

# Regional and National Drought Monitoring

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## Introduction

Drought is a worldwide threat to food and water security and is a constant presence in the Middle East and North Africa (MENA) region. Current droughts reveal the gaps and limitations in drought management in the region. This need is further heightened by any analysis of future climate conditions in the region.

## Objective

The Regional Drought Management System (RDMS) for the Middle East and North Africa (MENA RDMS) will focus on drought risk management to deliver new insights, management plans and drought resilience strategies at the national and local levels that will reduce drought impacts.

- Land Surface Temperature anomaly (LST) from MODIS satellite at 5 km resolution
- Rooting Zone soil moisture anomaly (SM) from the Land Information System LIS of NASA-GSFC at 5 km,
- the Standardized Precipitation Index (SPI) from CHIRPS UCSB at 5km
- The NDVI anomaly from MODIS at 5 km resolution.

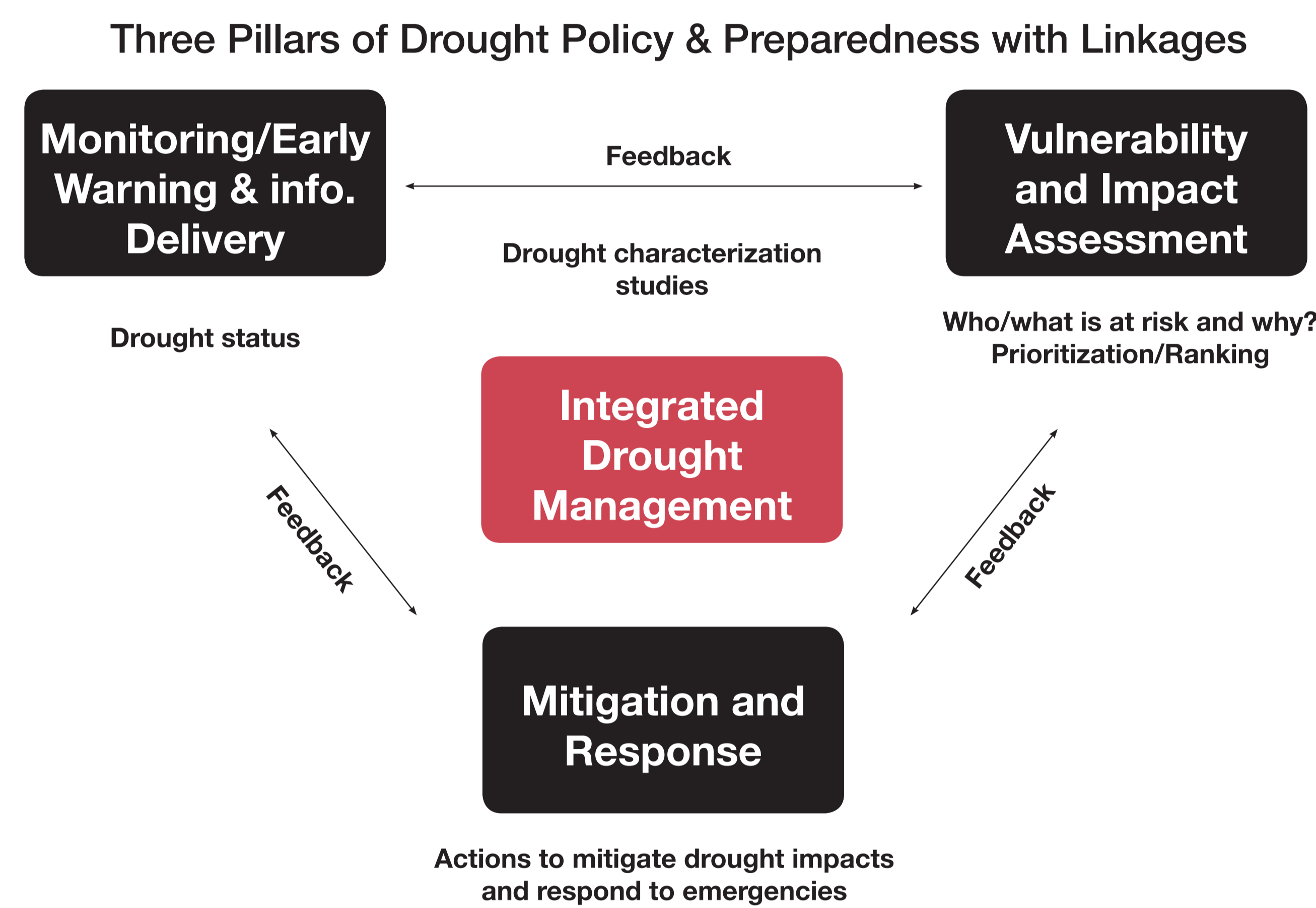
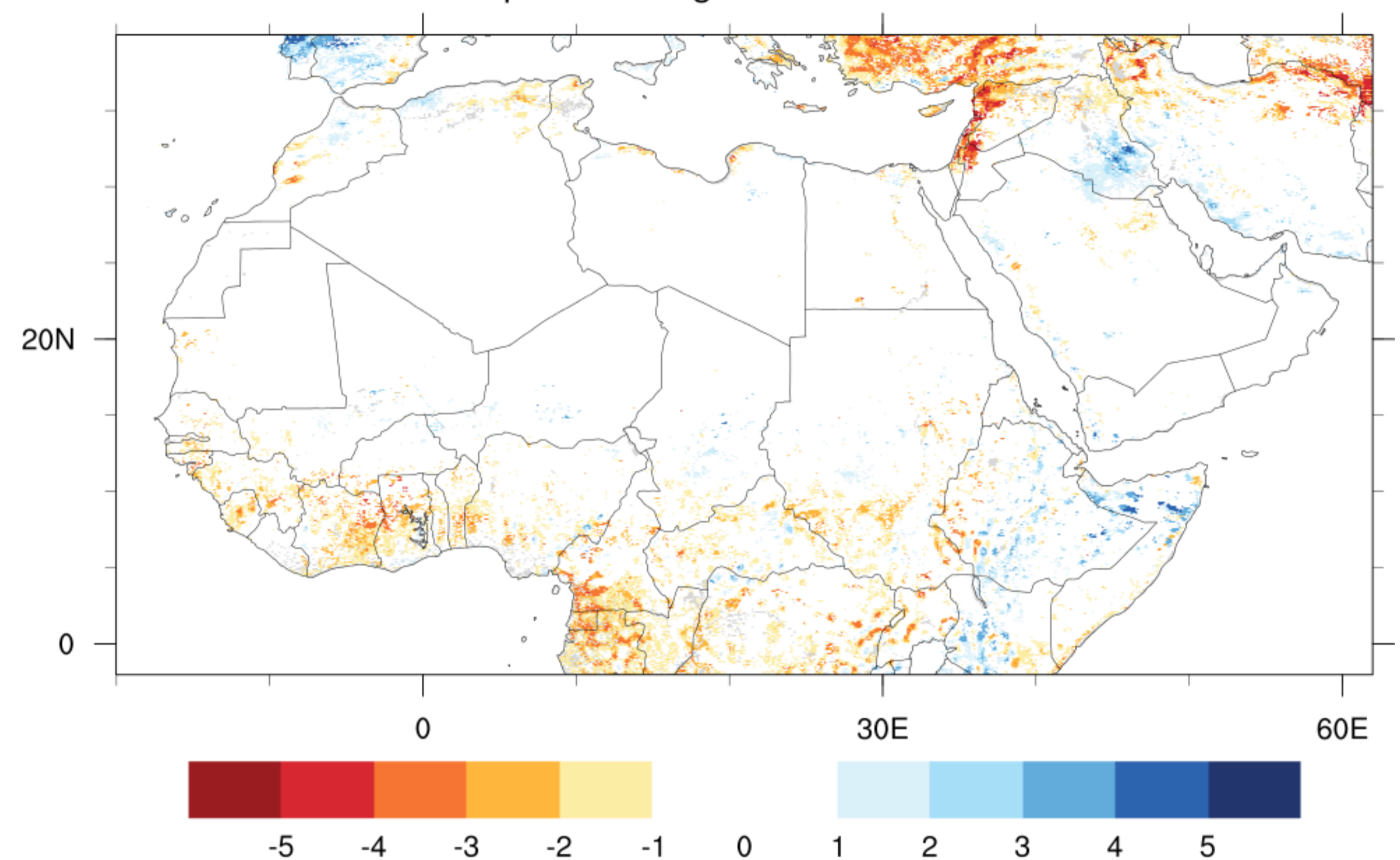
For each anomaly we calculate the percentiles and we rank them as follow:

