Operational Use of Satellite Products in West-Africa and The Sahel

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AGRHYMET Regional Centre

AfDB/EUMETSAT Webinar on Earth Observation in Africa: Satellite data support for weather, hydrological and climate services
24 September 2020

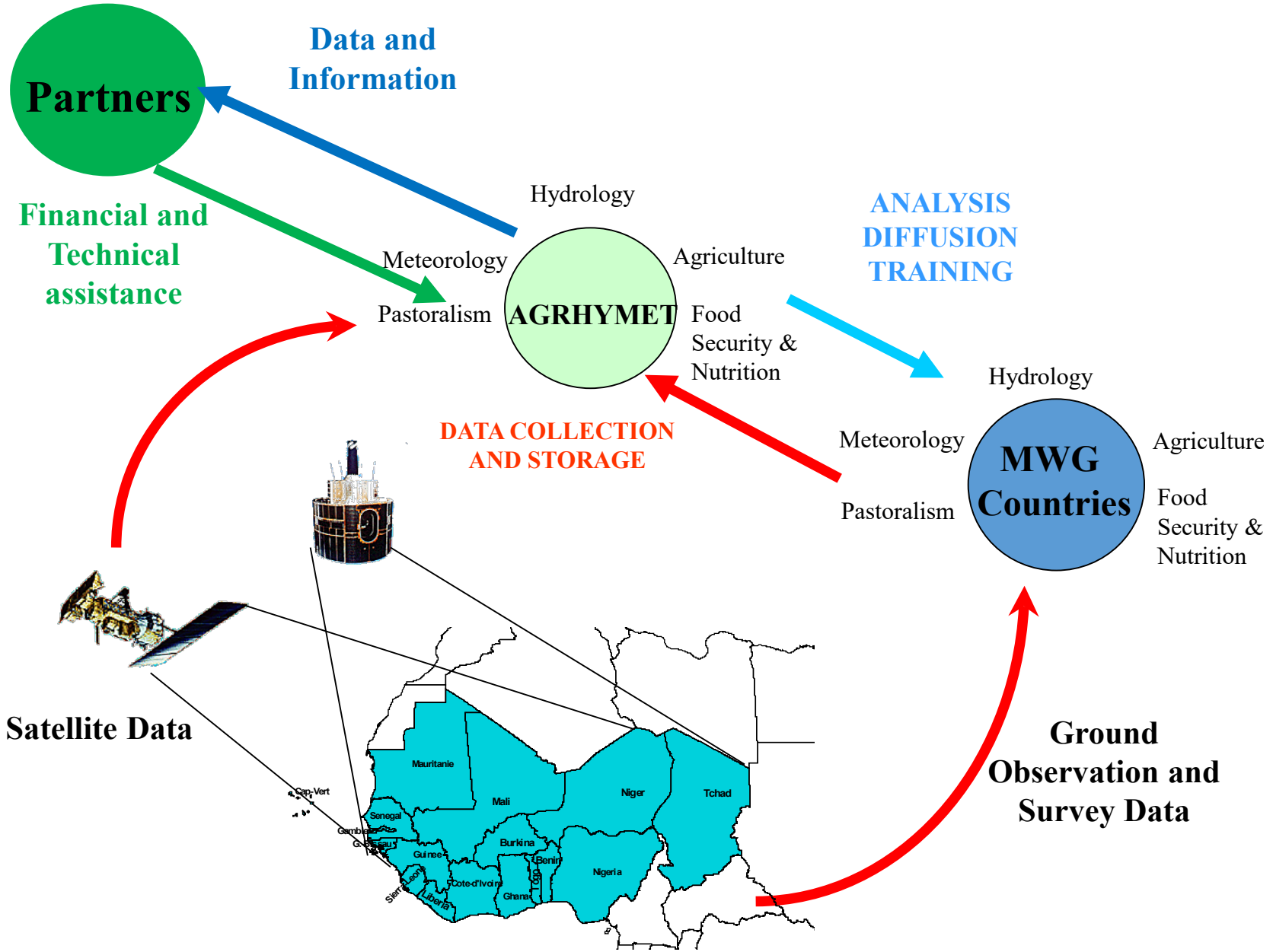
Outline

- **Introduction**
  - Background information on the AGRHYMET Regional Center
- **Use of satellite products for rainy season monitoring**
  - Rainfall monitoring
  - Vegetation monitoring (pastures biomass estimation)
  - Crop monitoring and yield forecasting,
  - Water resources monitoring and flood forecasting
  - Weather forecasting
    - Real time monitoring and Nowcasting
    - Assimilation in NWP
- **Partnerships**

The AGRHYMET Regional Center

- **Created in 1974,** as a specialized institution of CILSS (permanent interstate committee for drought control in the Sahel)
- **Mission :** to contribute to achieving sustainable food security and rational natural resource management through:
    - **Capacity building** of member states' Meteorological and Hydrological Services (training, equipment and financial support)
    - **Production and dissemination of information** to various decision makers (national authorities, cooperation partners, NGOs and farmers)
- **Covers** all the 17 CILSS and ECOWAS member countries in West Africa
- **Endorsed since July 2020 by ECOWAS** as the West Africa and Sahel Regional Climate Center (WAS-RCC).

