

# Application of Space Base Technology for Disaster Risk Management in Asia and Africa

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International Water Management Institute (IWMI)



# Outline

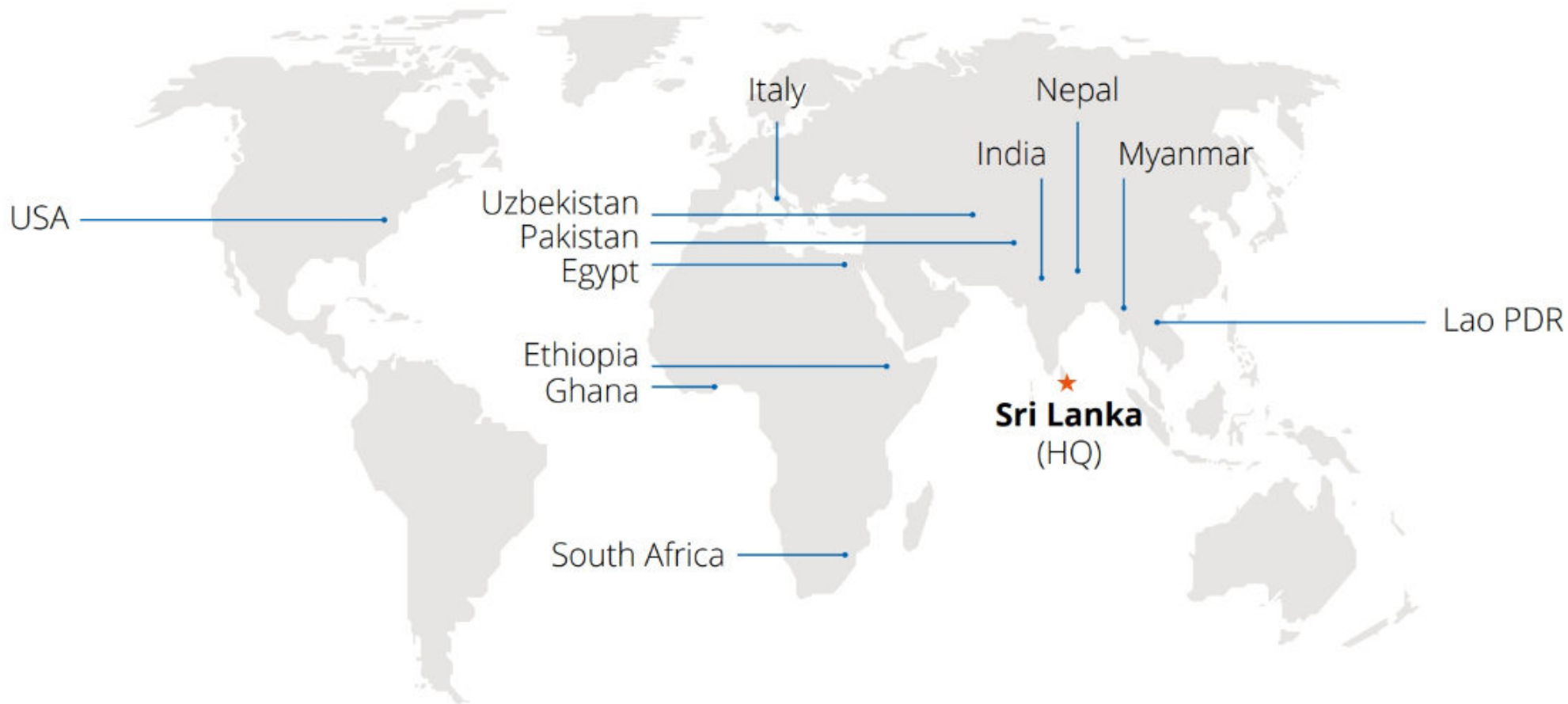
**South Asia Drought Monitoring System (SADMS)**

