



# EAST AFRICA DROUGHT WATCH

ICPAC'S SPECIALIZED SYSTEMS/APPLICATIONS

*Presentation By:*

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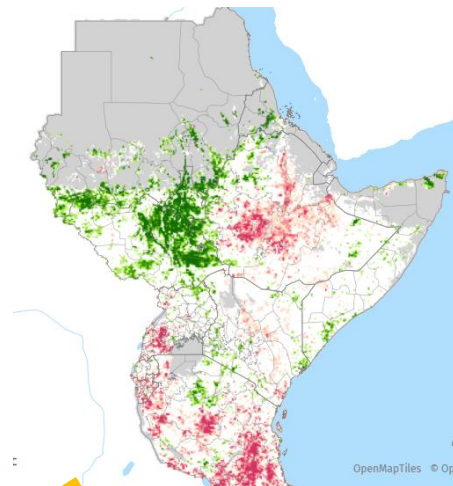
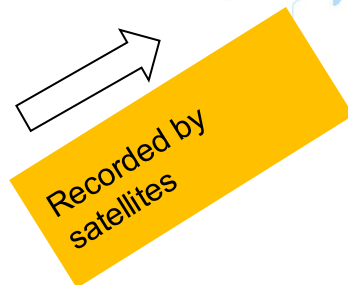
# THE EAST AFRICA DROUGHT WATCH

- ❑ Public online system for monitoring **drought conditions and drought events** in near-real time
- ❑ Provides automatic 10-day warnings for
  - ❑ developing and actual drought events
  - ❑ Recovery from drought conditions

- ❑ System developed by ICPAC that uses components of EDO/GDO
- ❑ Made possible by the Intra-ACP project, ICPAC and the JRC
- ❑ In collaboration with Drought Group of the Natural Disaster Risk Unit at JRC

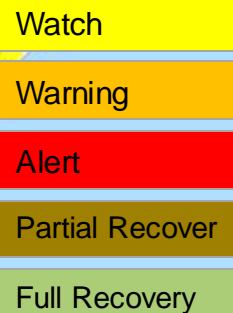
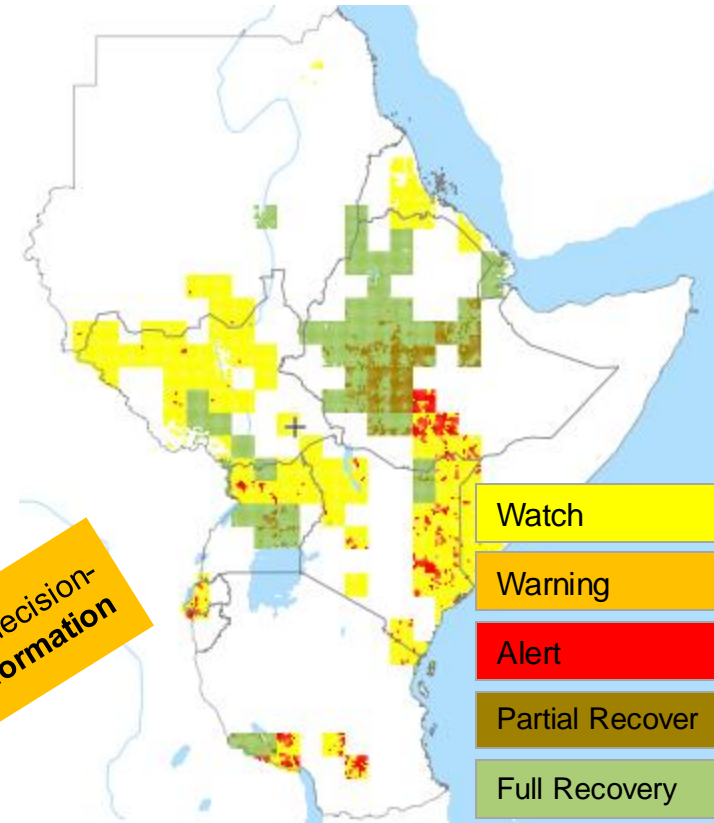
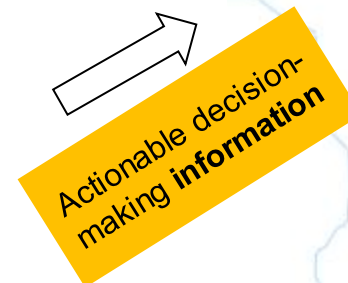


