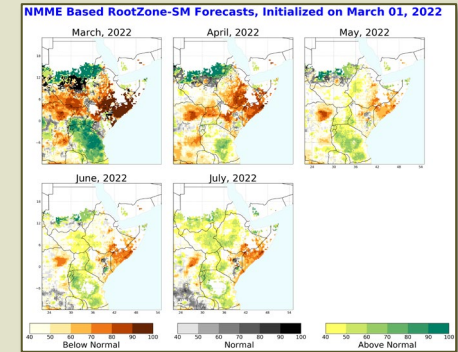
0.1-degree, monthly Noah3.6 global runs
(surface soil moisture anomalies shown)

FLDAS-Central Asia



High resolution (0.01-degree),
daily Noah-MP runs over Central
Asia (SWE anomalies shown)

FLDAS-Forecast



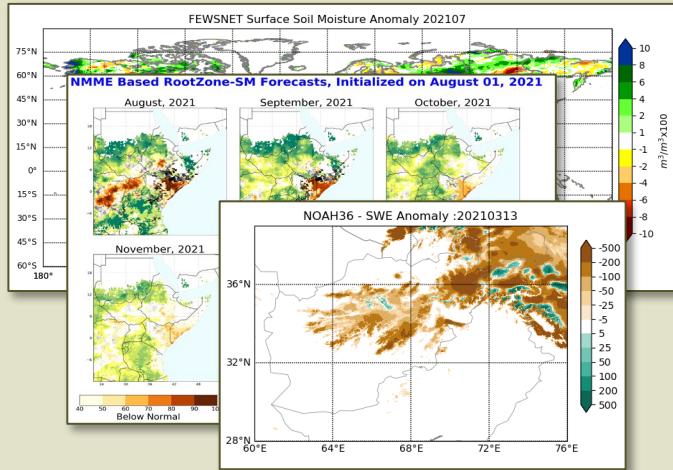
0.25-degree, 5-month forecasts over
Africa and the Middle East (root
zone soil moisture shown)

<https://ldas.gsfc.nasa.gov/fldas>

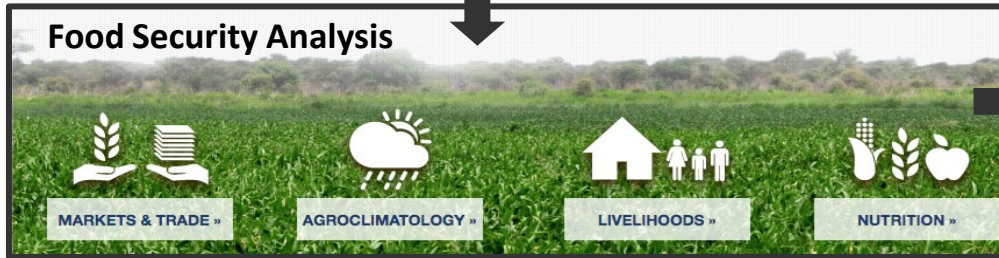
McNally, A., et al., 2017, *A land data assimilation system for sub-Saharan Africa food and water security applications*. Sci Data 4, 170012

FLDAS Supports Food Security Early Warning

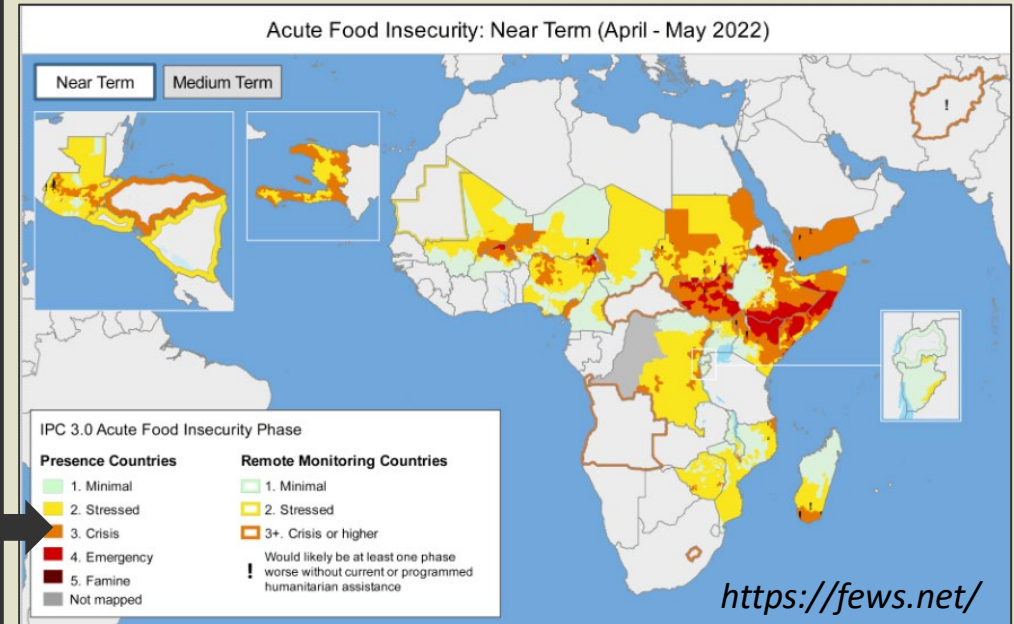
FLDAS Land Surface Modeling Products and S2S Forecasts