**Earth Observation for Agriculture Risk Management (EO4ARM)**

**IWMI's Emergency Response Mapping**

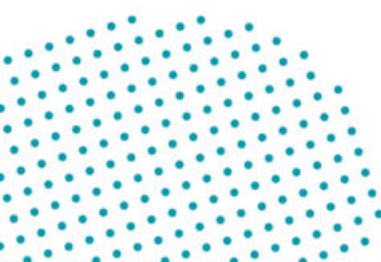
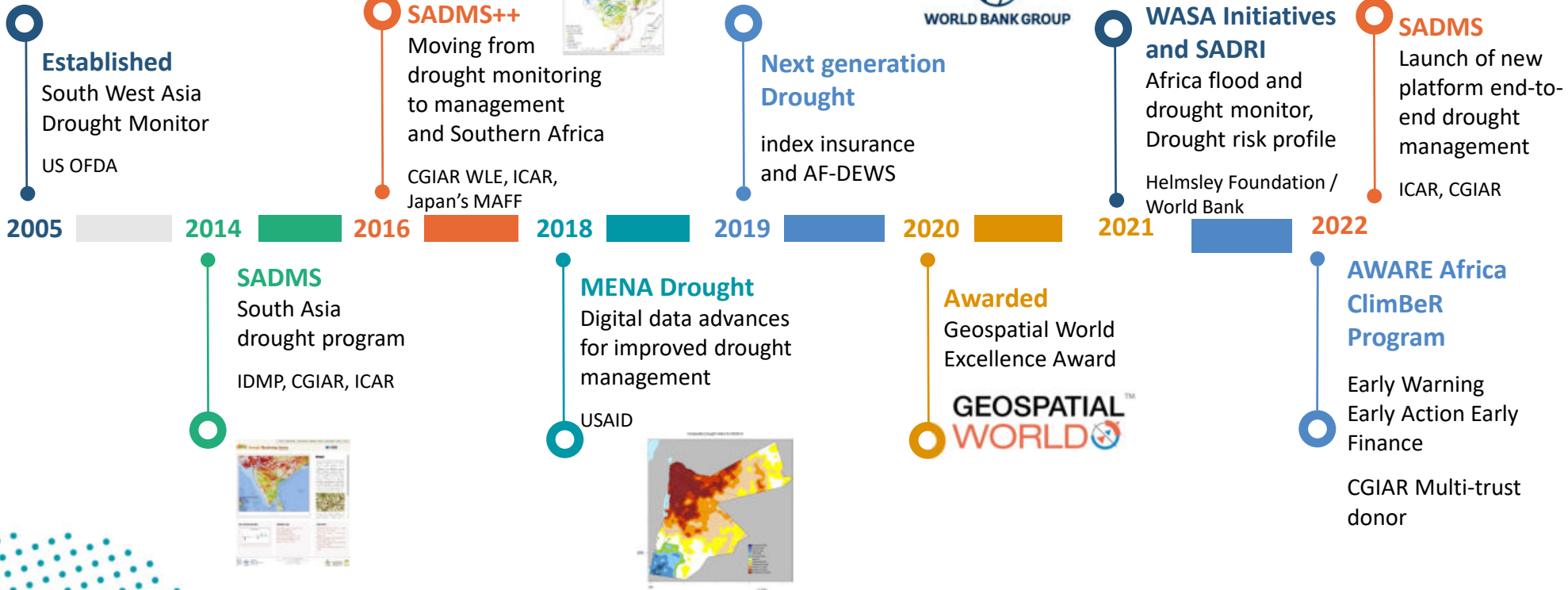
**Spatial Integration of Multi-hazard Records in Africa**