Conditions in the field



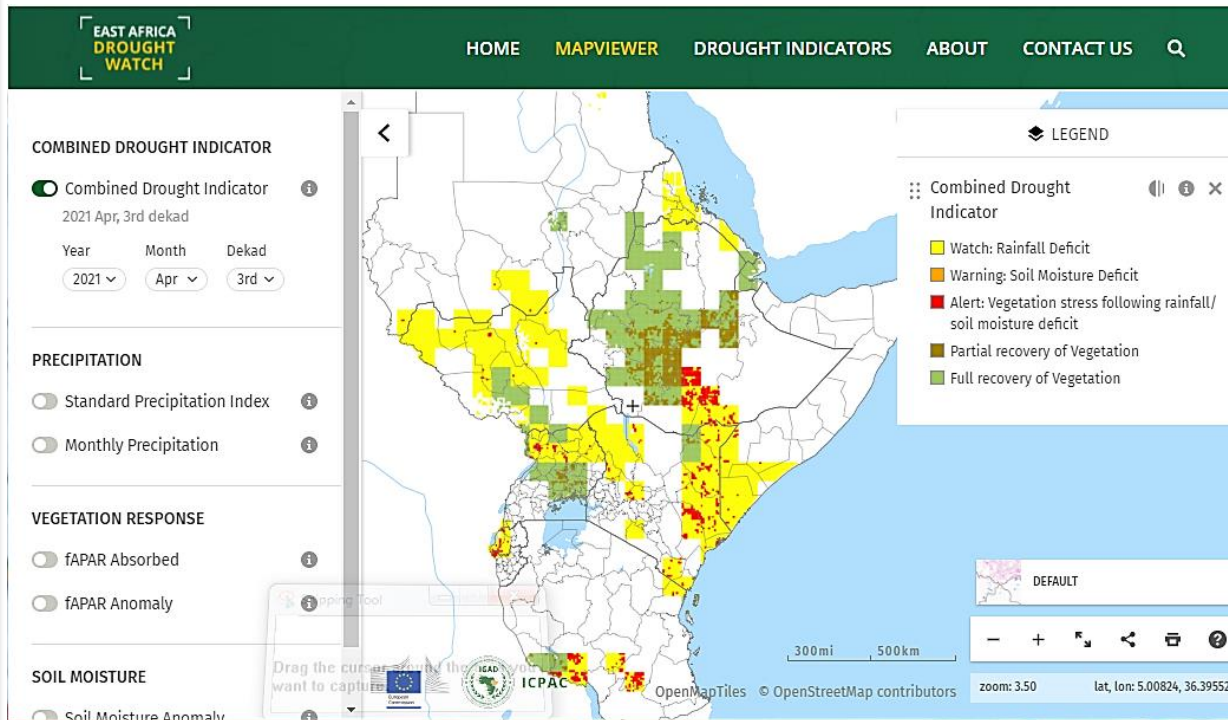
Satellite, models  
+  
Station data

Ground Truth 2





# INTRODUCTION TO THE SYSTEM



**East Africa Drought Watch** a drought monitoring system in a nutshell: a complete platform to explore and analyze EO-derived data for drought monitoring

<http://droughtwatch.icpac.net>

## A web-GIS environment:

- ☐ Weather and
- ☐ **Earth Observation (EO)** indicators, model output
- ☐ Automatic warnings regarding drought conditions every 10 days
- ☐ Additional indicators showing recovery process after drought conditions

## A statistics dashboard:

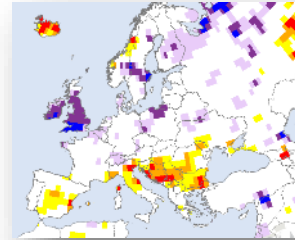
- ☐ Indicators statistics aggregated at sub-national level(s)
- ☐ Additional information such as periodic reports

# COMBINED DROUGHT INDICATOR

Combined Drought Indicator (CDI)  
for Agricultural Drought  
**Time = Current dekad**

1

Precipitation  
Anomalies (SPI)



**Time = Previous  
month**

2

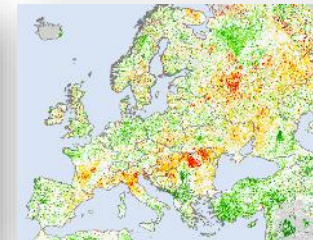
Soil Moisture  
Anomalies



**Time = Previous  
dekad**

3

Vegetation  
Anomalies (fAPAR)



**Time = Current  
dekad**

Precipitation Shortage

Soil Moisture deficit

Reduced Vegetation  
Production

WATCH

WARNING

ALERT

- ✓ 3 levels of Drought categories:  
Watch, Warning, Alert
- ✓ 2 levels of Recovery categories:  
Partial Recovery, Full Recovery