The AGRHYMET Operating scheme

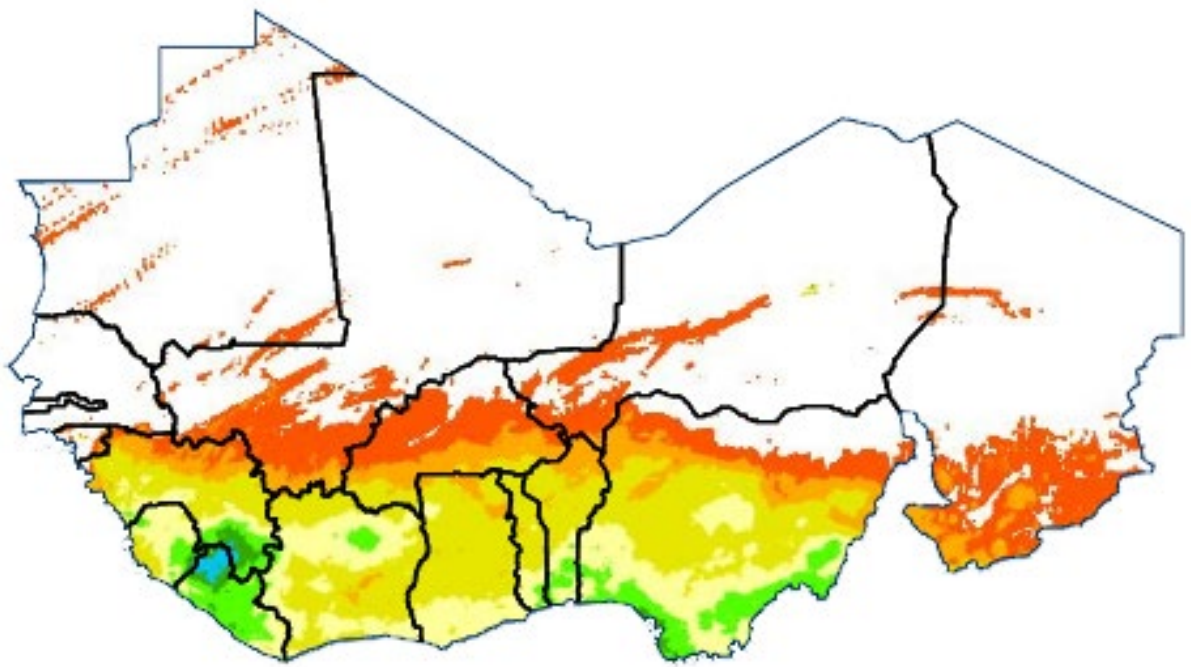


Use of Satellite Products for Rainy Season Monitoring

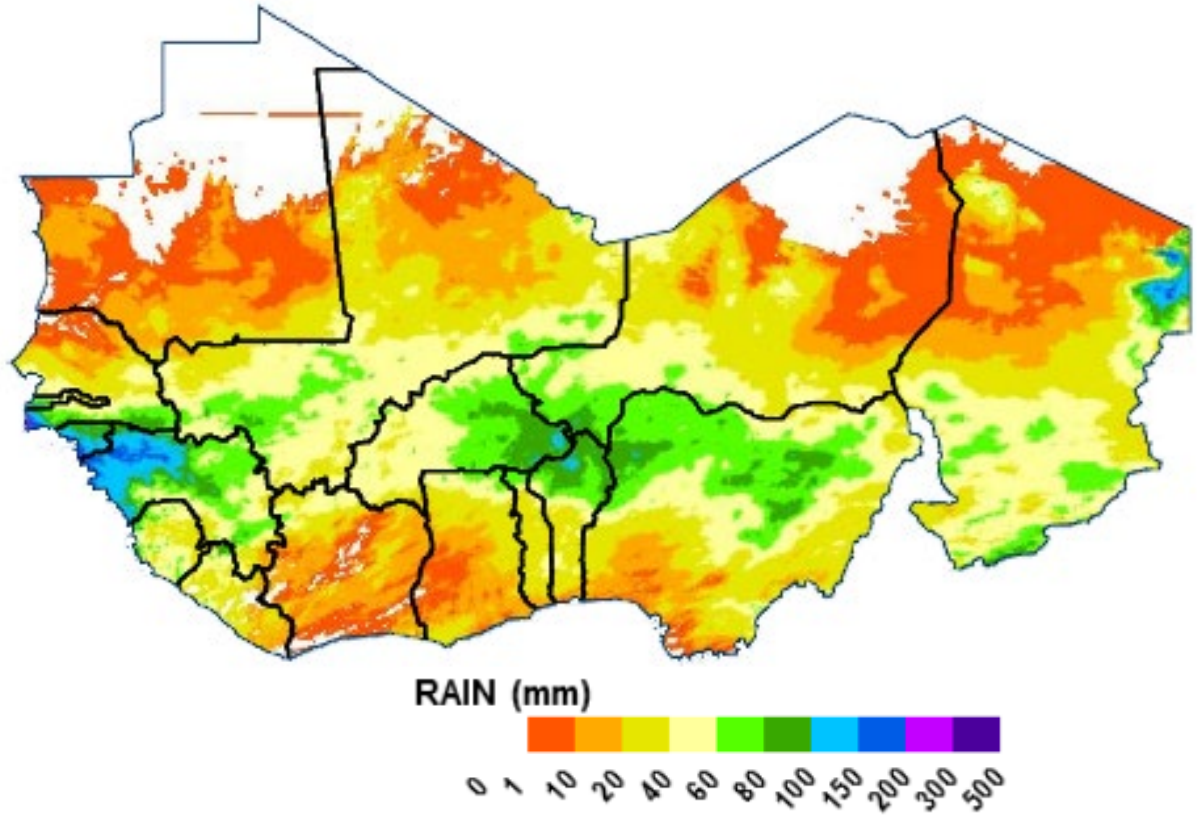
Rainfall Monitoring

Dekadal cumulative Rainfall

3rd Dekad April 2020



1st Dekad August 2020



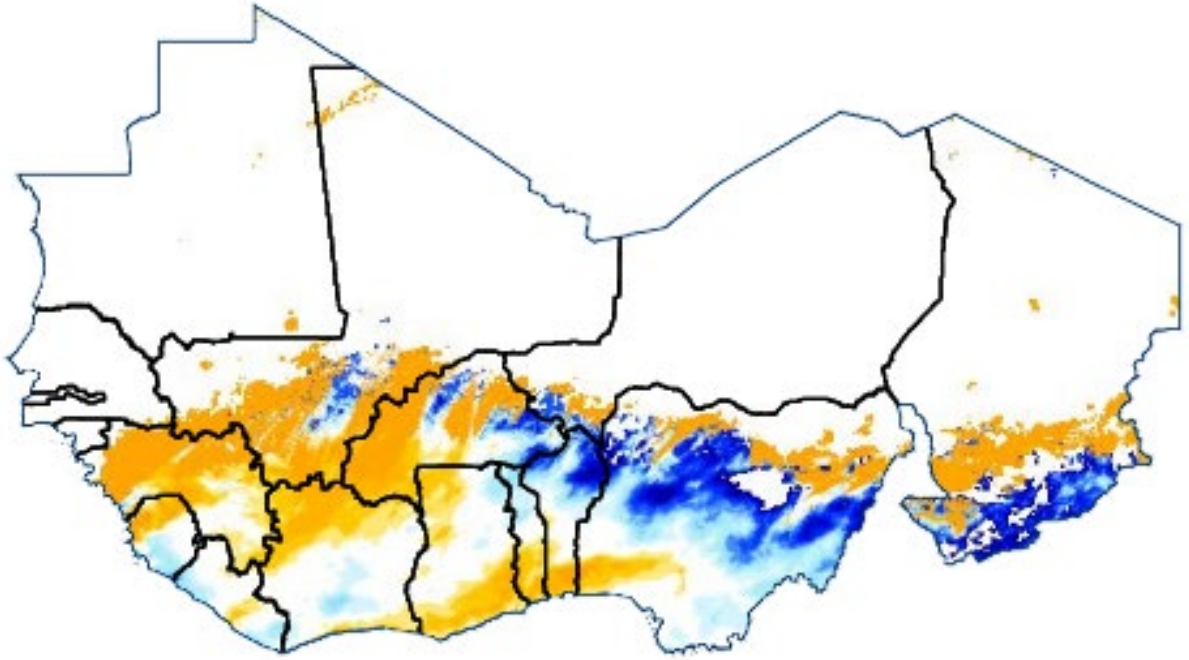
Source AGRHYMET AMESD/MESA e-station

MESA