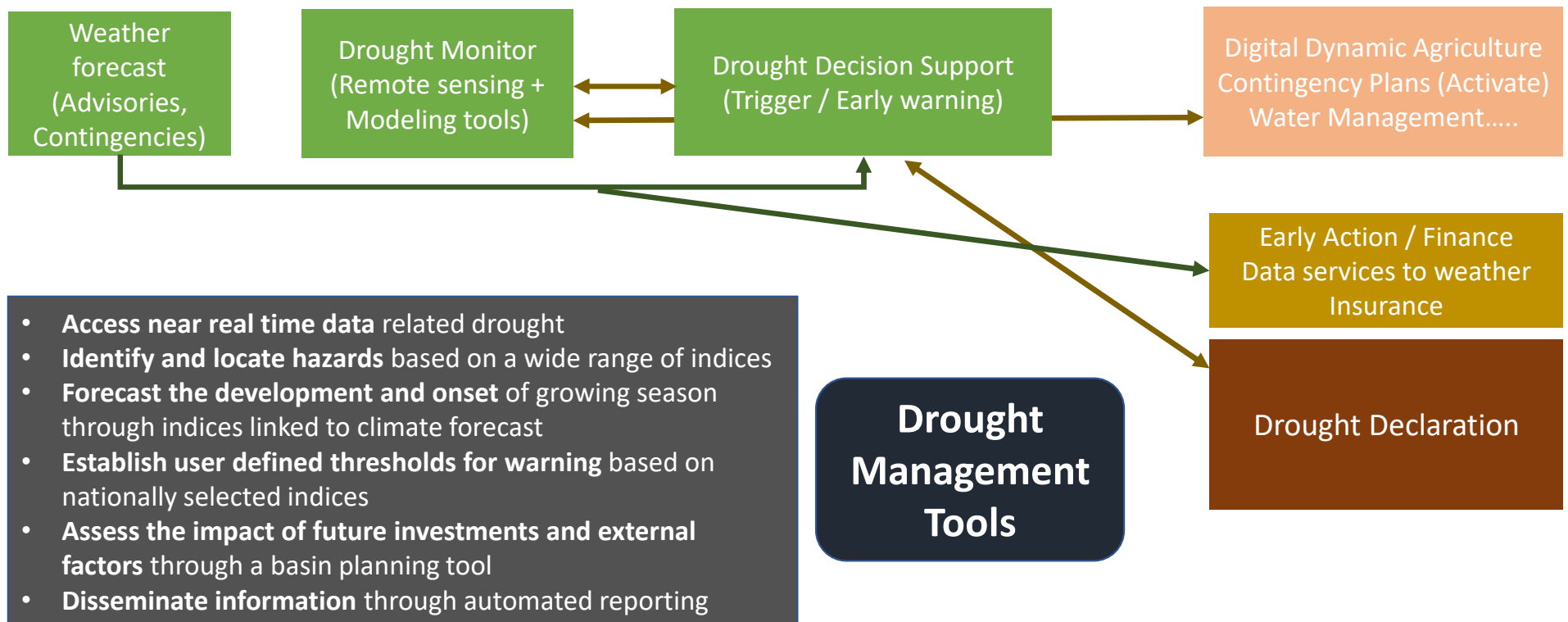
# South Asia Drought Monitoring System (SADMS)