Time

Normal precipitation  
conditions

Normal  
Production

Vegetation

PARTIAL RECOVERY  
OF VEGETATION

FULL RECOVERY  
OF VEGETATION

# DERIVING COMBINED DROUGHT INDICATOR

CDI value		SPI					Soil moisture anomaly	fAPAR anomaly	Convergence of evidence
		SPI12 < -1	SPI3 < -1	SPI1 < -2	SPI3 <sub>prev</sub> < -1	SPI1 <sub>prev</sub> < -2	SMA < 1	ΔfAPAR < -1	
Watch	1			✓					Precipitation shortage
	2		✓						
	3	✓	✓						
Warning	4			✓			✓		Precipitation shortage + Soil Moisture Anomaly
	5		✓				✓		
	6	✓	✓				✓		
Alert	7			✓				✓	Precipitation shortage + Soil Moisture Anomaly + Vegetation Anomaly
	8		✓					✓	
	9		✓				✓	✓	
	10	✓	✓				✓	✓	
Partial recovery	11					✓		✓	
	12				✓			✓	
Full recovery	13					✓			
	14				✓				



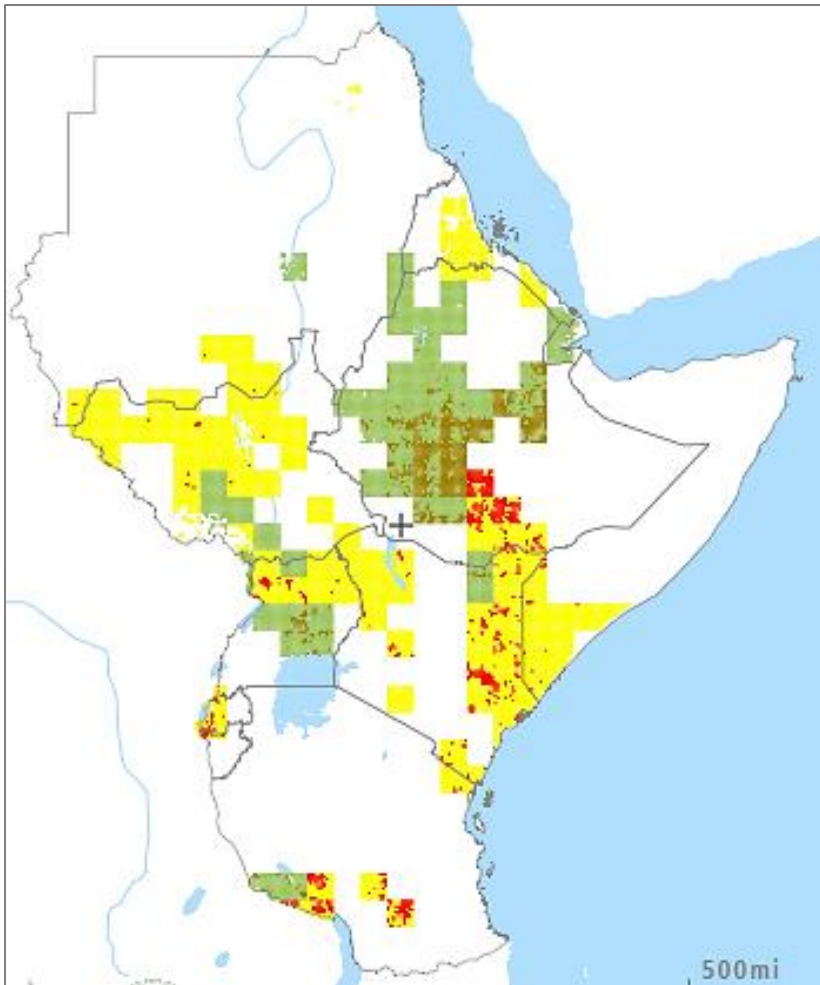
Increasing Dryness



Increasing Recovery

# WHAT IS THE CURRENT DROUGHT CONDITION?

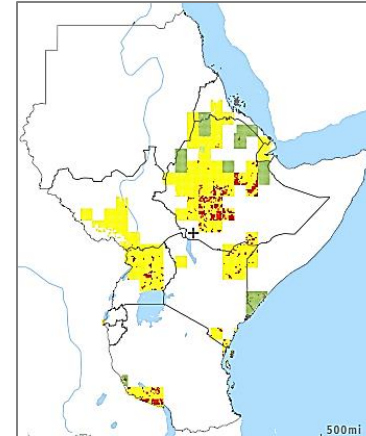
April 3<sup>rd</sup> Dekad 2021



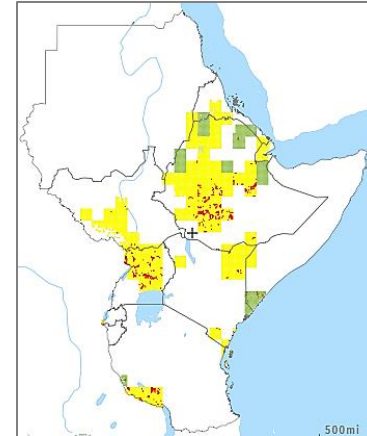
## Legend

- Watch:** Rainfall deficit
- Warning:** + Soil Moisture deficit
- Alert:** + Vegetation stress following rainfall/soil moisture deficit
- Partial Recovery** of vegetation
- Full Recovery** of vegetation

