Drought occurrence Assessment Using AFDM online tool. A case of Ethiopia.

Group_3
@ECA

Introduction and Justification

- Throughout the course of human history, drought has been a problem affecting our welfare and food security.

- Of all human activities, agriculture was perhaps the first sector for which humans recognized the strong relationships between crops and weather.

- Short-term rainfall deficits prompted early humans to find alternative food crops.

- However, even a single year with a severe drought during the rainy season resulted in crop failures, which most likely led to humans migrating to other areas.

- Therefore, in early human history, even limited droughts had large impacts.

- Horn of Africa has frequently affected by drought which resulted failure in crop production, loss of life (livestock and human).

- Ethiopia is not exception to this recurring event.

However, by understanding past events, the region particularly Ethiopia has a limitation in early monitoring and warning activities.

These might be due to lack of expertise and availability of data (remote sensing and in-situ).

However, there are varieties of data sources that can a fill a gap. Accessing, utilizing, analyzing and interpreting might also be another challenge…

- This group work address;

- how to utilize the online platform to access and analyze drought indices (a case of Ethiopia)

- Associate online drought indices with drought events observed in the country.

- Assess the temporal drought occurrence with Indices

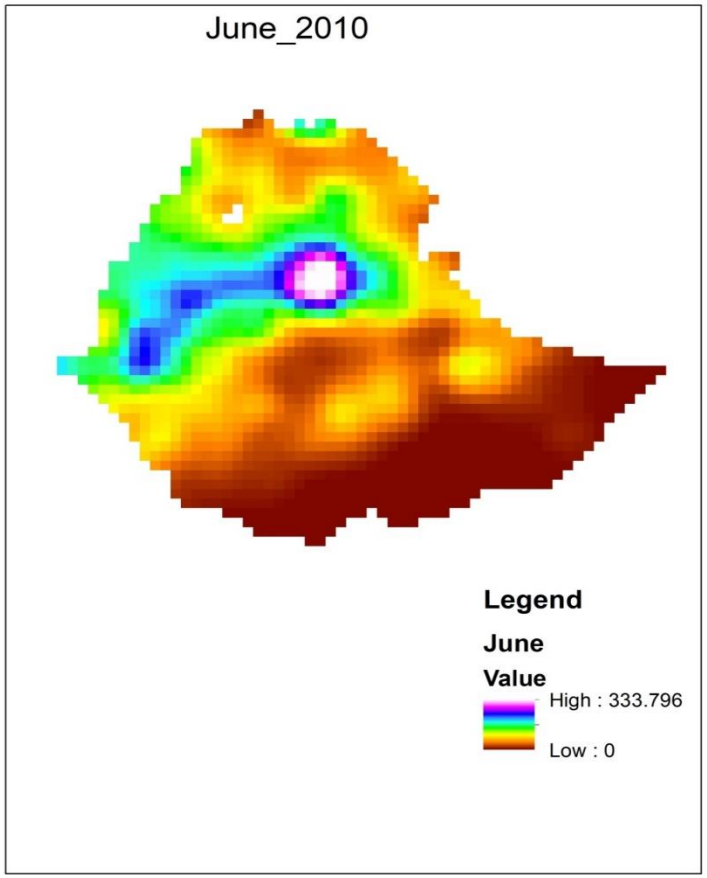
Methods and materials used for this group work