# IWMI's Drought Resilience Initiatives



# Solution Platform “Integrated Drought Risk Management”

## Next generation of the SADMS Platform



# SADMS Components



# SADMS

**South Asia Drought  
Monitoring System**



Observation  
and Monitoring



Prediction and  
Forecasting



Planning and  
Preparedness



Communication  
and Outreach

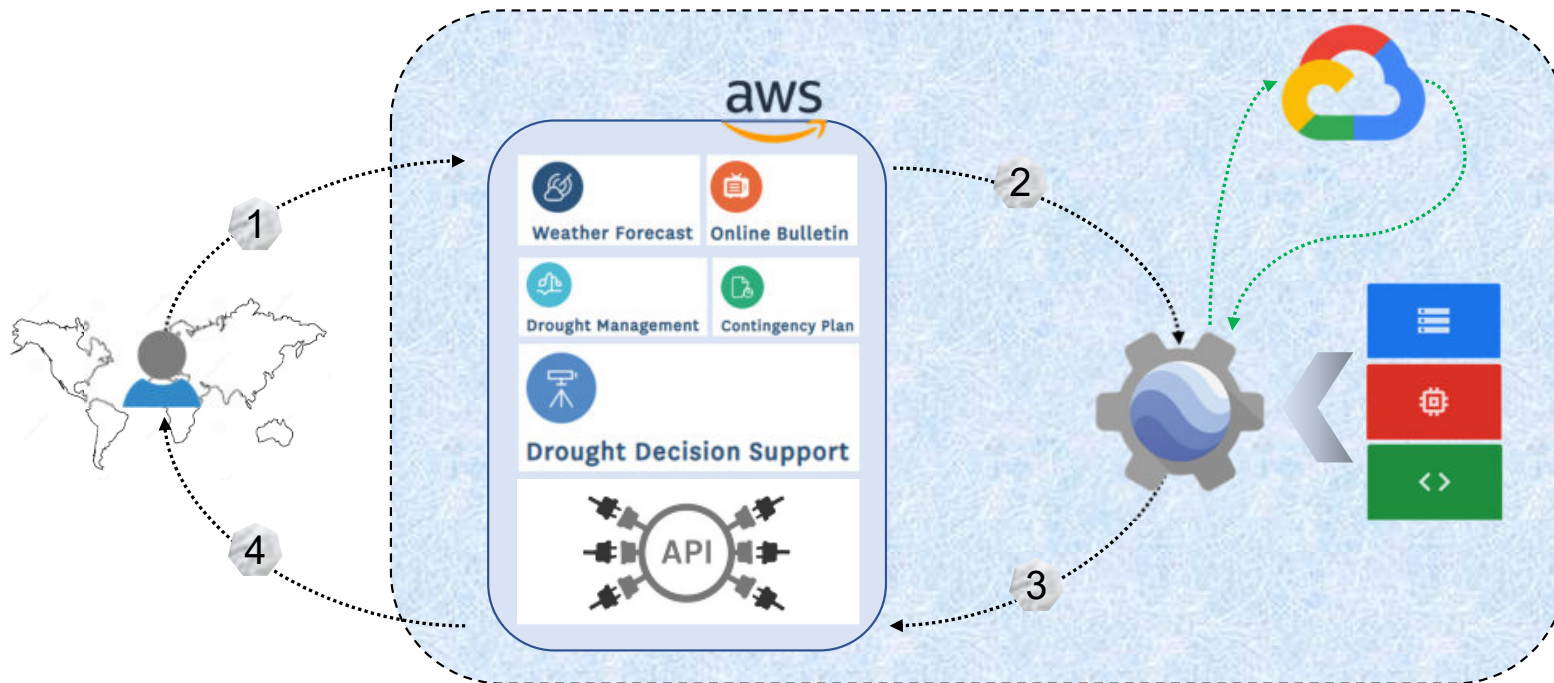


De-Risk and  
Safety nets



# SADMS workflow

*Integration different data, technology and systems*




Other Technologies blended inside the system



- 1** Index / data request with parameters
- 2** GEE API to run the index specific analyses
- 3** Run the analysis and return JSON
- 4** Return the response to client



## Overview of SADMS Modules






**South Asia Drought Monitoring System**


Sign In

Development Version




### Weather Forecast

The Tool offers seasonal to short-term weather forecast to guide users for drought early warning and management measures.



### Drought Management

The tool allows the users to monitor past and current drought frequency and severity and to determine the drought conditions to promote proactive drought management measures.




### Drought Decision Support

Drought decision support tool offers triggers using pre-defined conditions for drought alert to determine drought conditions and support in contingency plan.




### Contingency Plan

This tool summarizes the actions to be measured for different stages of drought using the monitoring system to mitigate drought risk.



### Newsfeed

This space is to learn various information related to drought, water scarcity and food security from IWMI and relevant institutions on the news contents, publications, and various other resource materials.




### User Guide

User Guide provides opportunity for users step wise procedure on the various knowledge products of SADMS for quick access and information sharing.



### Public API

The Application Programming Interface (API) offers the users to retrieve various indices developed in SADMS platform to be used in other platforms through REST framework to promote integrated solutions.