Food Security Analysis



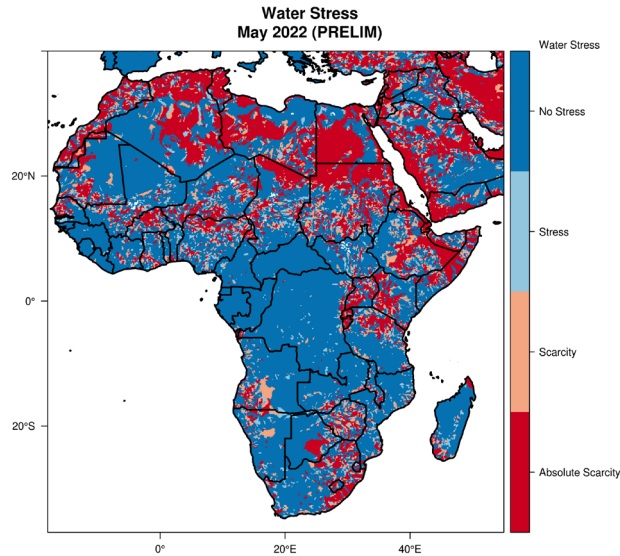
FEWS NET Outlooks, Alerts, and IPC Acute Food Insecurity Phase Classification



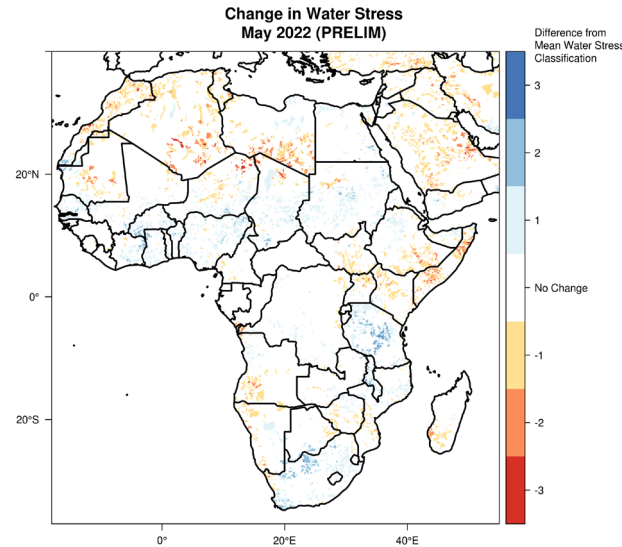
<https://fews.net/>



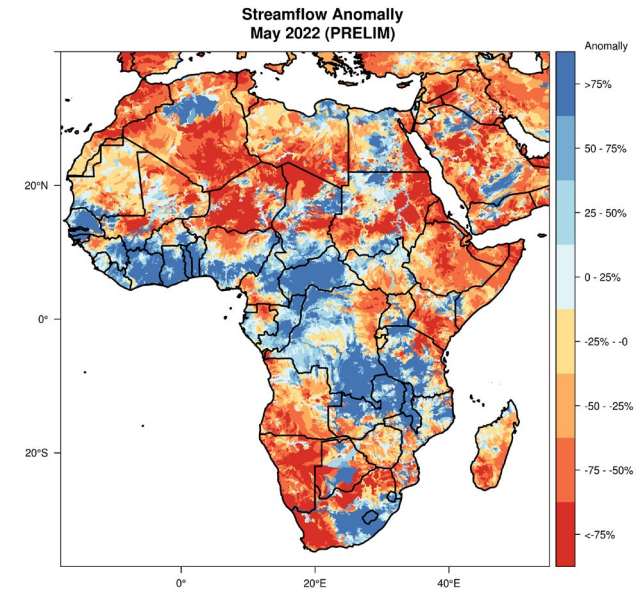
Water Stress



Water Stress maps highlight locations experiencing water stress based on current runoff and 2015 population.