Monitoring for Environment and Security in Africa

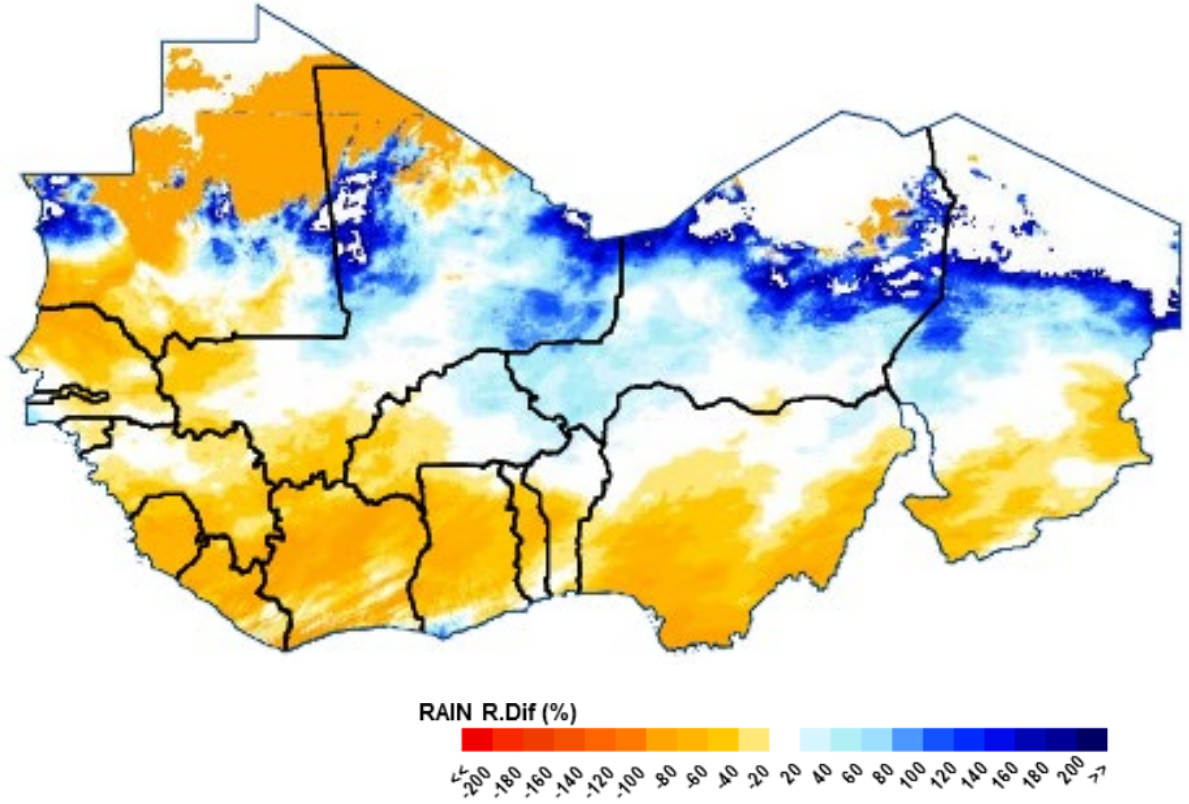
Rainfall Monitoring

Dekadal rainfall anomalies

1st Dekad April 2020



1st Dekad August 2020

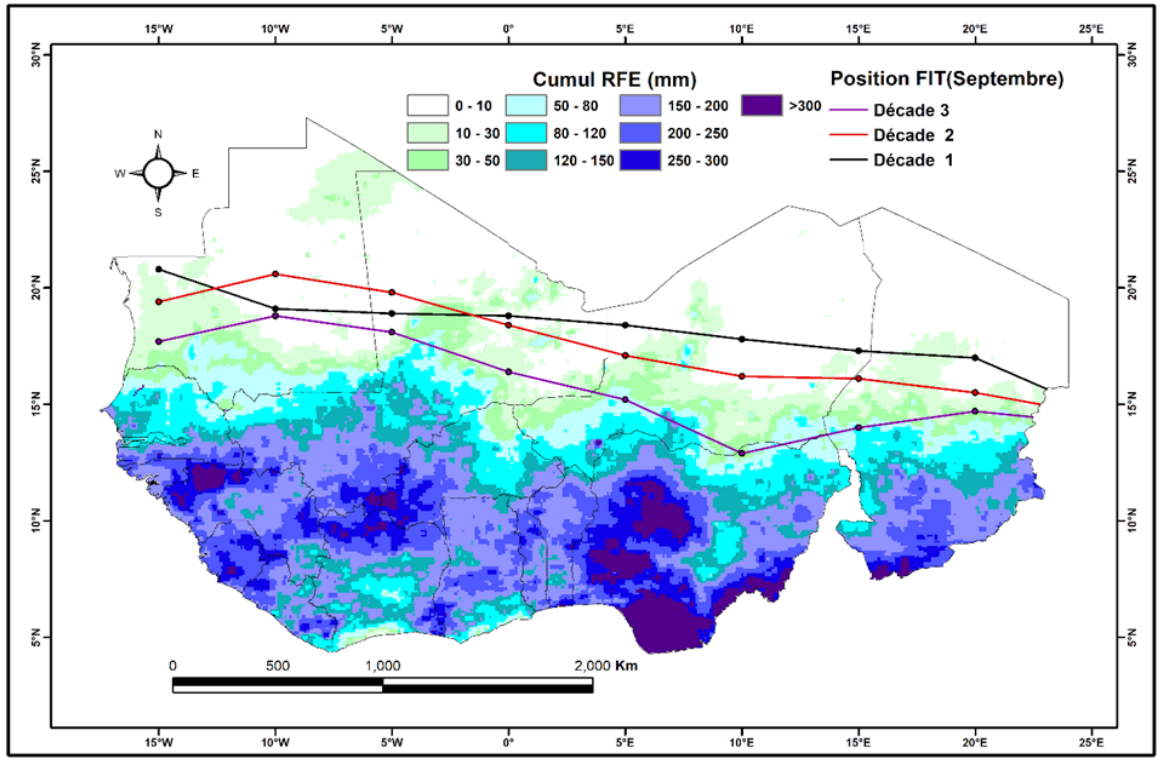


Source AGRHYMET AMESD/MESA e-station

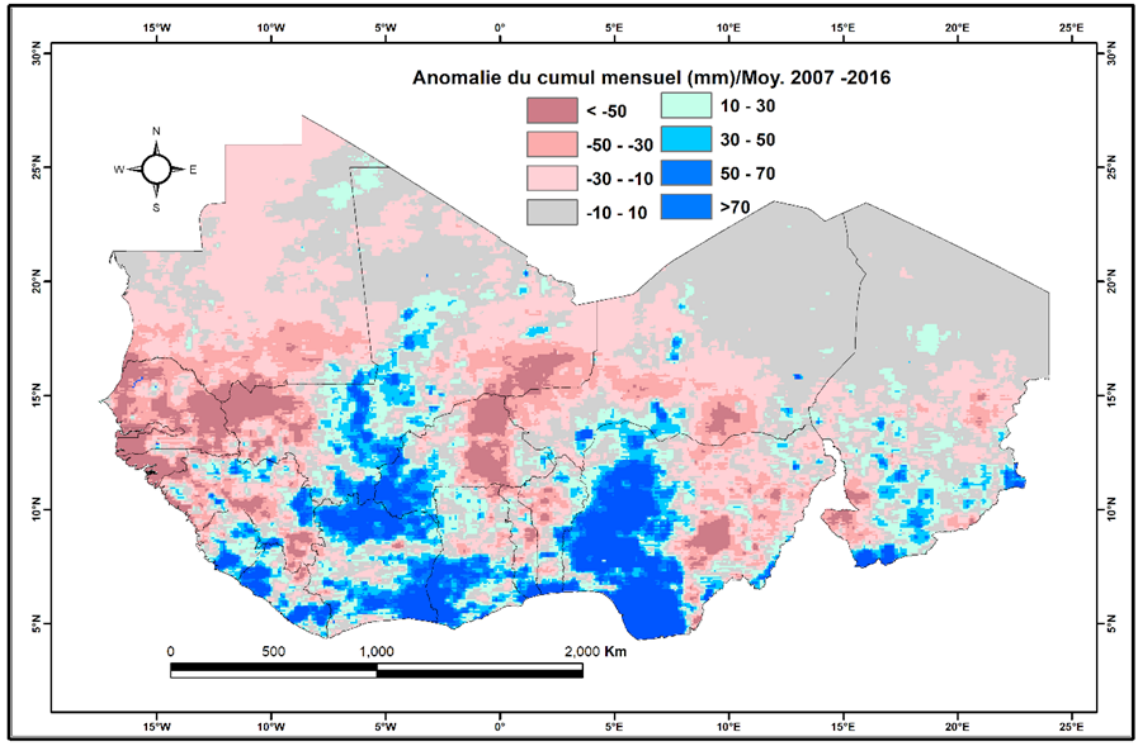
MESA
Monitoring for Environment and Security in Africa