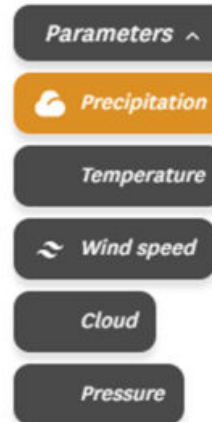
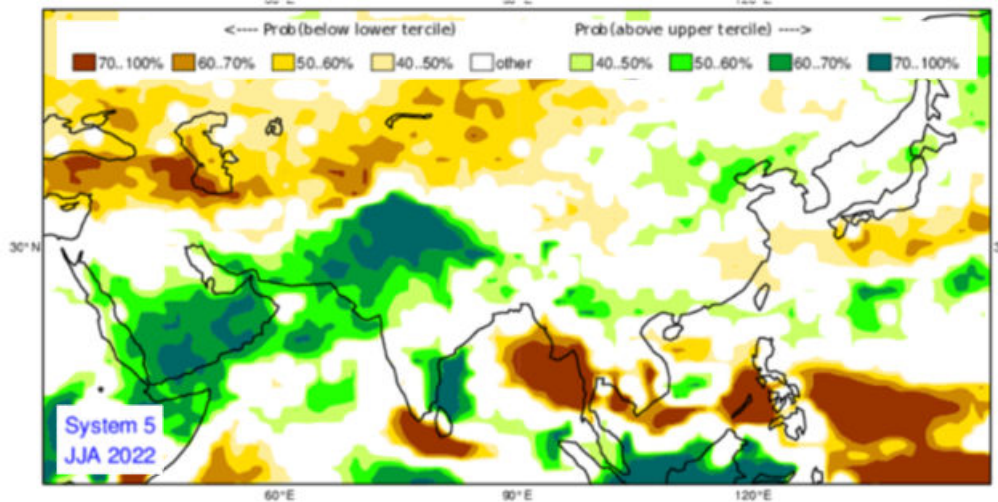
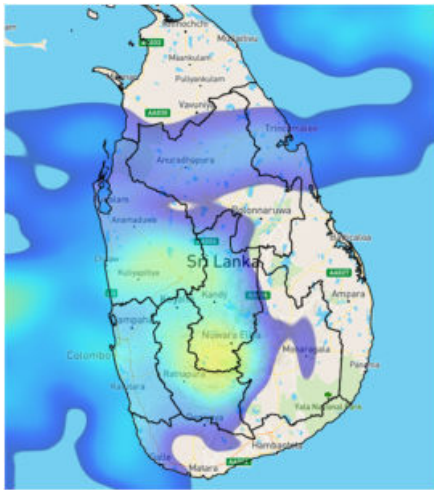
### Online Bulletin

This space is to learn various information related to drought, water scarcity and food security from IWMI and relevant institutions on the news contents, publications, and various other resource materials.

<https://dmsdemo.iwmi.org/home>

# Weather Services

*Offers short-term to seasonal weather forecasts as well as historical weather data to guide users for drought early warning and management measures.*



## Usefulness

The tool provides the users with a flexibility to take an in-depth view of weather across the provinces in the country using different data sources.

# Drought Management

**IWM** International Water Management Institute

**SADMS** South Asia Drought Monitoring System

## Drought Management Tool

Sign In Development Version

Home Weather Forecast **Drought Management** Contingency Plan Public API More Disclaimer

Hide Bar

**Select Module**  
Drought Monitor

**Select Region**  
India  
Select State

**Select Indicators**  
Mandatory  
Drought  
SPI (GPM)  
SPI (CHIRPS)  
Dry Spell

### Drought Management

The tool allows the users to monitor past and current drought frequency and severity and to determine the drought conditions to promote proactive drought management measures. Drought decision support tool offers triggers using pre-defined conditions for drought alert to determine drought conditions and support in contingency plan.

[Start using Drought Monitoring >](#)