Water Stress Anomaly maps highlight departure from average (1982-2017).



Streamflow Anomaly maps highlight water supply departures from average conditions (1982-2017).

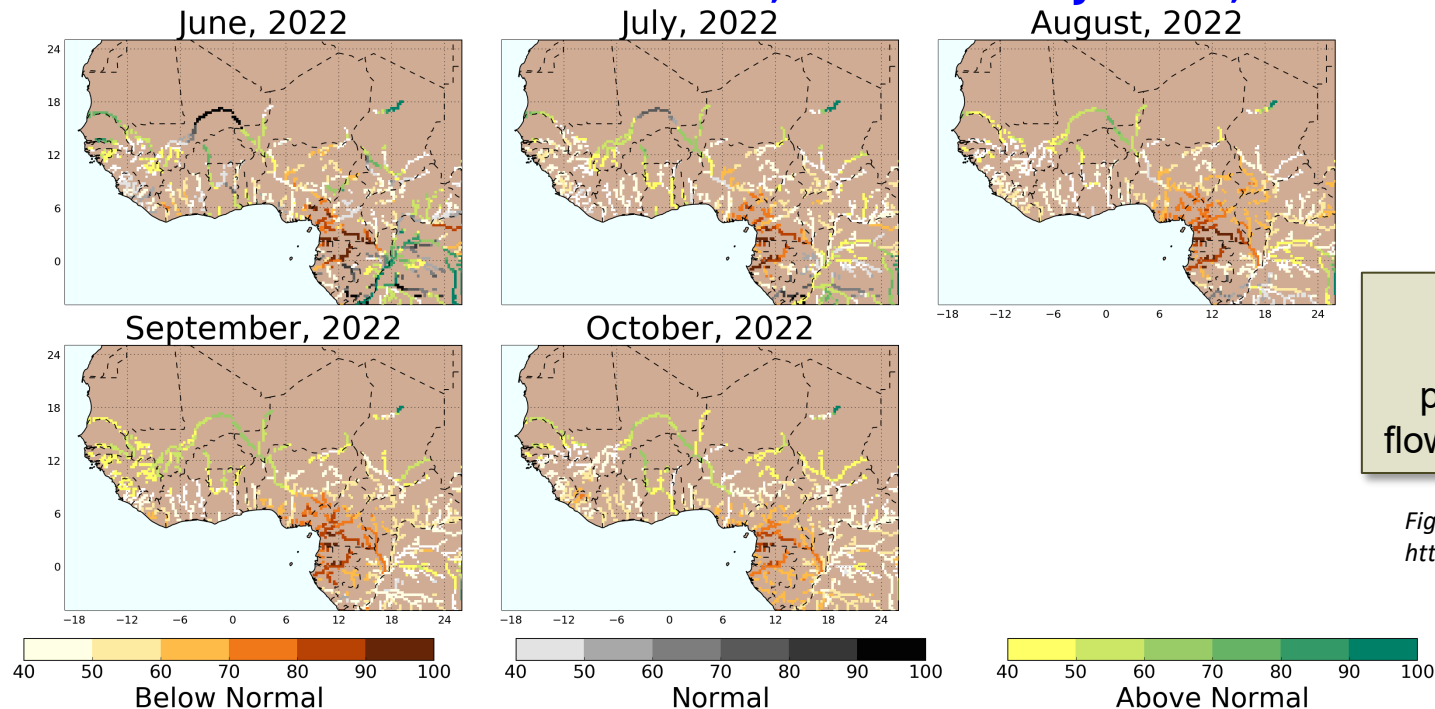
Figures from: <https://ldas.gsfc.nasa.gov/fldas/models/global>

McNally, A., et al., 2019, *Acute Water-Scarcity Monitoring for Africa*. *Water* 11, no. 10