- 0 - 2 % Exceptional drought
- 2 - 5 % Extreme drought
- 5 - 10 % Severe drought
- 10 - 20 % Moderate drought
- 20 - 30 % Abnormal drought

The Composite Drought Index CDI is a weighting regression of the 4 inputs. In our case we chosen the following weighting:

$$CDI = 0.30 * SPI + 0.3 * SM + 0.2 * LST + 0.2 * NDVI$$

Composite Drought Index for Feb 2014



## Material and Method

The work is undertaken for two geographic scales:

- Regional: Middle East and North Africa
- National: Four key countries and serves as a proof-of-concept in this proposal: Jordan, Lebanon, Morocco and Tunisia.

First, we are examining with partners organizations the existing in-country drought monitoring systems in terms of the definitions of drought used, impacts, data sources, modeling, distribution of data and perceived effectiveness and evidence of usage.

In a second stage we are using ground observations, remote sensing and modeled climate reanalysis to generate a baseline of 'normal' conditions to characterize the drought anomalies (Figure 1). Discussions with in-country partner organizations and international experience for each country and sub-region, will define the drought classes (i.e, moderate, severe, extreme, and exceptional drought).

The Composite Drought Index (CDI) is based on the anomalies of the following data:

## Results

The RDMS system is pre-operational for the regional level. A monthly map of 5km resolution is generated during the 3rd week of the following month presenting the CDI. Following is the case of the severe drought of Southern Levant in February 2014.

## Conclusions

ICBA work on drought monitoring is serving the region in the following:

- Establishing a regional drought monitoring and early warning system and associated information delivery systems
- Providing assessment of drought vulnerabilities and impacts
- Developing actions and measures to mitigate and respond to drought impacts