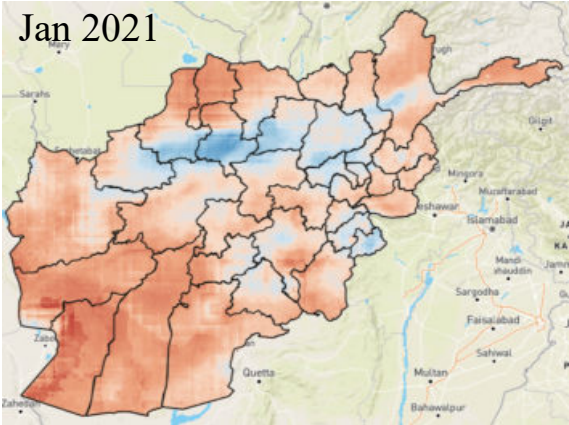
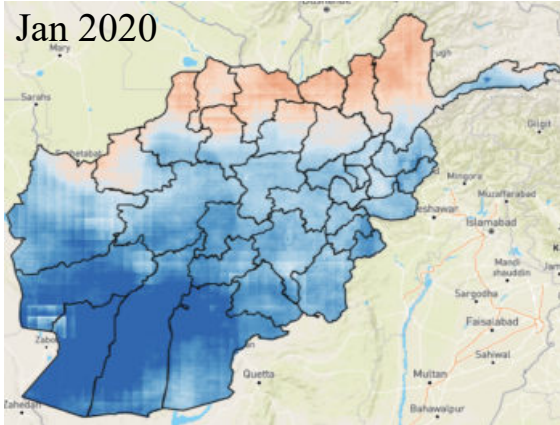
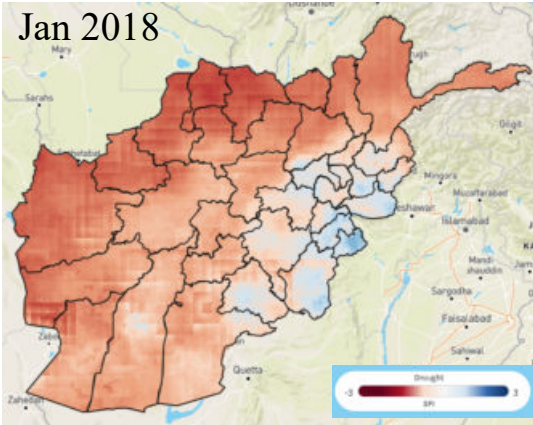
Drought Prediction  
Drought Monitor  
DDS  
Other Indices



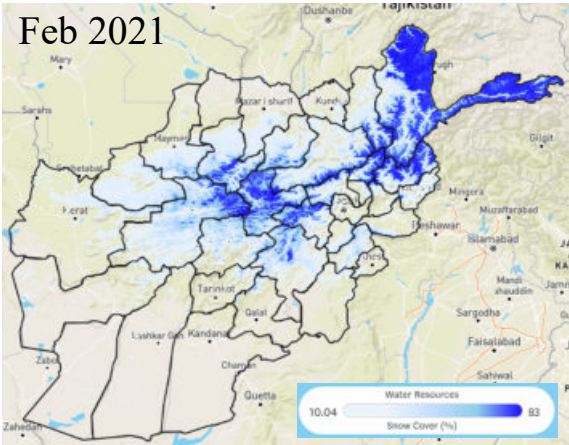
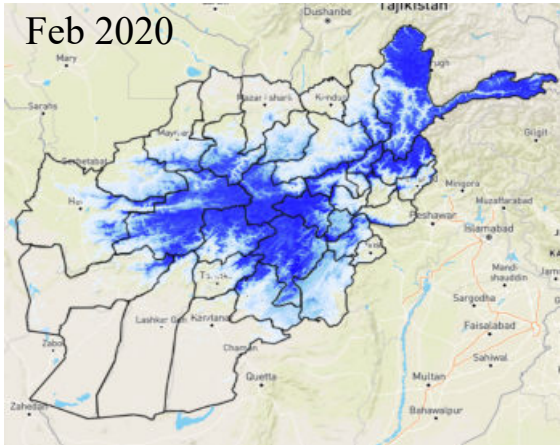
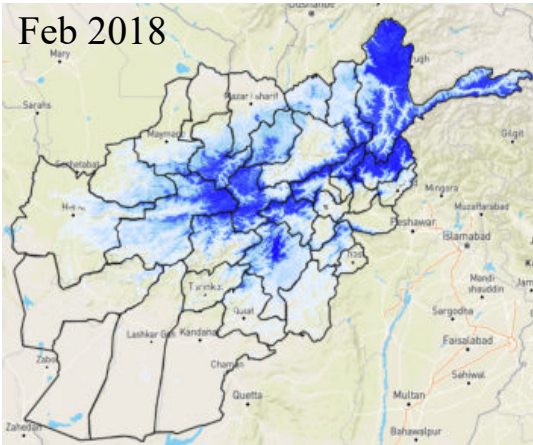
# Drought Monitor – Case study Afghanistan