Rainfall Monitoring

Monthly cumulative rainfall



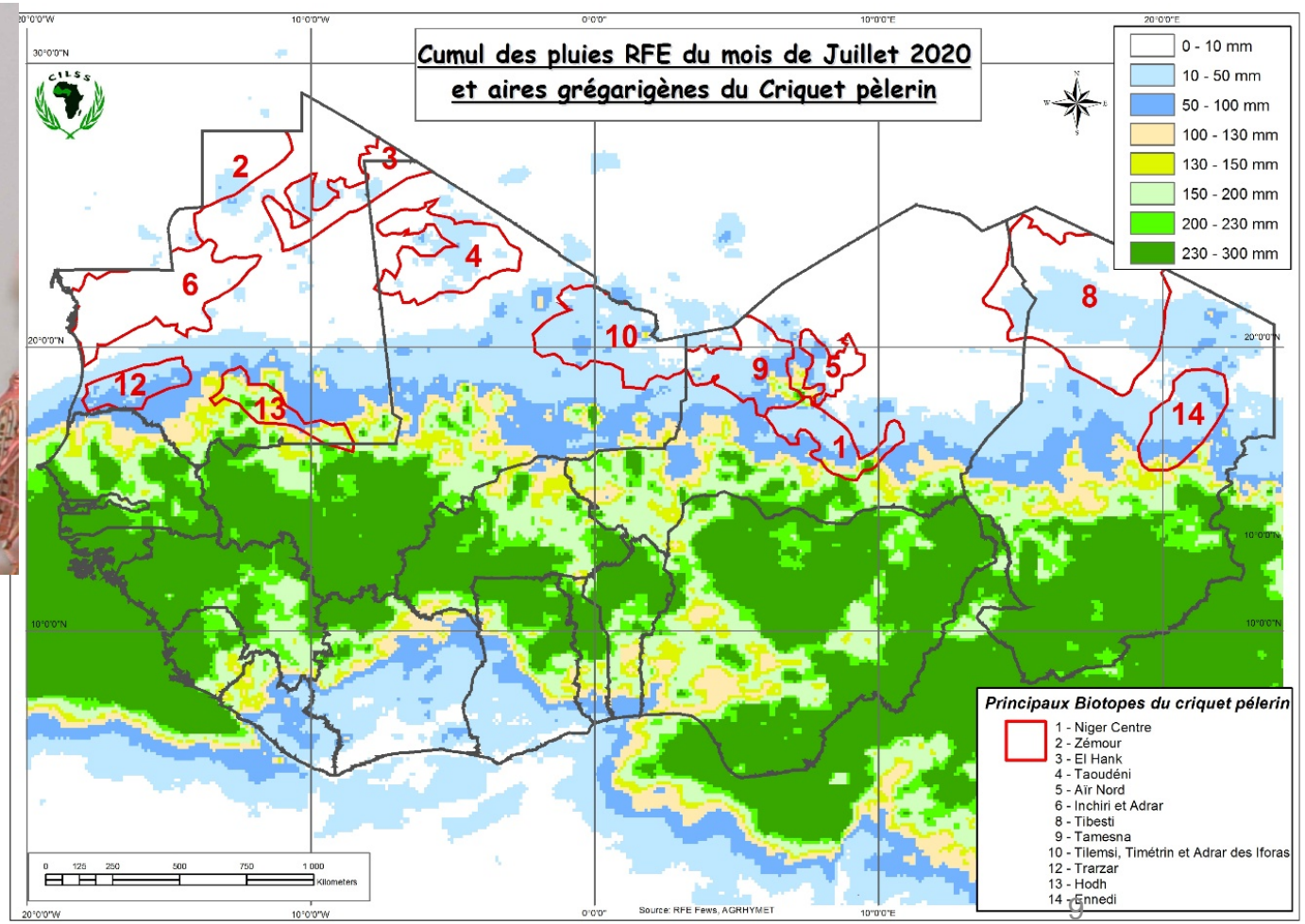
Monthly rainfall anomalies



Source FEWSNET

Rainfall Monitoring

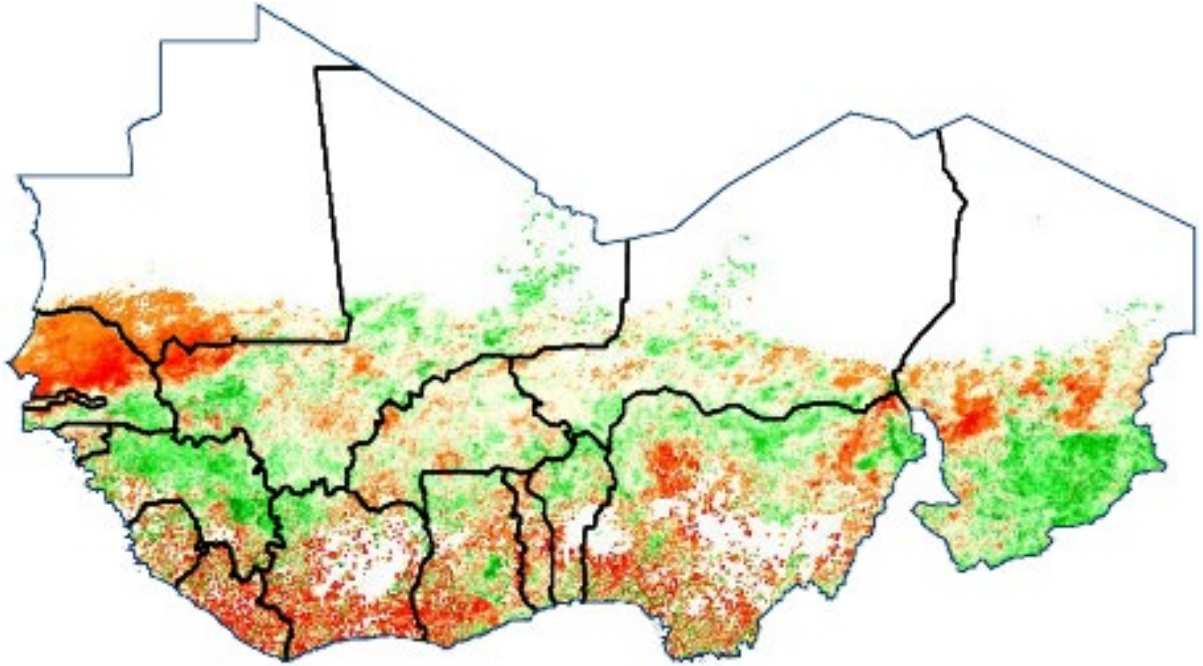
Favorable conditions in desert locust breeding areas