Seasonal Streamflow Forecasts

NMME Based Streamflow Forecasts, Initialized on June 01, 2022

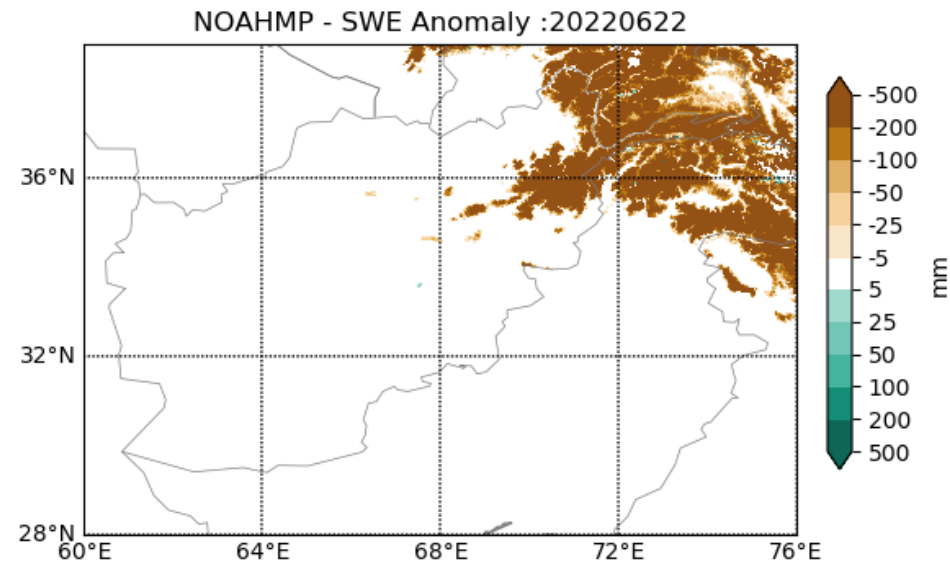
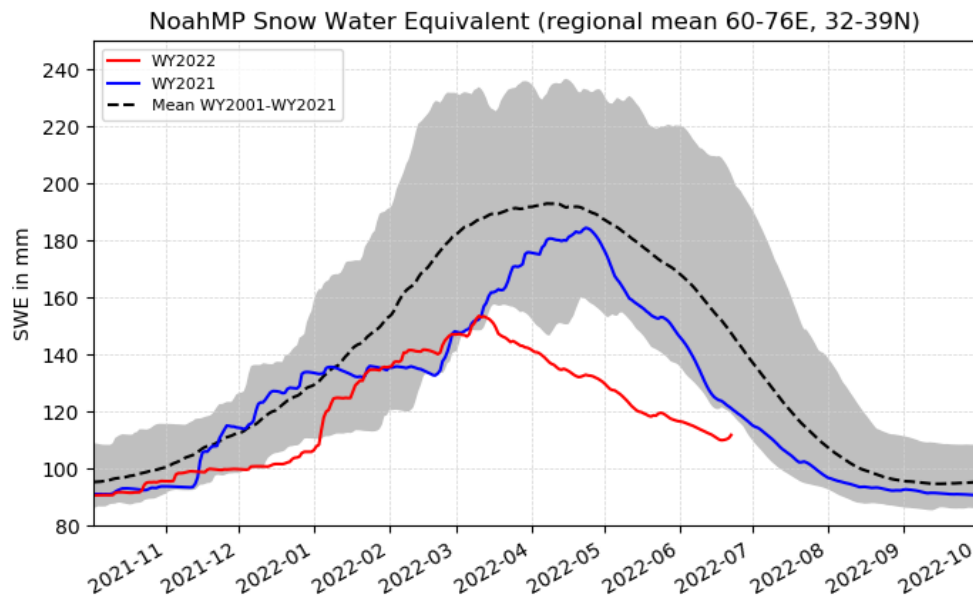


Arsenault et al., 2020, *The NASA Hydrological Forecast System for Food and Water Security Applications*, Bulletin of the American Meteorological Society, 101(7) .

Hazra, A. et al., 2022, *NASA's NMME-based S2S hydrologic forecast system for food insecurity early warning in southern Africa*. In review for *Journal of Hydrology*.