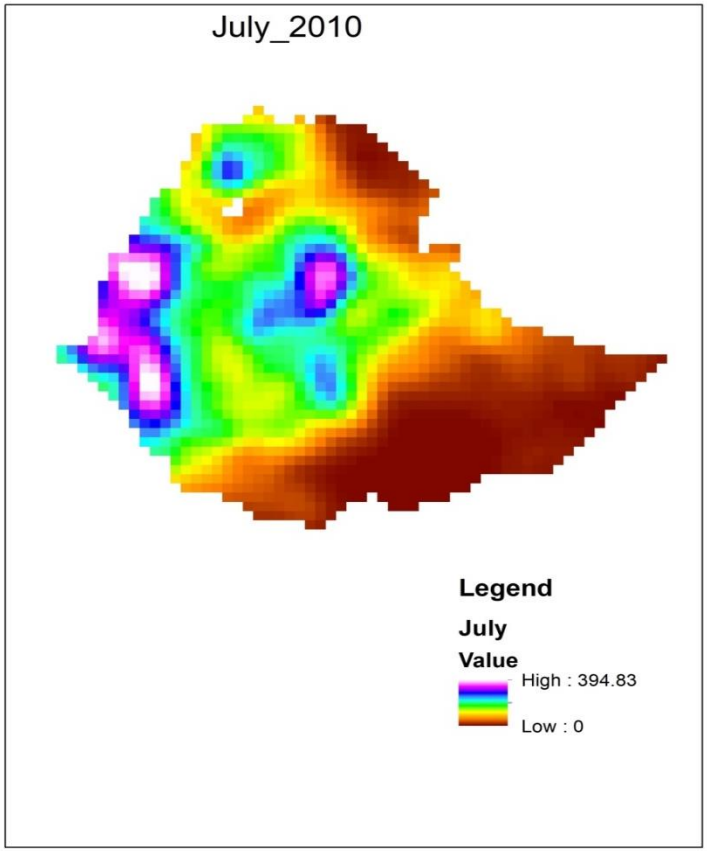
- Data was accessed from African Flood and Drought Monitoring site.
- The downloaded data raster and point data for specific area.
- These data includes; Precipitation, SPI (3 months), different drought indices to show temporal drought.