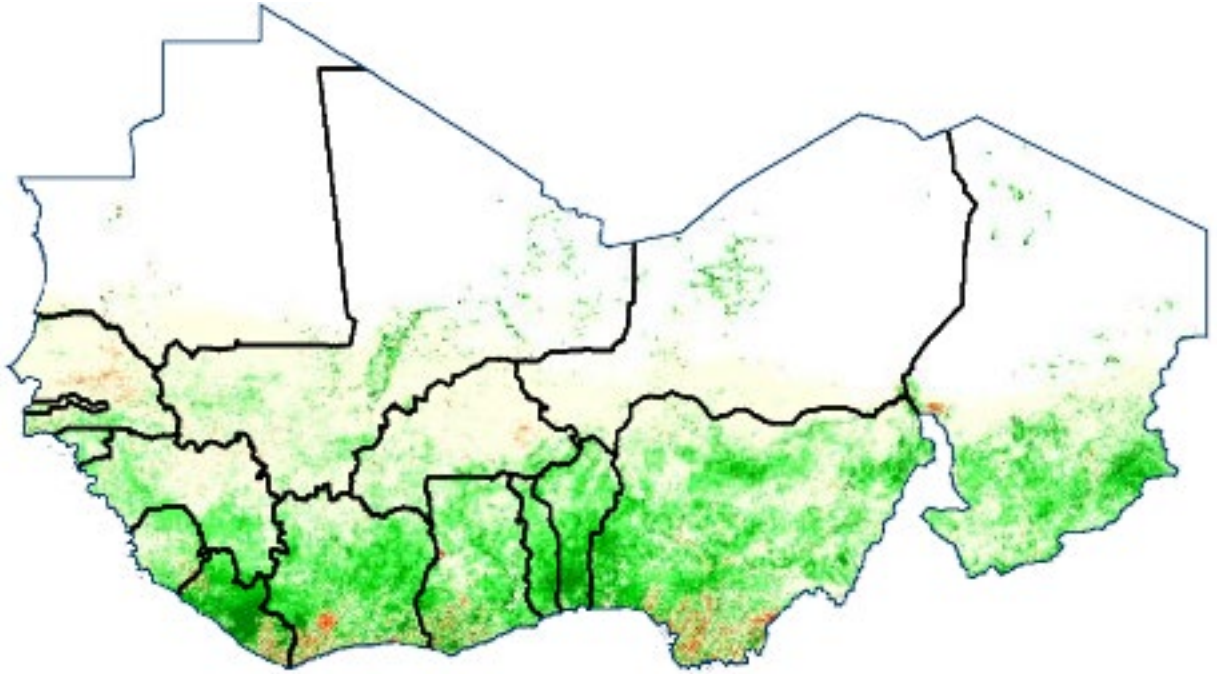
Vegetation monitoring

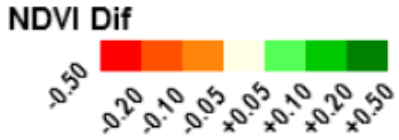
Dekadal vegetation index anomalies

1st Dekad August 2019



3rd Dekad November 2019



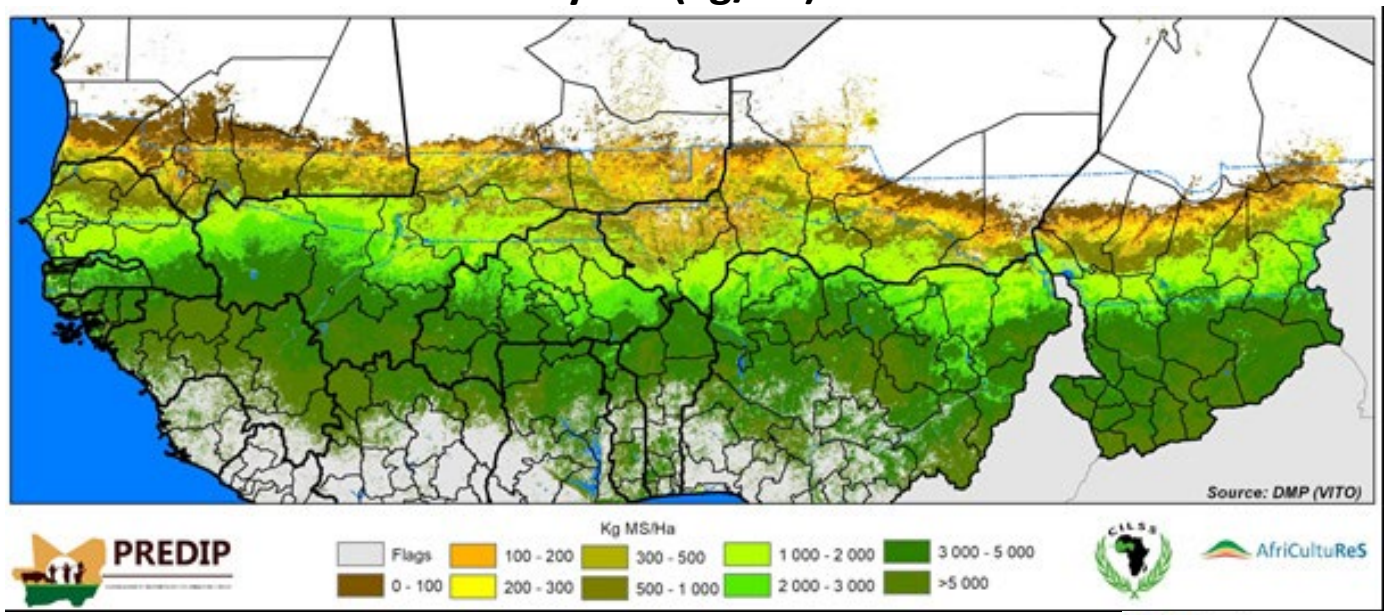


Source AGRHYMET AMESD/MESA e-station

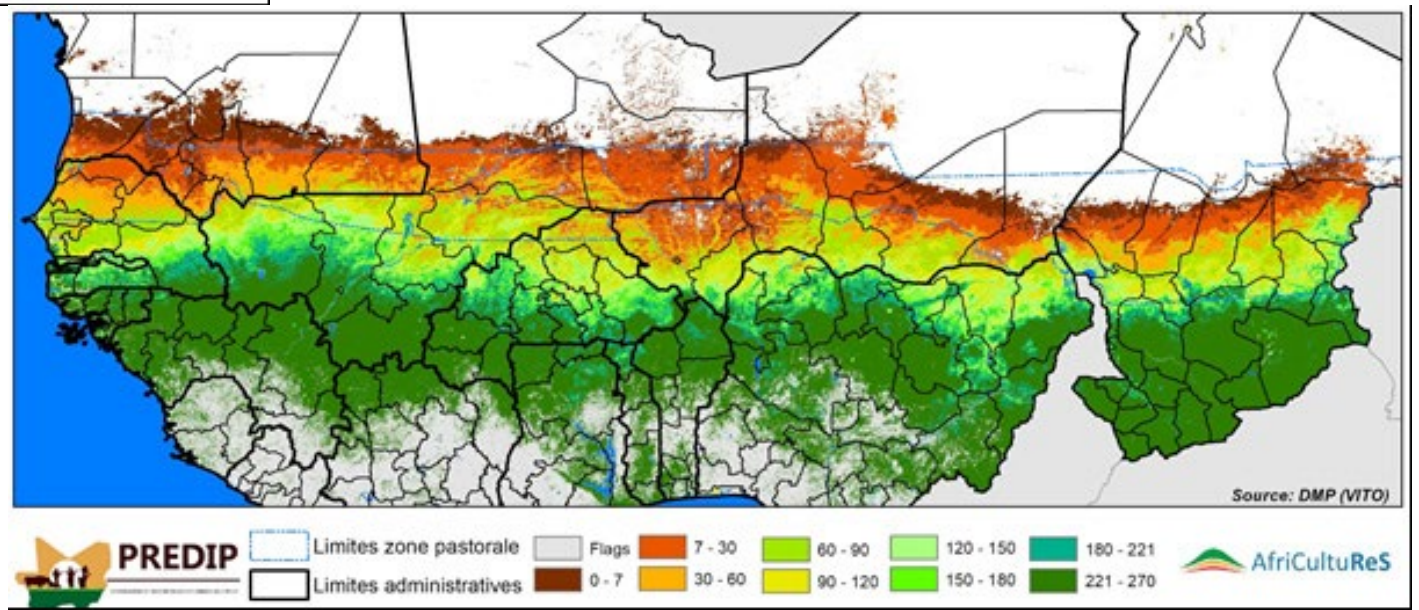
MESA
Monitoring for Environment and Security in Africa

Vegetation monitoring

Potential biomass yield (kg/ha)



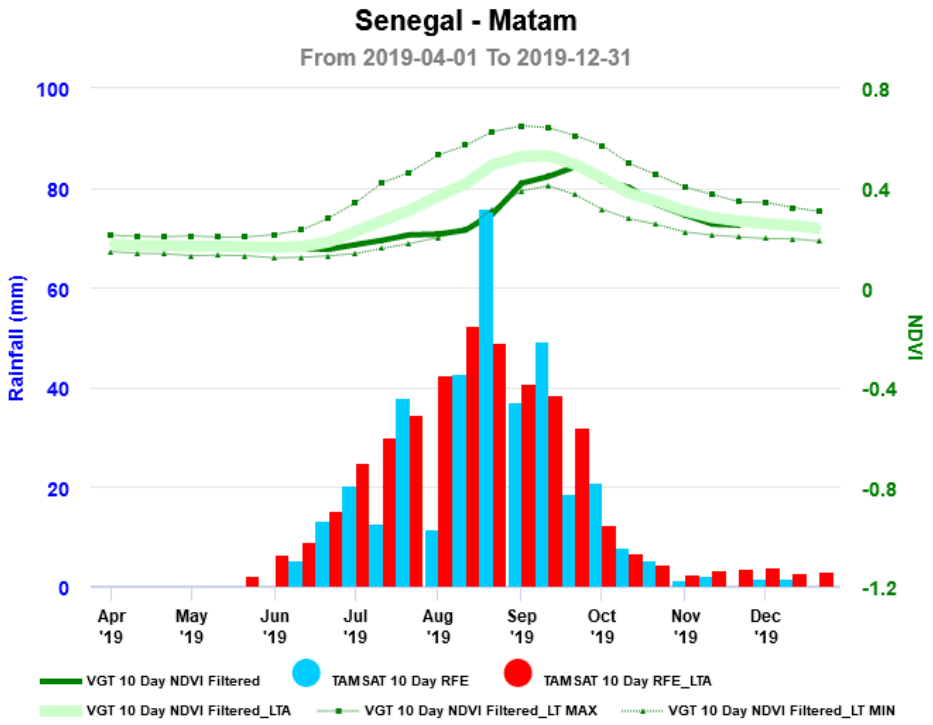
Livestock carrying capacity (days)