**SPI (CHIRPS) - Standardized Precipitation Index**



**Extent of Snow Cover**



Source: SADMS Portal

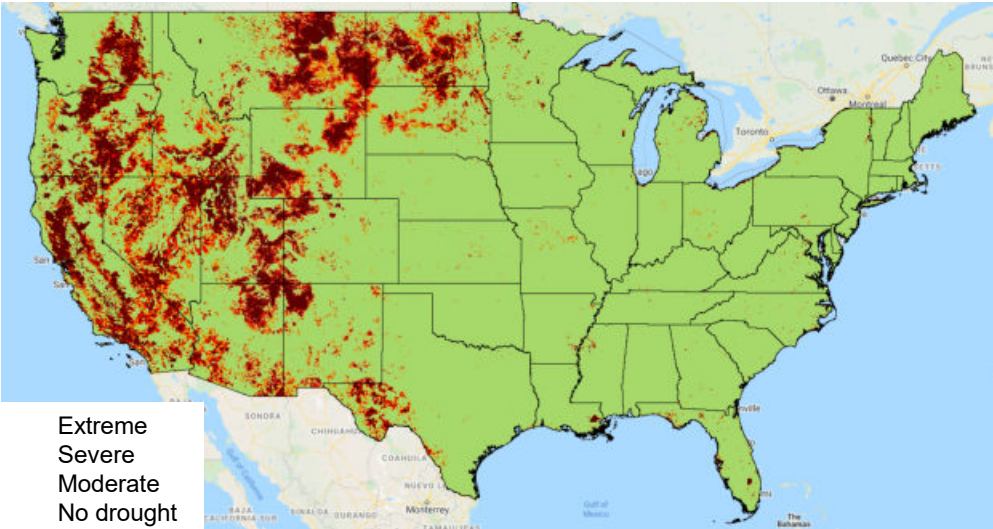


# 'Mega-drought' persists in Western U.S.



IWMI's Drought Monitor

U.S. Drought Monitor



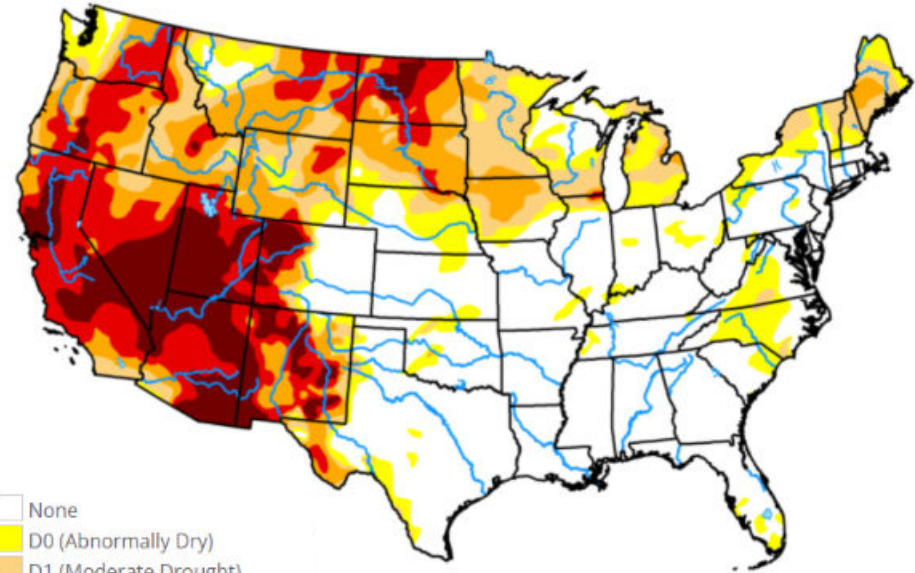
Integrated Drought Severity Index (IDSI)