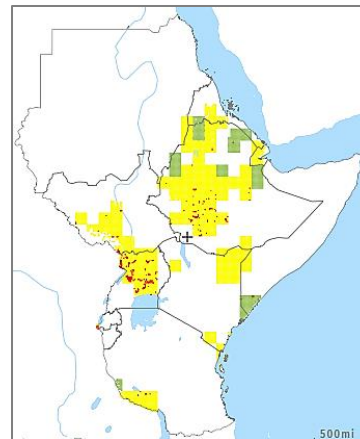
April 2<sup>nd</sup> Dekad



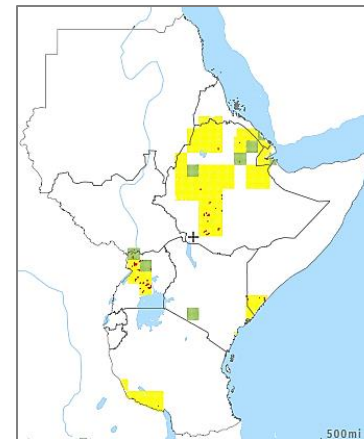
April 1<sup>st</sup> Dekad



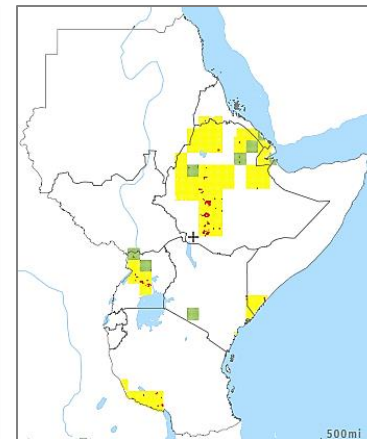
March 3<sup>rd</sup> Dekad



March 2<sup>nd</sup> Dekad



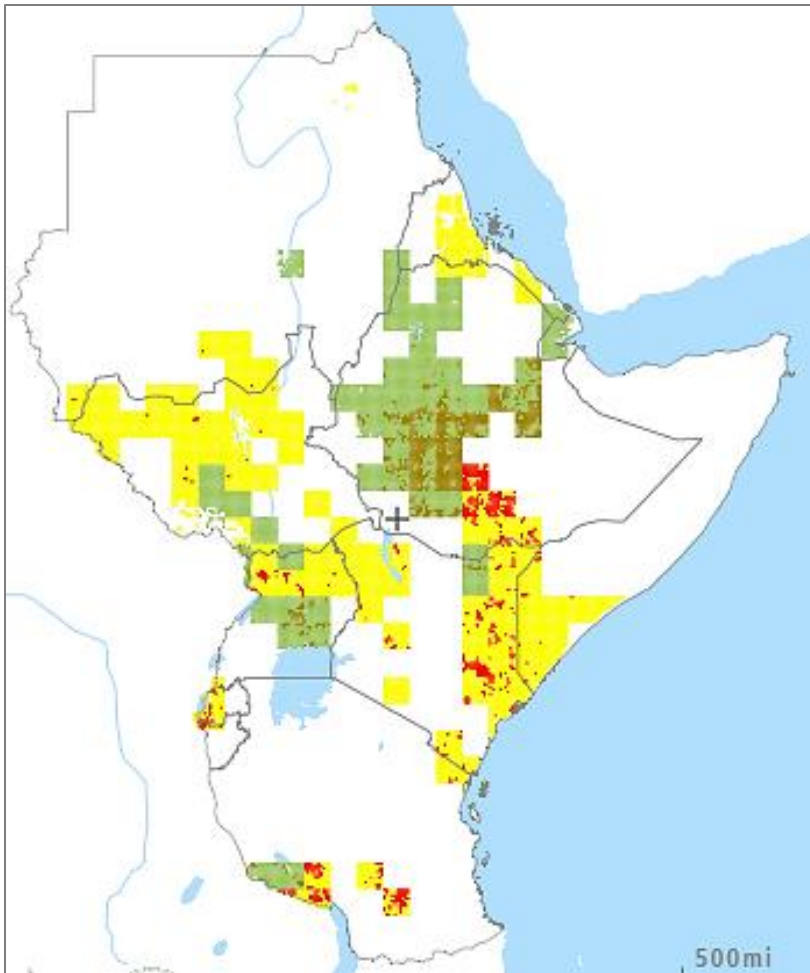
March 1<sup>st</sup> Dekad





# COMBINED DROUGHT CONDITION – CONVERGENCE OF EVIDENCE

April 3<sup>rd</sup> Dekad 2021

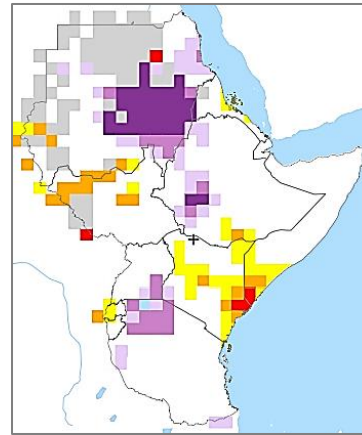


## Legend

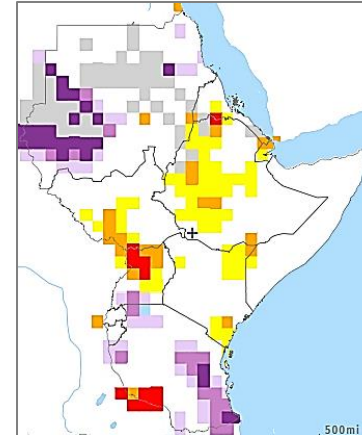
- **Watch:** Rainfall deficit
- **Warning:** + Soil Moisture deficit
- **Alert:** + Vegetation stress following rainfall/soil moisture deficit
- **Partial Recovery** of vegetation
- **Full Recovery** of vegetation