- Raster data was masked to Ethiopian boundary with ArcGIS software

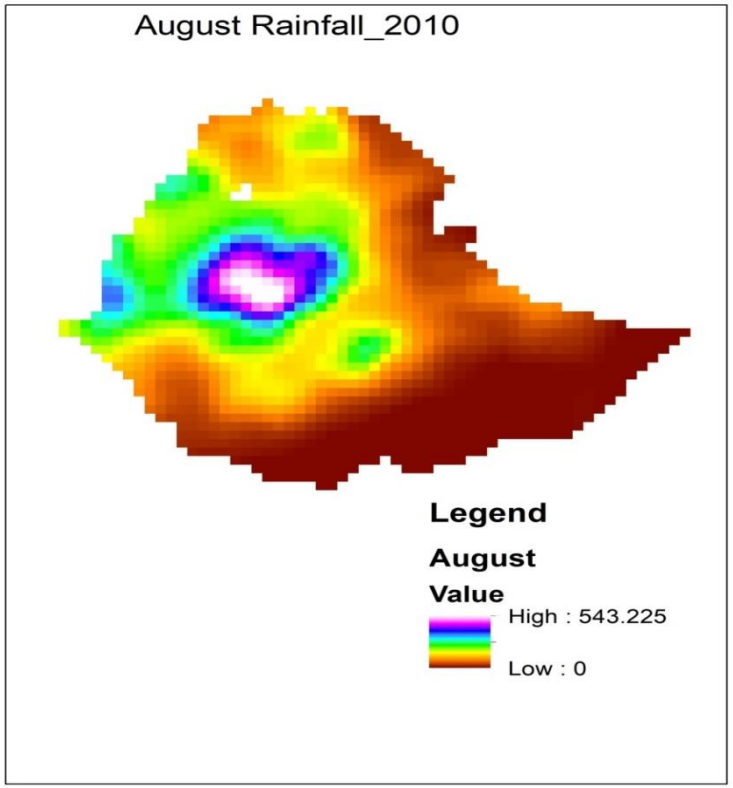
Result

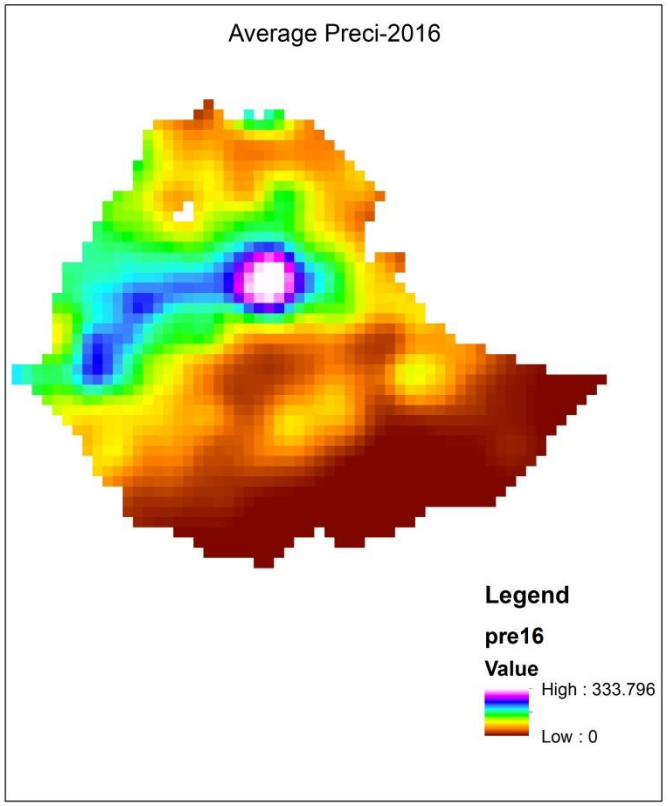
- Three months of precipitation (JJA) which are rainy seasons of Ethiopia have been considered to show the change as shown on the following fig.