Map Produced: Surajit Ghosh/IWMI

*Moderate to exceptional drought covers 38.5% of the United States including Puerto Rico*



*affecting over 137 million people across the United States including Puerto Rico—about 44.1% of the population.*



- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

<https://droughtmonitor.unl.edu/Maps/ComparisonSlider.aspx>

# Earth Observation Data for Agricultural Risk Management



Home



Weather &amp; Water



Crop Health Monitor



Farm Tracker



Risk Analytics



User Guide

Earth observation for Agricultural Risk Management (EO4ARM) platform is to support various institutions including insurance companies to strengthen agricultural insurance program to enhance agricultural resilience among smallholder farmers in Sri Lanka. The platform provides a complete stack of solutions ranging from weather forecast, monitoring of floods and drought, crop health status and integrate farm-level updates for assessing climate risks among agencies for timely compensation and mitigation measures. The platform is developed using cloud-based spatial analytical framework to have seamless access to near real-time publicly available satellite data namely NASA MODIS, ESA Sentinel 1 & 2 for fine-scale agricultural insurance monitoring. The platform has capacity to access historical data to assist various partners to promote new insurance products, disaster preparedness program including climate resilience strategies.

## Weather & Water

This Tool offers short-term to seasonal weather forecasts as well as historical weather data to guide users for drought early warning and management measures. It helps to analyze the current and future weather using different data sources. It provides the users with a flexibility to take an in-depth view of weather across the provinces in the country.

[Explore](#)

# Earth Observation for Agriculture Risk Management (EO4ARM)

## Climate & Weather

### Weather Forecast

- Rainfall
- Temperature

### Weather monitoring (current and past)

- Rainfall
- No of rainy days
- Dry spell
- Temperature
- Humidity, etc.

## Crop Health Monitor

### Vegetation

- NDVI, EVI, VCI
- Soil Moisture
- GPP
- Composite Crop Health Index

### Water resources

- Reservoir extent
- Discharge forecast
- Flooding

## Risk Analytics

### Risk indicators

- SPI
- IDSJ



Farm tracker





# Farm Tracker

## *Products and usage*

*To digitize the farm or upload existing boundary files. Users can also add several attributes to the farm (for example- farm type, water resources).*

**Create Project**

Title

Description

Province

District

DSD

GND

**Farm Details**

Location  Farm(s)

Province: North Central

District: Anuradhapura

DSD: Galenbidunuwewa

GND: 21 Colony East

Name

Description

Upload image

latitude: 8.00

longitude: 80.00



## Usefulness

*Farm-level details in the EO4AI platform to track the crop health status including the crop production (biomass). Individual users can visualize the portfolio with specific access management system.*



# Risk Analytics

## Products and usage

### Objectives

Various indicators such as rainfall deficit, drought, water scarcity and from IWMI and relevant institutions to understand the risk profile of a farmland.



### Usefulness

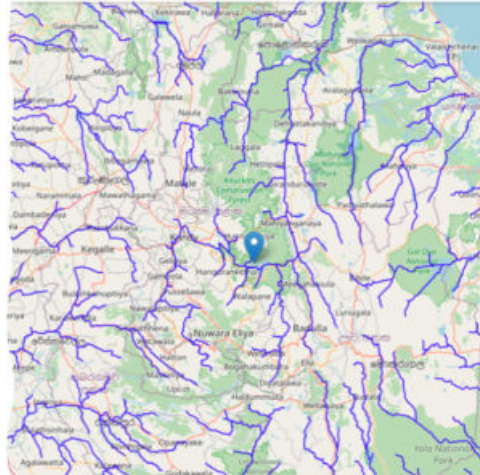
This tool helps to disseminate drought/flood risk-related information to guide various users for timely early action and decision-making process..



## Discharge forecast for early warning

*Forecasted flow, historical flow*

- *GeoGlows for real-time flood protection to support partners for flood preparedness and insurance claim monitoring.*
- *The model is run in a REST environment for accessing the model results in an interactive way.*
- *The tool is easy to use and is easily accessible.*



# **IWMI's Emergency Response Mapping**