7

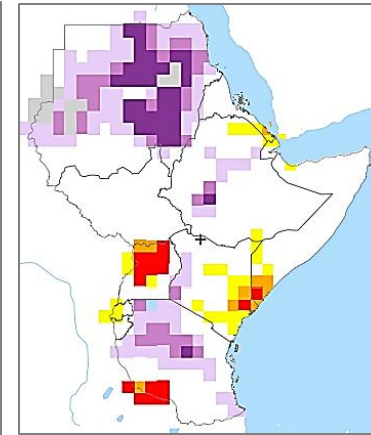
SPI-1 April



SPI-3 April

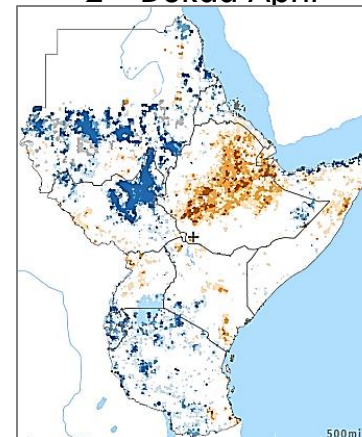


SPI-12 April

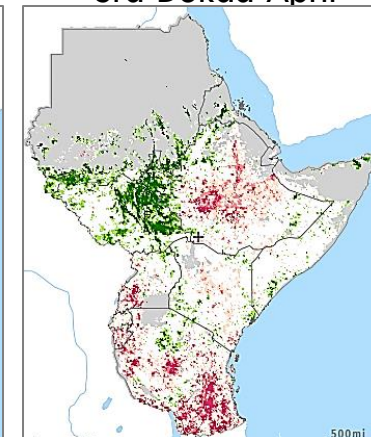


■ **Negative anomalies** ■ **Positive anomalies**

Soil moisture anomaly  
2<sup>nd</sup> Dekad April



fAPAR anomaly  
3<sup>rd</sup> Dekad April

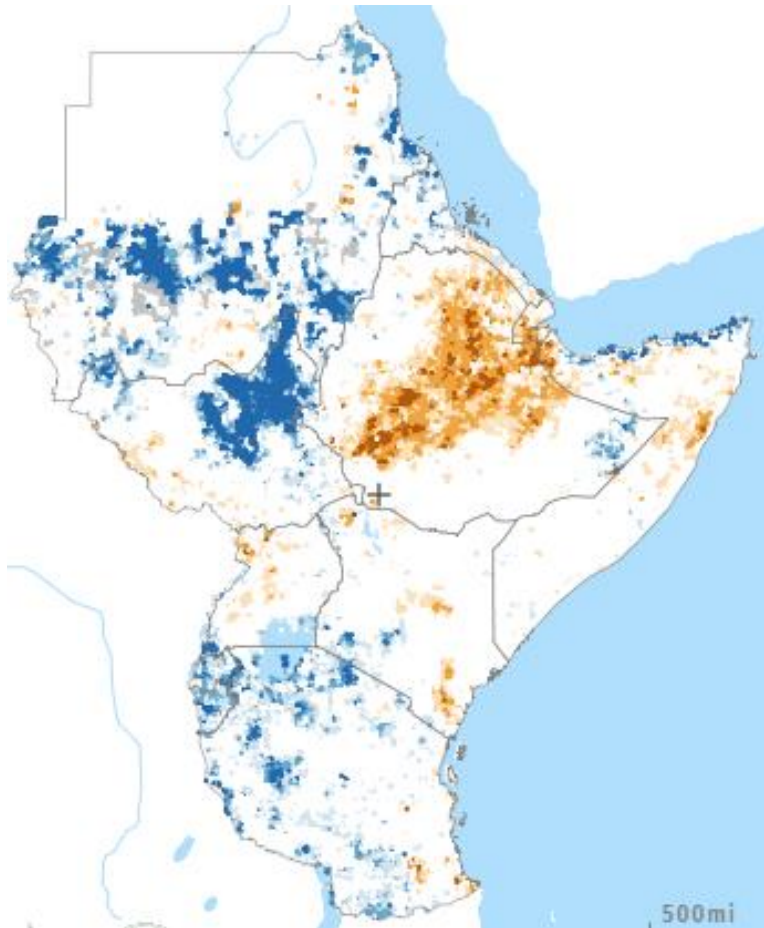




■ **Negative anomalies**  