Precipitation (JUNE, JULY, AUGUST_2010)







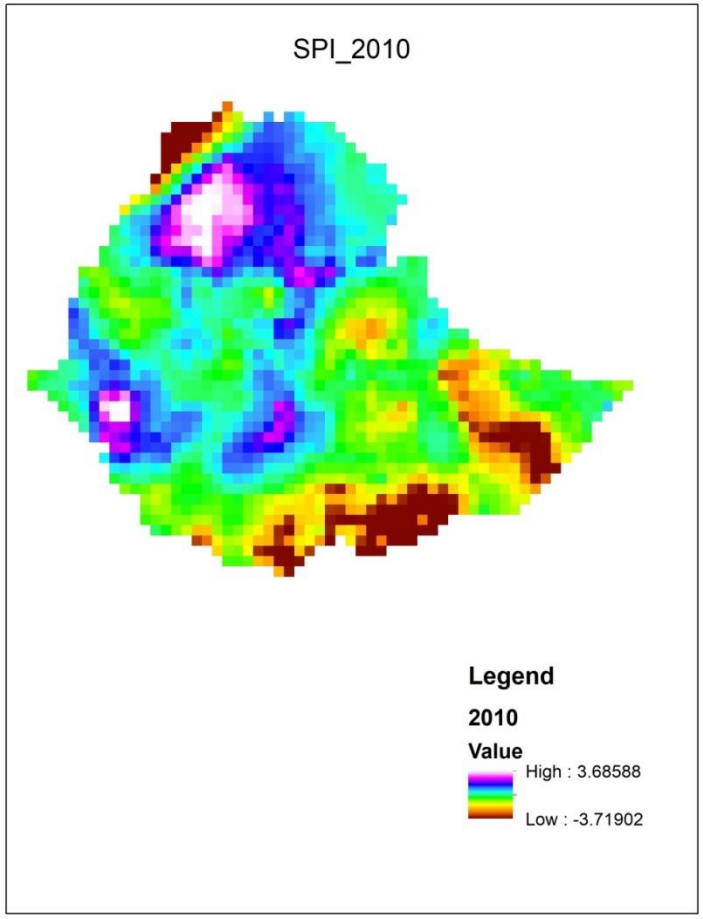


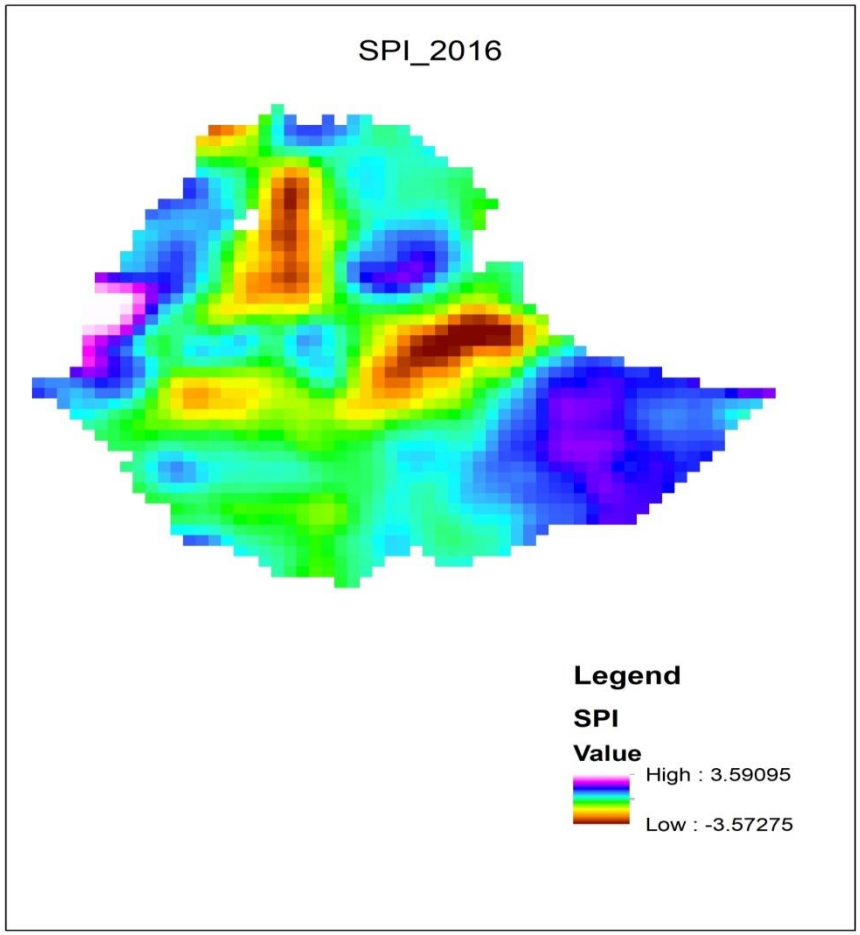
Based on the Fig. the rainfall was minimal in southeastern, North eastern and eastern parts of Eth.

The monthly variation is observable during these rainy season.

However, the max rainfall was recorded in August.

SPI_2010 (3 months)