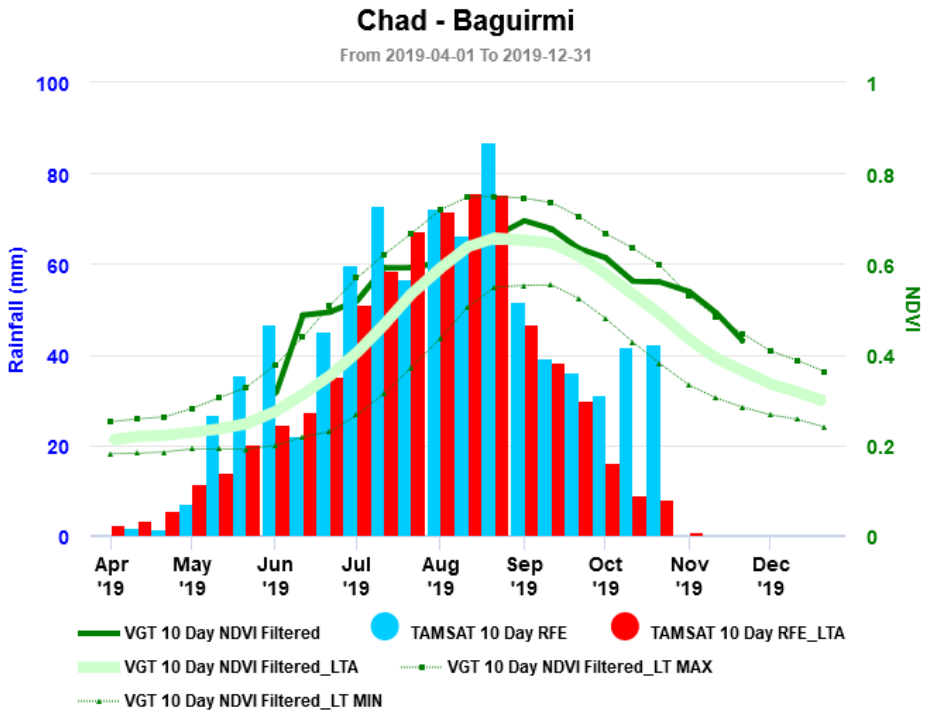
Rainfall and Vegetation Monitoring

Rainfall and vegetation indices profiles per administrative units

Northern Senegal 2019



Southern Chad 2019



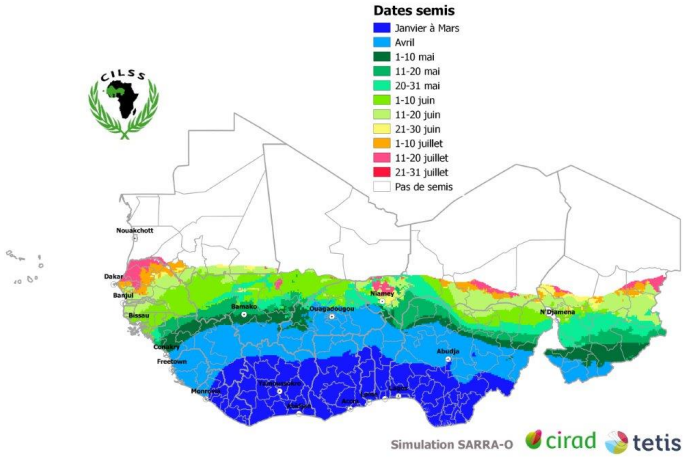
Source AGRHYMET AMESD/MESA e-station

MESA
Monitoring for Environment and Security in Africa

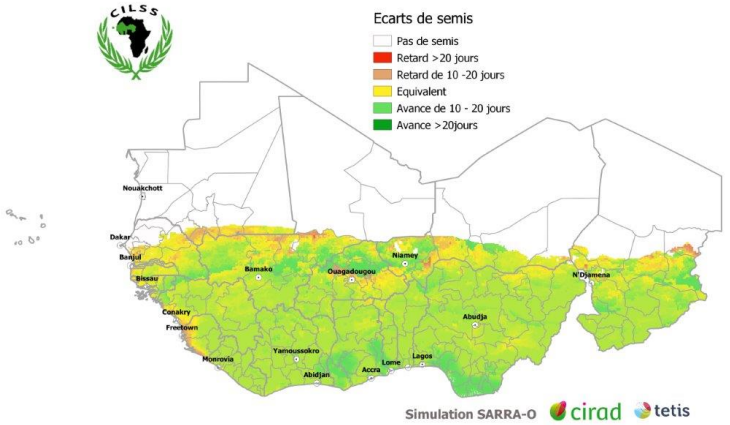
Crop monitoring and Yield Forecasting

Outputs of the SARRA-O crop model

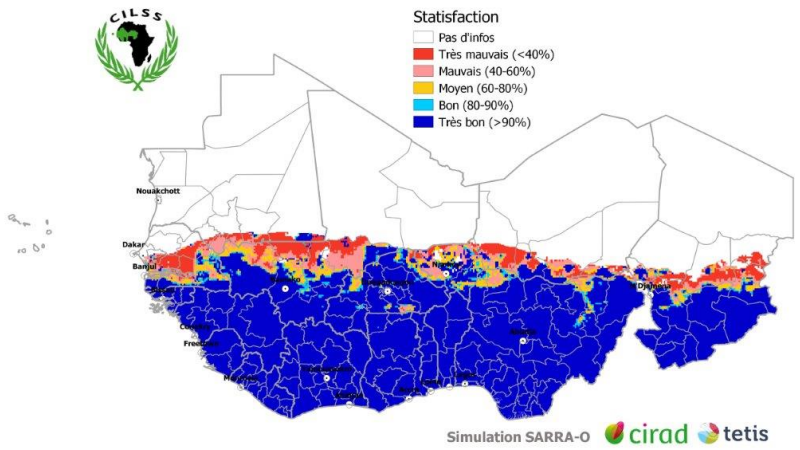
Starting dates of the season



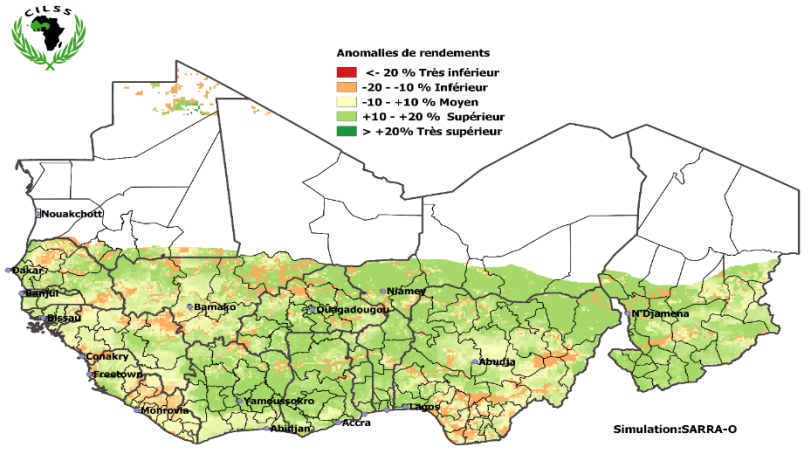
Anomalies of starting dates relatively to the last 5 year average



Water requirements satisfaction indices Photoperiod sensitive Millet

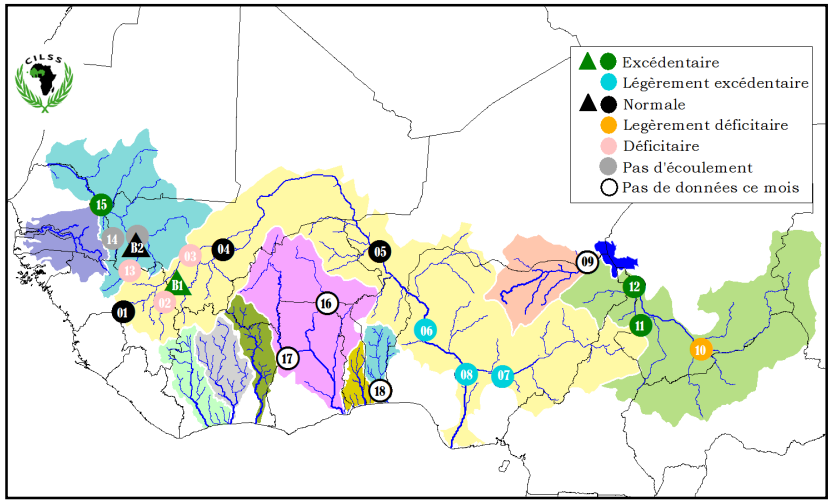


Potential yield anomalies relatively to the last 5 year average Maize 90 days

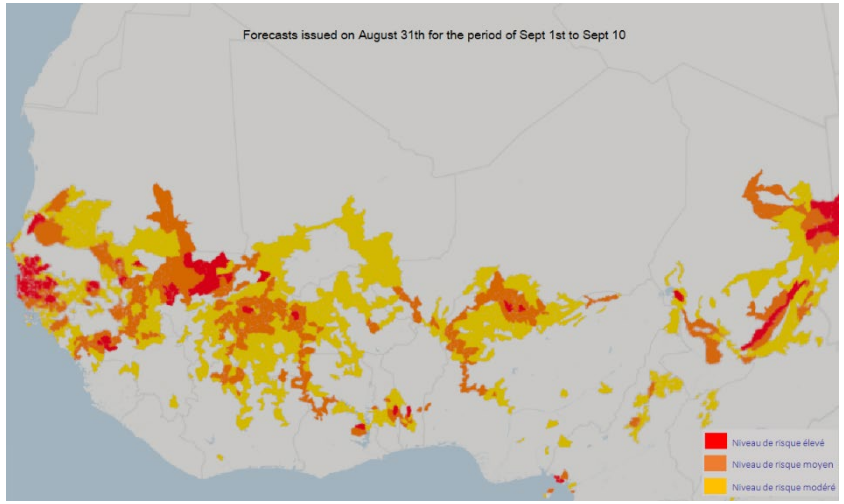


Water resources monitoring and flood risk assessment using hydrological (rainfall – runoff) models

- **Satellite rainfall estimates and PET are used to evaluate water resource availability and assess flood risk, as well as the impacts of climate change on water resources**
- **Examples used by AGRHYMET**
  - **HYPE (in FANFAR)**
  - **SWAT**
  - **GEOSFM**