■ **Positive anomalies**

■ **Negative anomalies**  
■ **Positive anomalies**

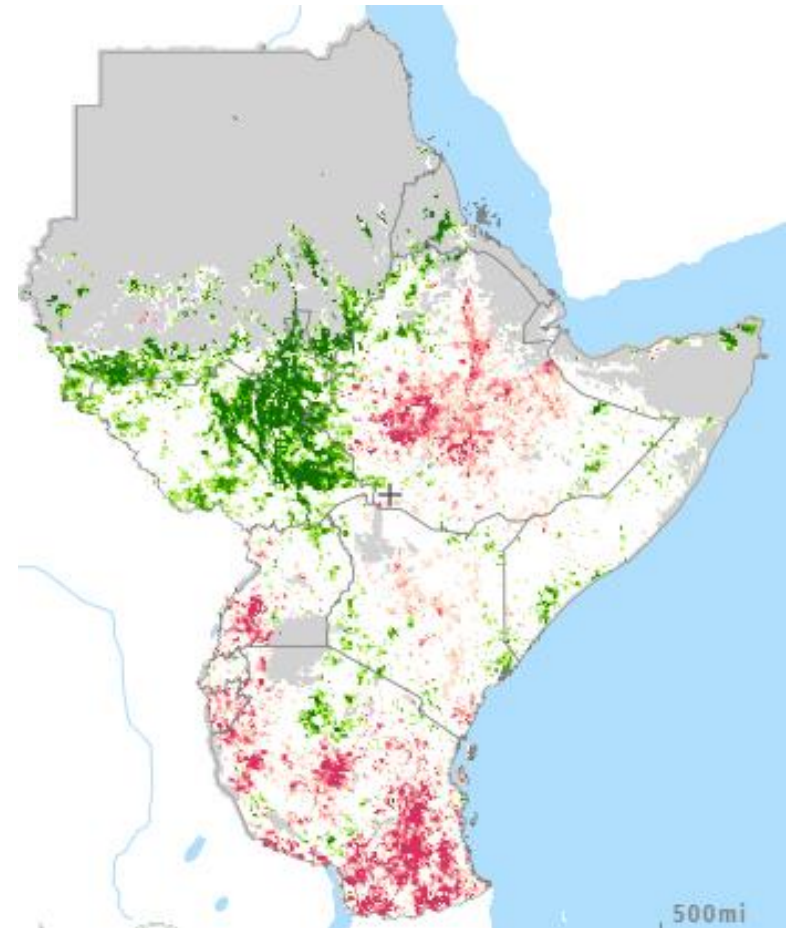
# COMBINED DROUGHT CONDITION – CONVERGENCE OF EVIDENCE



Soil moisture anomaly  
2<sup>nd</sup> Dekad April



 **Negative** anomalies  
 **Positive** anomalies

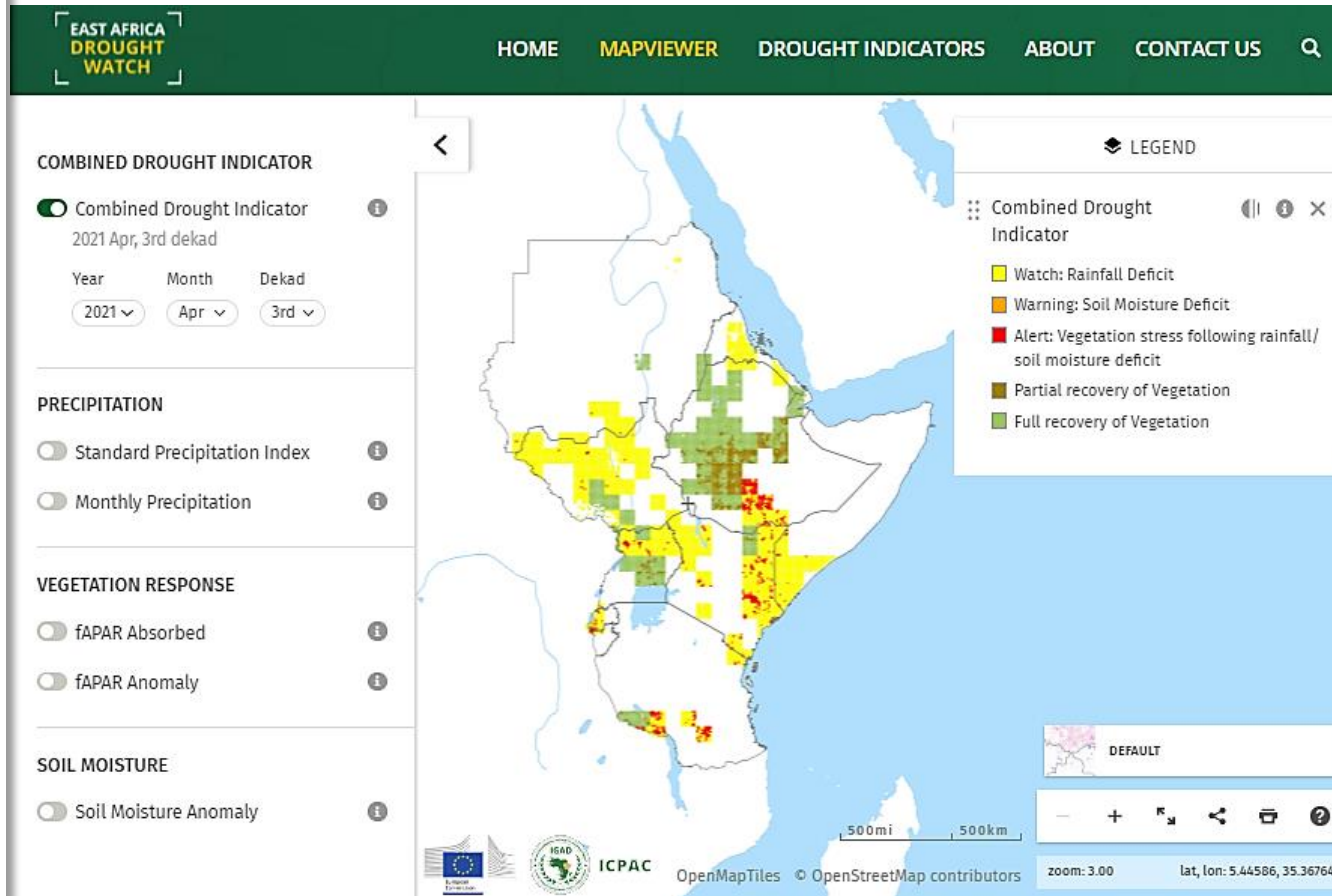
fAPAR anomaly  
3<sup>rd</sup> Dekad April



 **Negative** anomalies  
 **Positive** anomalies



# WHAT CAN YOU DO WITH THE SYSTEM



- ☐ Visualization of raster layers for selected weather and biophysical indicators and anomalies
- ☐ Maps, graphs downloadable (png, csv)
- ☐ Visualization of the pixel value and its historical development
- ☐ Background layers and opacity bars facilitate image interpretation
- ☐ Long time series is available