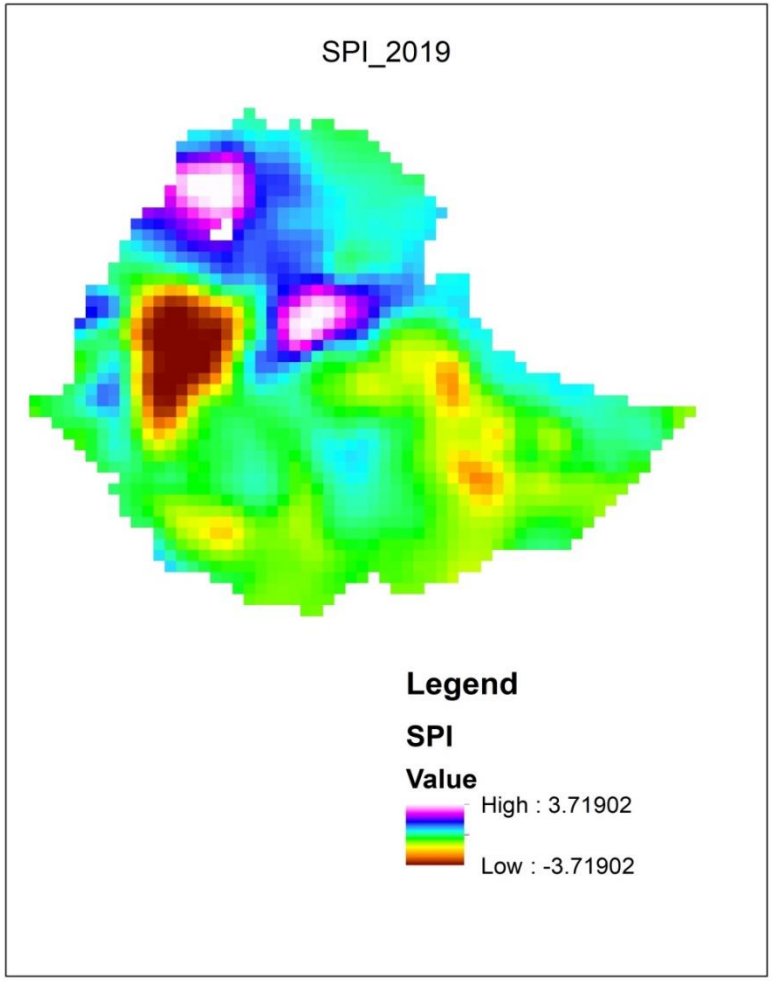
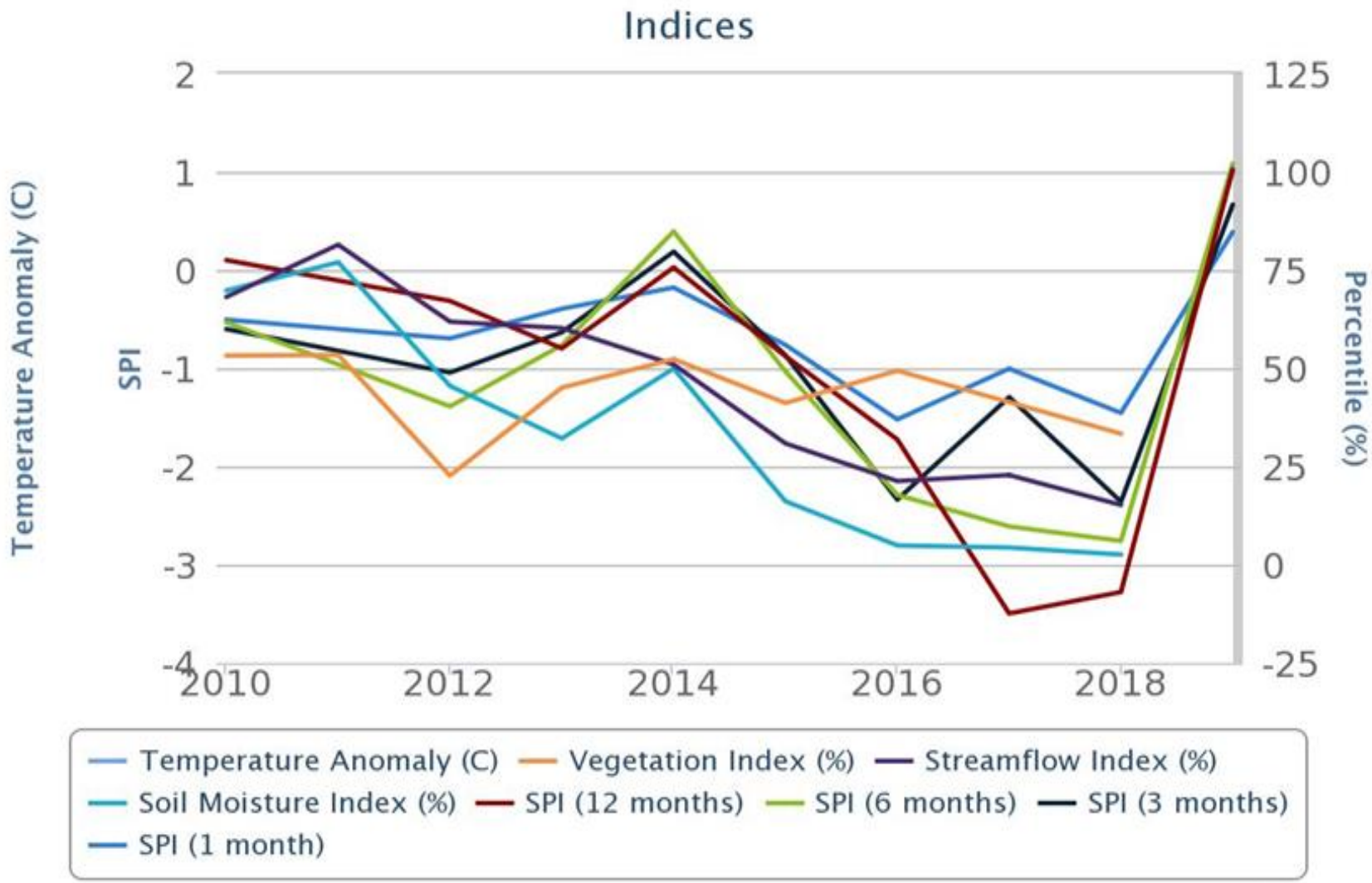