Afghanistan Snowpack Monitoring



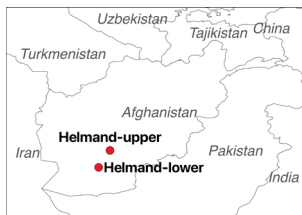
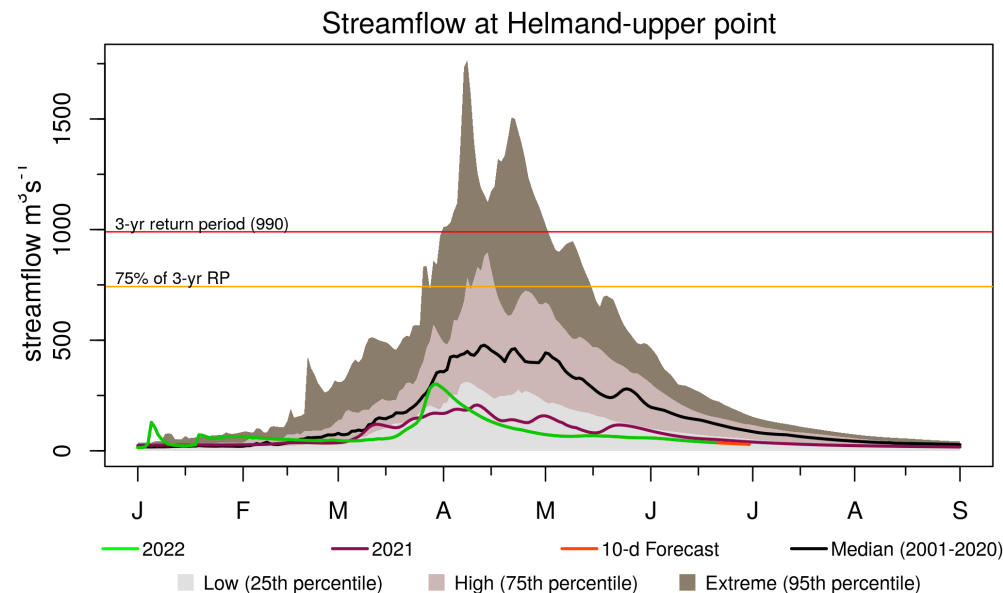
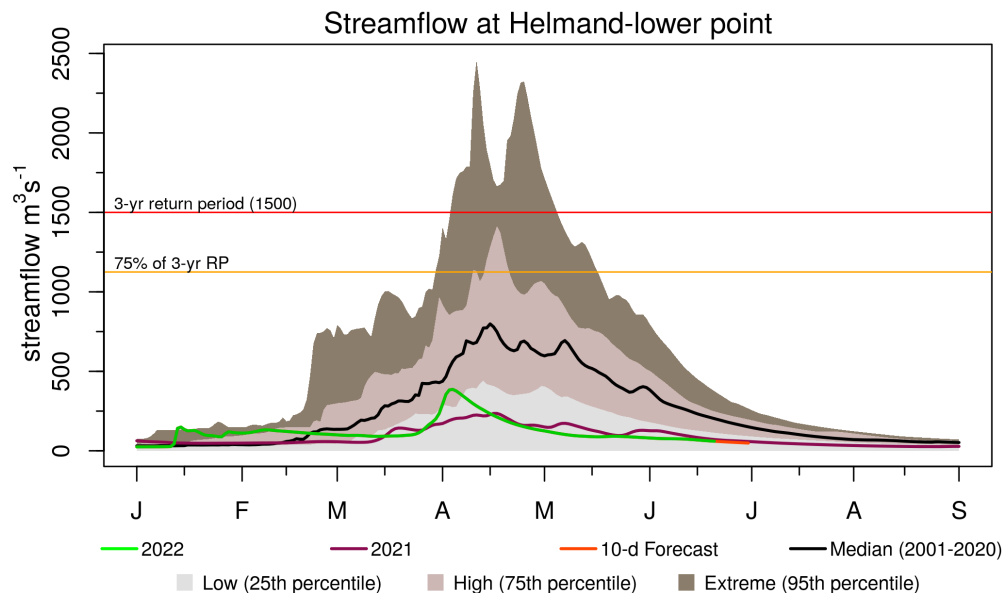
Snow water equivalent (SWE) from the FLDAS-Central Asia model is used to monitor water availability over Afghanistan.

Figures from: <https://ldas.gsfc.nasa.gov/fldas/models/central-asia>

McNally, A., et al., 2021, *A Central Asia Hydrologic Monitoring Dataset for Food and Water Security Applications in Afghanistan*. Earth System Science Data Discussions



Afghanistan Streamflow Monitoring and Forecasts



Streamflow from the FLDAS-Central Asia model identifies Afghanistan rivers with high and low flow, flood potential, and water availability for irrigation and hydroelectric power.

Links and Contact Information

Latest model products:

- FLDAS-Global: <https://ldas.gsfc.nasa.gov/fldas/models/global>
- FLDAS-Central Asia: <https://ldas.gsfc.nasa.gov/fldas/models/central-asia>
- FLDAS-Forecast: <https://ldas.gsfc.nasa.gov/fldas/models/forecast>

FEWS NET Land Data Assimilation System: <https://ldas.gsfc.nasa.gov/fldas>

Famine Early Warning Systems Network: <https://fews.net/>

NASA Land Information System Software Suite: <https://lis.gsfc.nasa.gov/>

NASA Center for Climate Simulation High Performance Computing Resources:
<https://www.nccs.nasa.gov/>

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