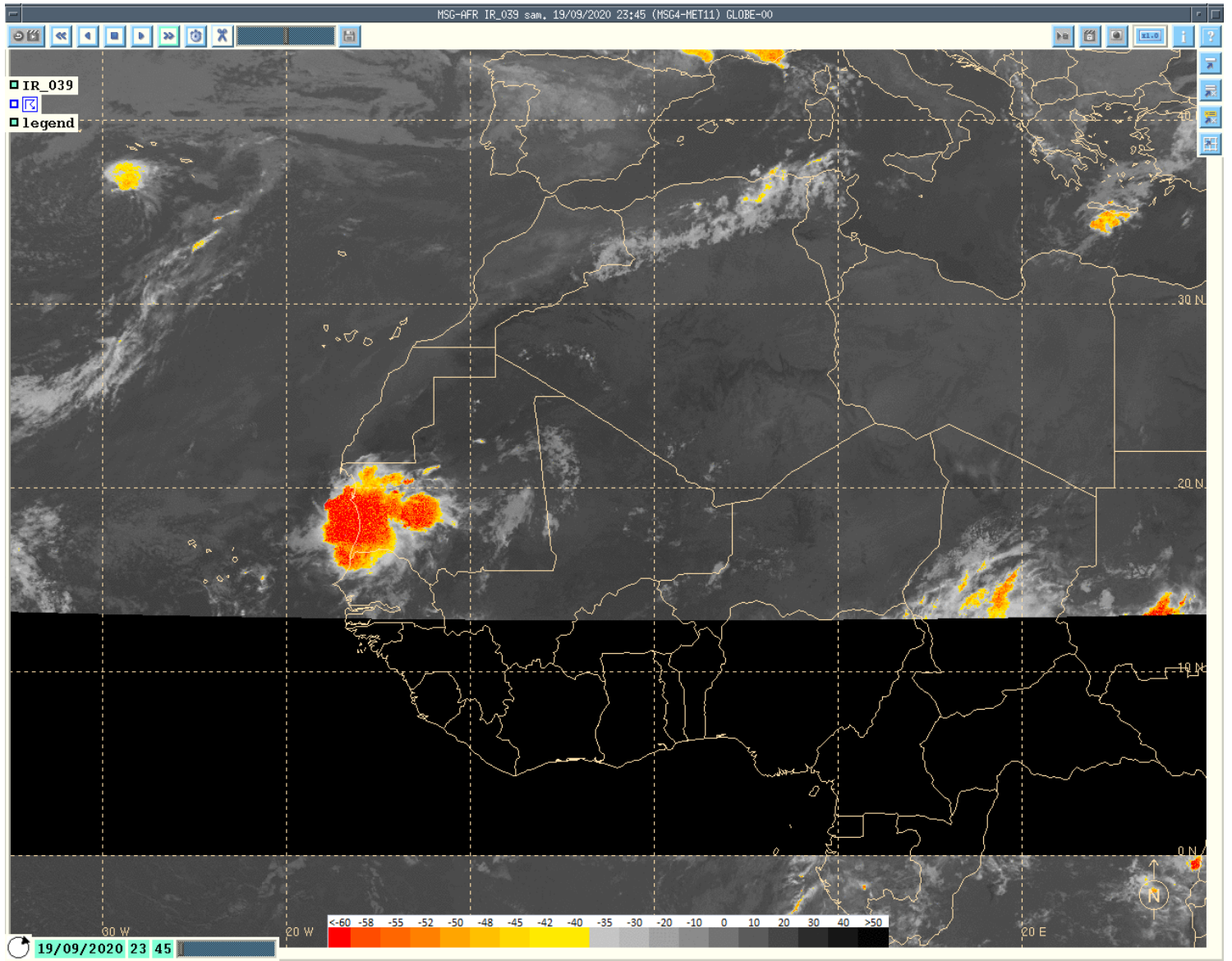
Water resources monitoring



Flood risk assessment

Weather Forecasting

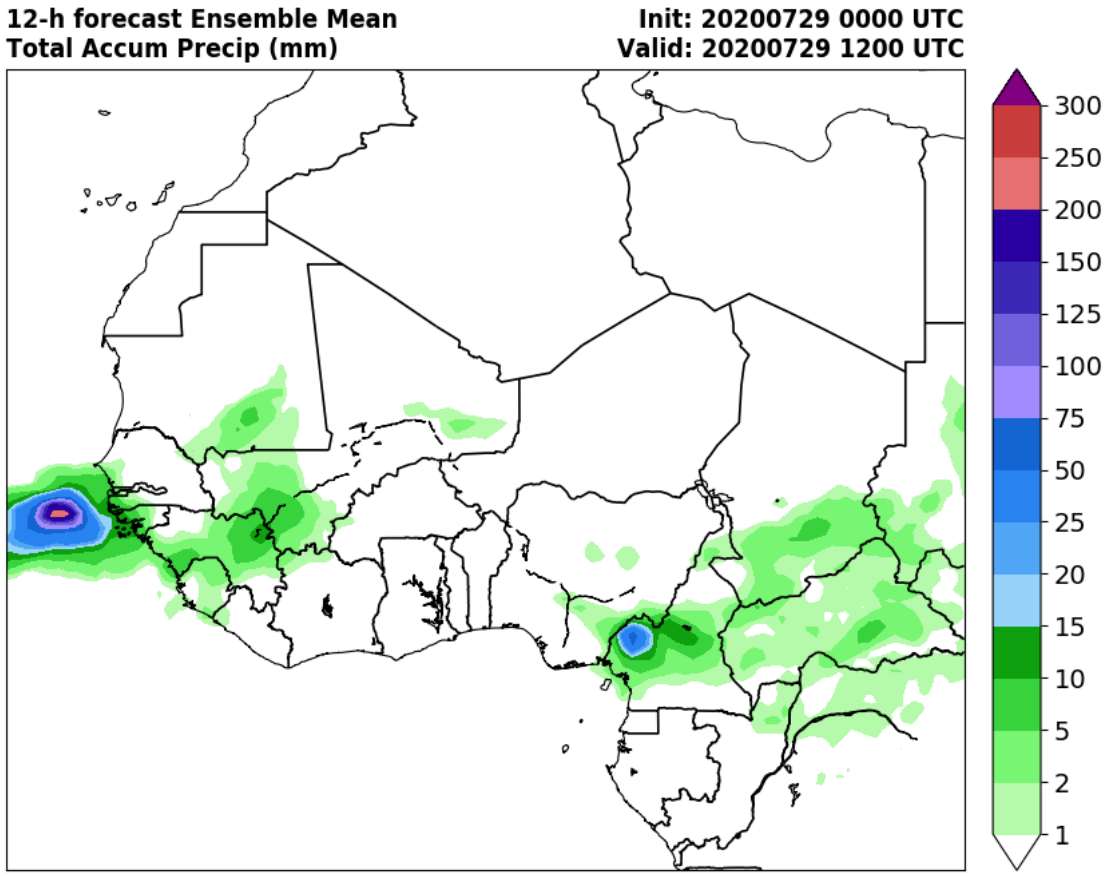
Nowcasting with the PUMA Station



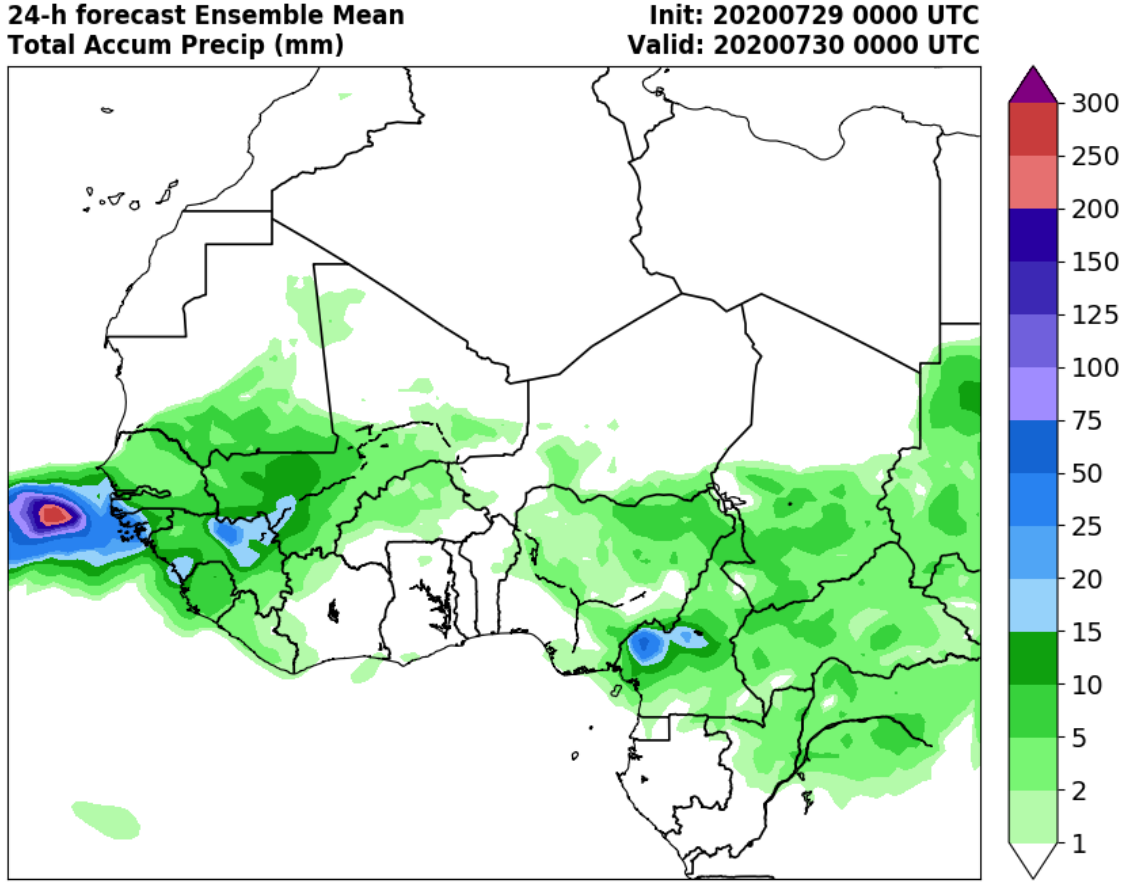
Weather Forecasting

Outputs of the WRF model

Ensemble mean, next 12 Hours



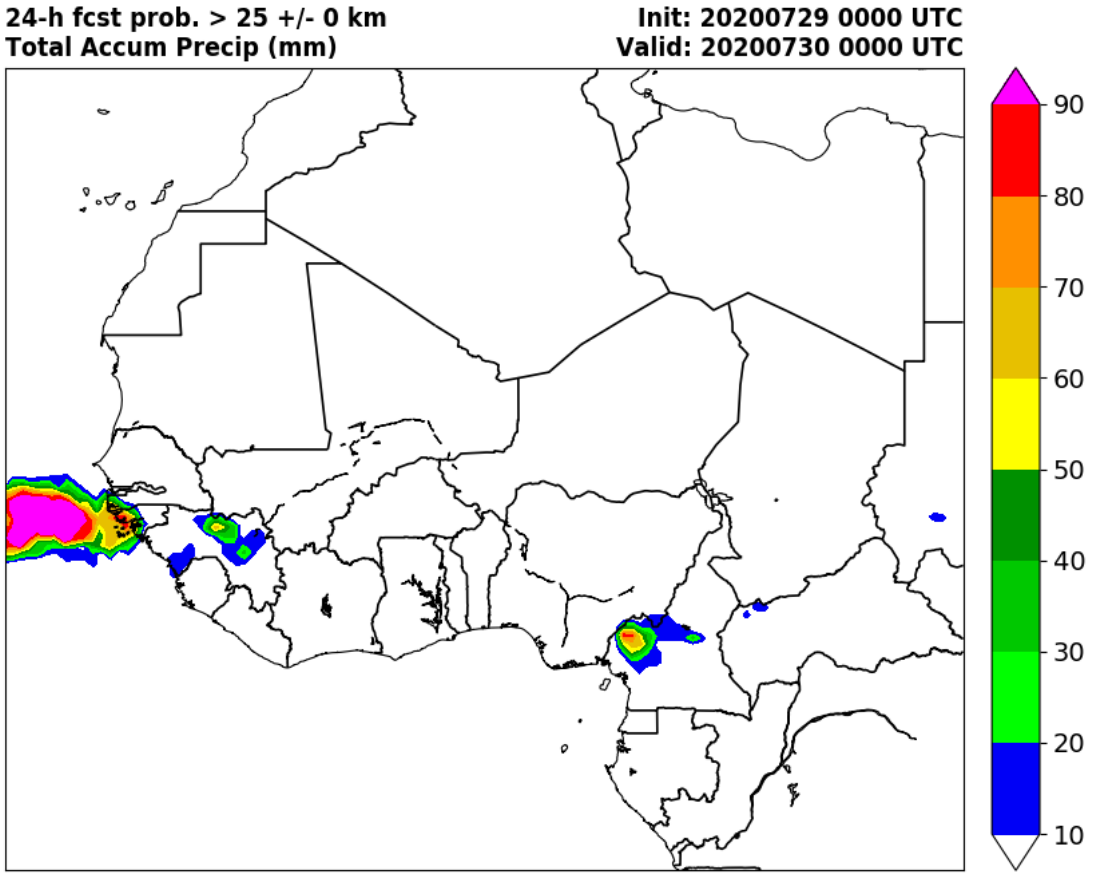
Ensemble mean, next 24 Hours



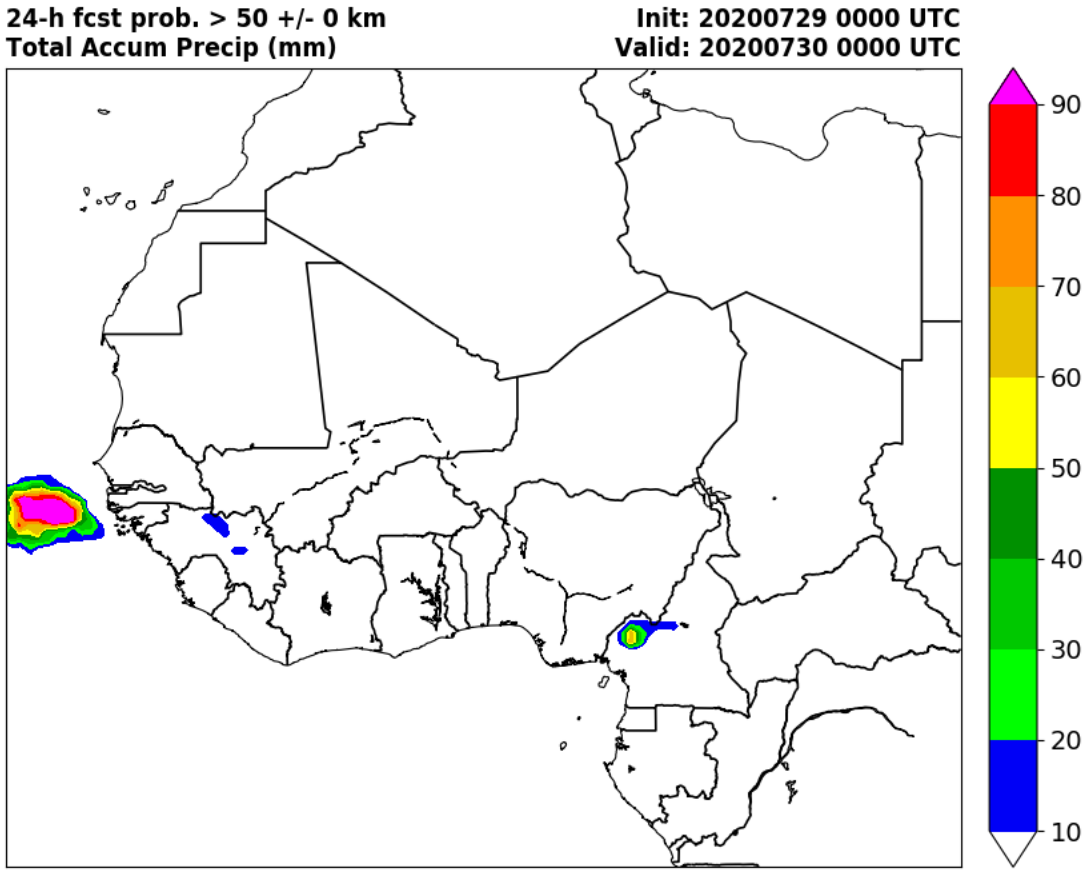
Assimilation of satellite products to improve weather forecasts

Outputs of the WRF model

Probability of getting more than
25 mm in the next 24 Hours



Probability of getting more than
50 mm in the next 24 Hours



Partnerships

- **EUMETSAT, JRC, VITO, FEWSNET, IRI, CIRAD, ACMAD, etc...**
- **National Meteorological and Hydrological Services**
- **National Agricultural Research Institutes,**
- **Universities**

Thank you for your attention