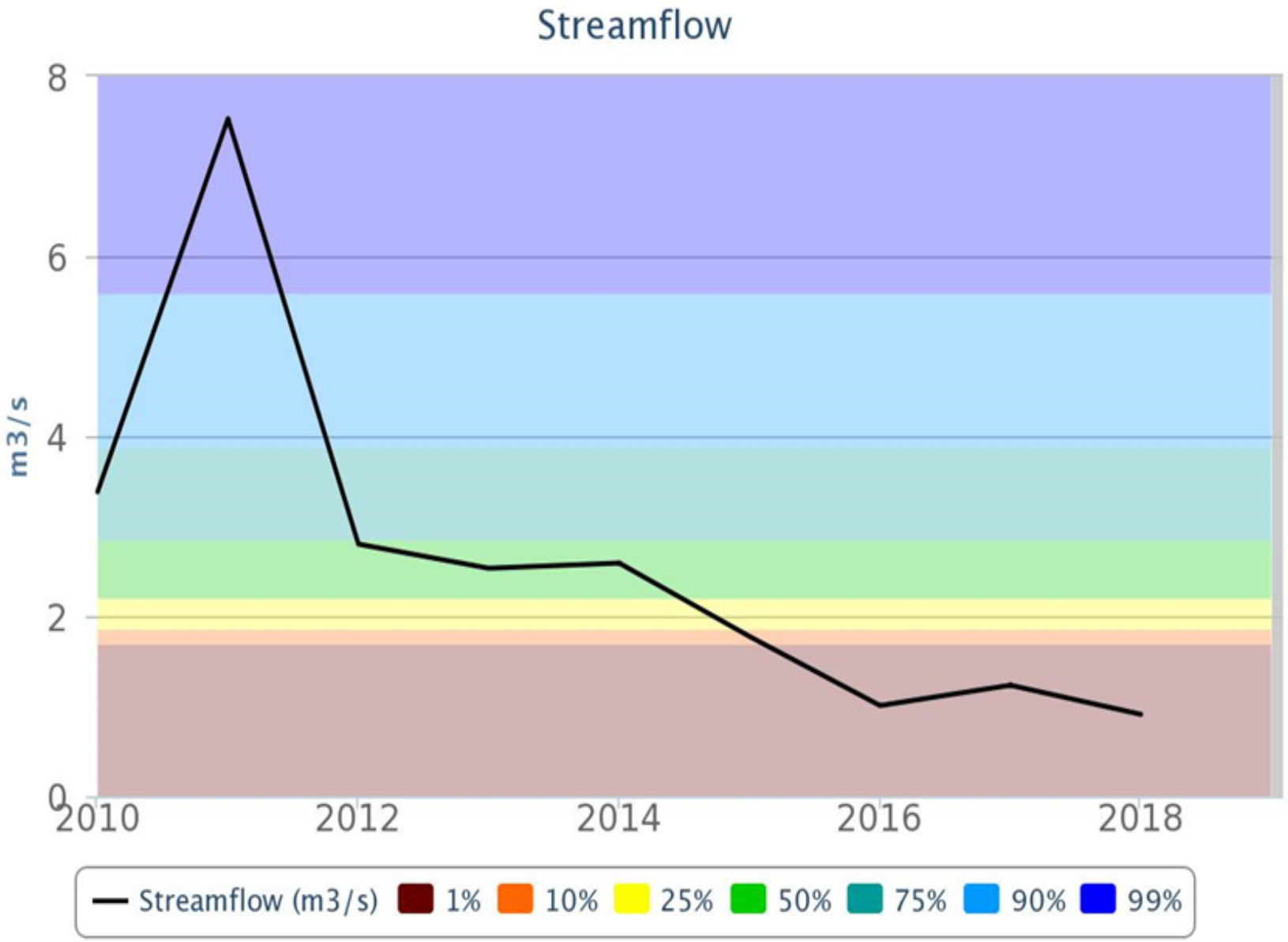