## Combined Drought Index (CDI)

10day CDI

## SPI

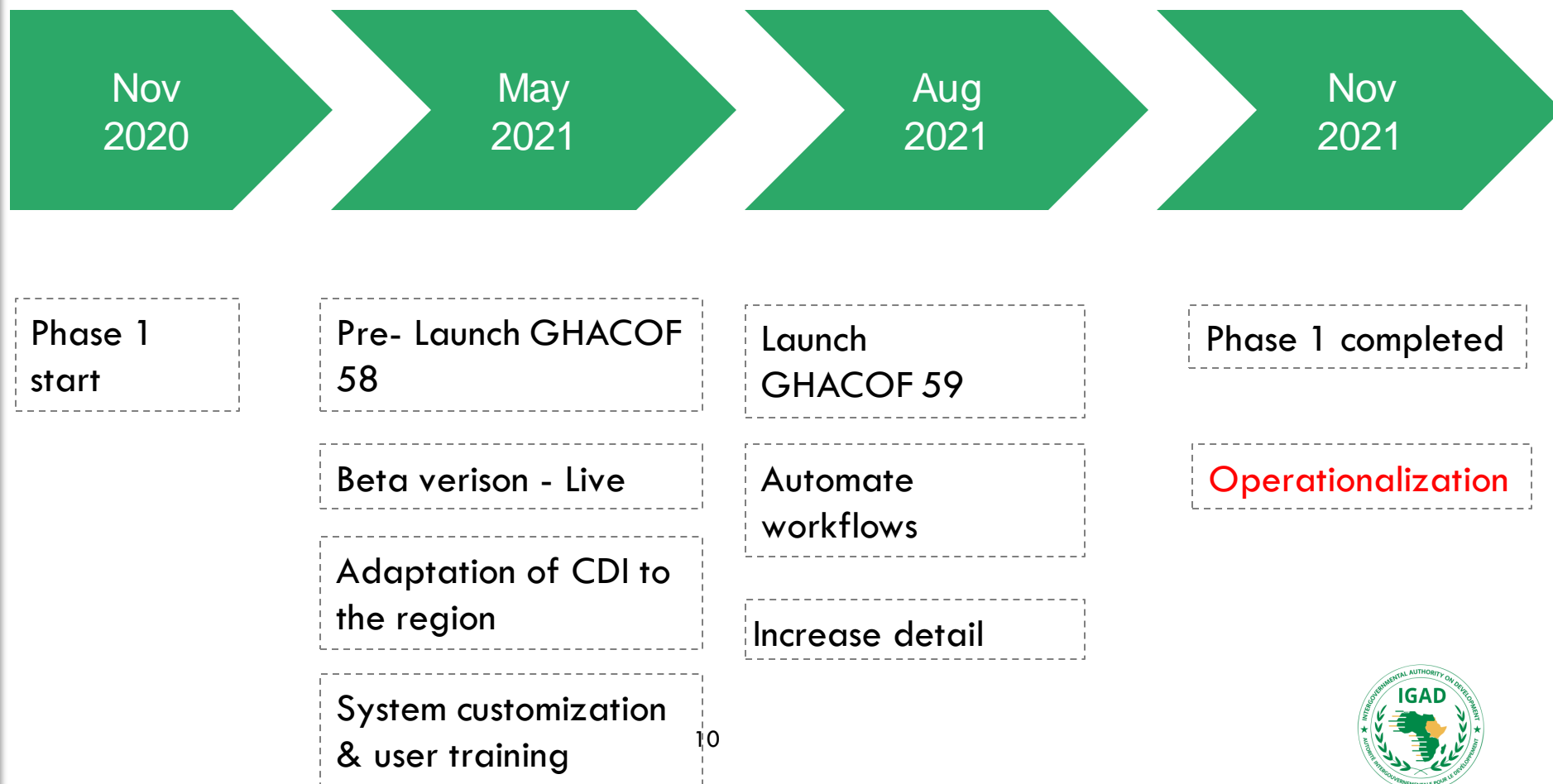
1 month	12 month
3 month	24 month
6 month	48 month
9 month	

Vegetation indicators	Soil Moist. indicators
10day fAPAR	10d SM anomaly
10d fAPAR Anomaly	

Modis, GPCC, LISflood model

# PROJECT TIMELINE

<https://droughtwatch.icpac.net/>



# Thank You!

## Q&A

## Demo



ICPAC





- Evidence of Drought
  - Media news of drought
  - GDACs