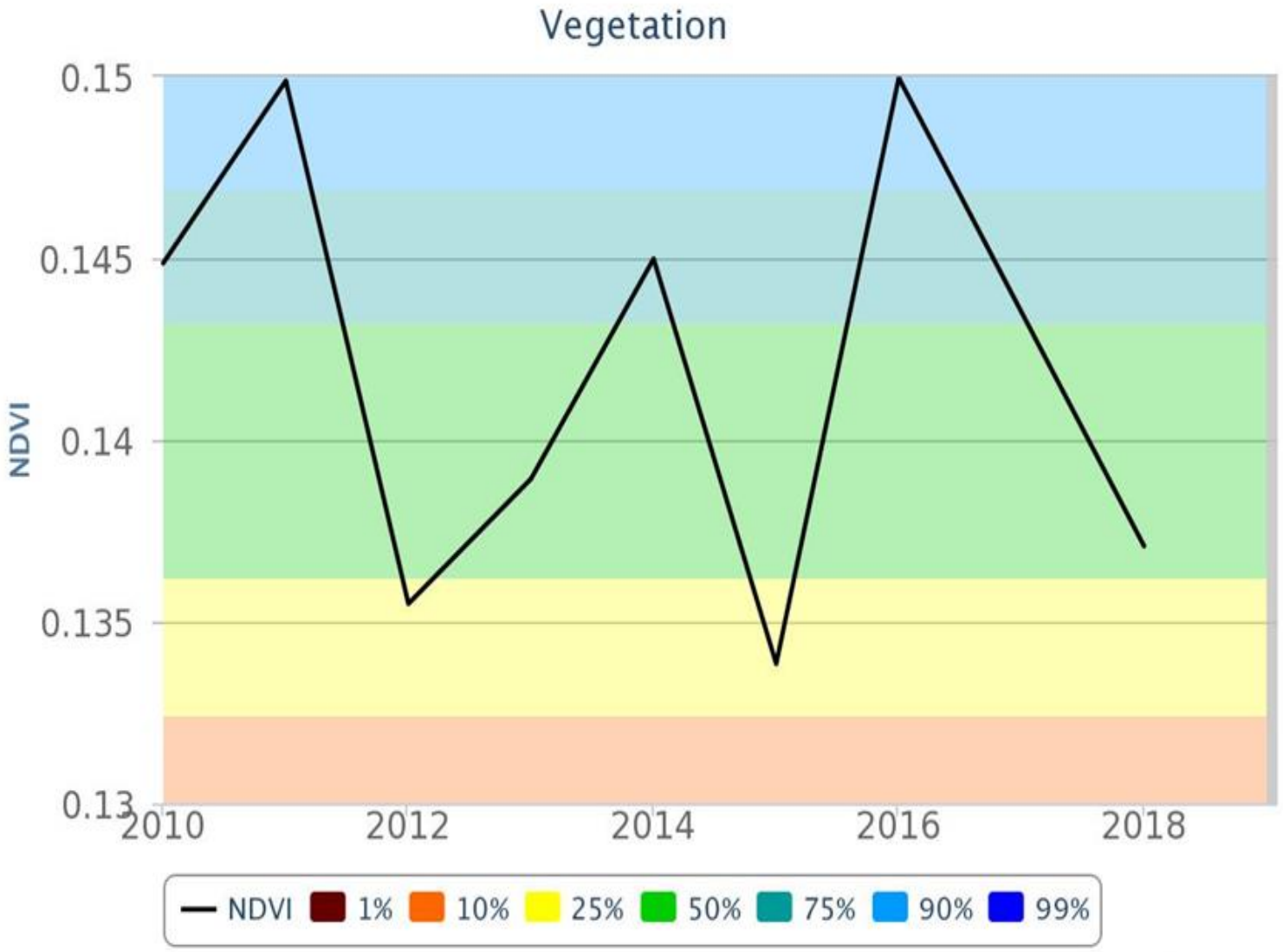
Table 1. SPI values

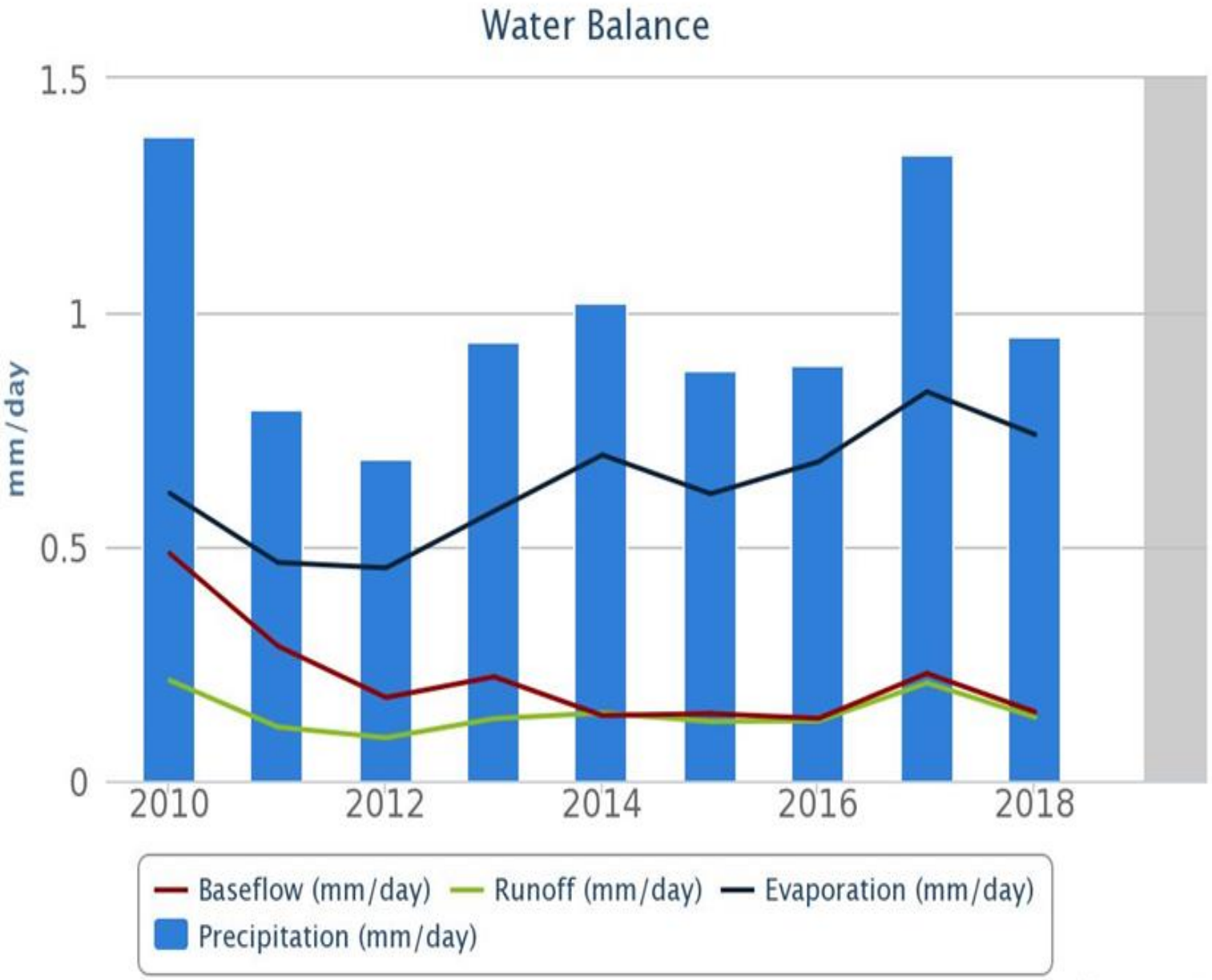
2.0+	extremely wet
1.5 to 1.99	very wet
1.0 to 1.49	moderately wet
-.99 to .99	near normal
-1.0 to -1.49	moderately dry
-1.5 to -1.99	severely dry
-2 and less	extremely dry

Source: Literatures


Indices
Temperature Anomaly (C)
SPI
Percentile (%)
2
1
0
-1
-2
-3
-4
125
100
75
50
25
0
-25
2010
2012
2014
2016
2018
Temperature Anomaly (C)
Vegetation Index (%)
Streamflow Index (%)
Soil Moisture Index (%)
SPI (12 months)
SPI (6 months)
SPI (3 months)
SPI (1 month)


Streamflow
8
6
4
2
0
m3/s
2010
2012
2014
2016
2018
Streamflow (m3/s)
1%
10%
25%
50%
75%
90%
99%


Vegetation
NDVI
0.15
0.145
0.14
0.135
0.13
2010
2012
2014
2016
2018
NDVI
1%
10%
25%
50%
75%
90%
99%


Water Balance
1.5
1
0.5
0
mm/day
2010
2012
2014
2016
2018
Baseflow (mm/day)
Runoff (mm/day)
Evaporation (mm/day)
Precipitation (mm/day)

SUMMARY

- The rainfall is characterized with variation in different times within a country.
- The SPI result shows that the country has faced extreme wet and dry periods in different parts of it.
- Southeastern, eastern, and North eastern parts of Ethiopia have been frequently hit by this event.

- As the charts indicated that different drought indices evidenced the occurrence of drought.

- Therefore, by effectively accessing existing data, indices (processed), interpreting the result should be effectively addressed to avert the live lose.

- Frequently drought prone areas should have early warning platform to aware society.
- Online data accessing platforms should be introduced to different stakeholders working in drought…

Thank you!!!