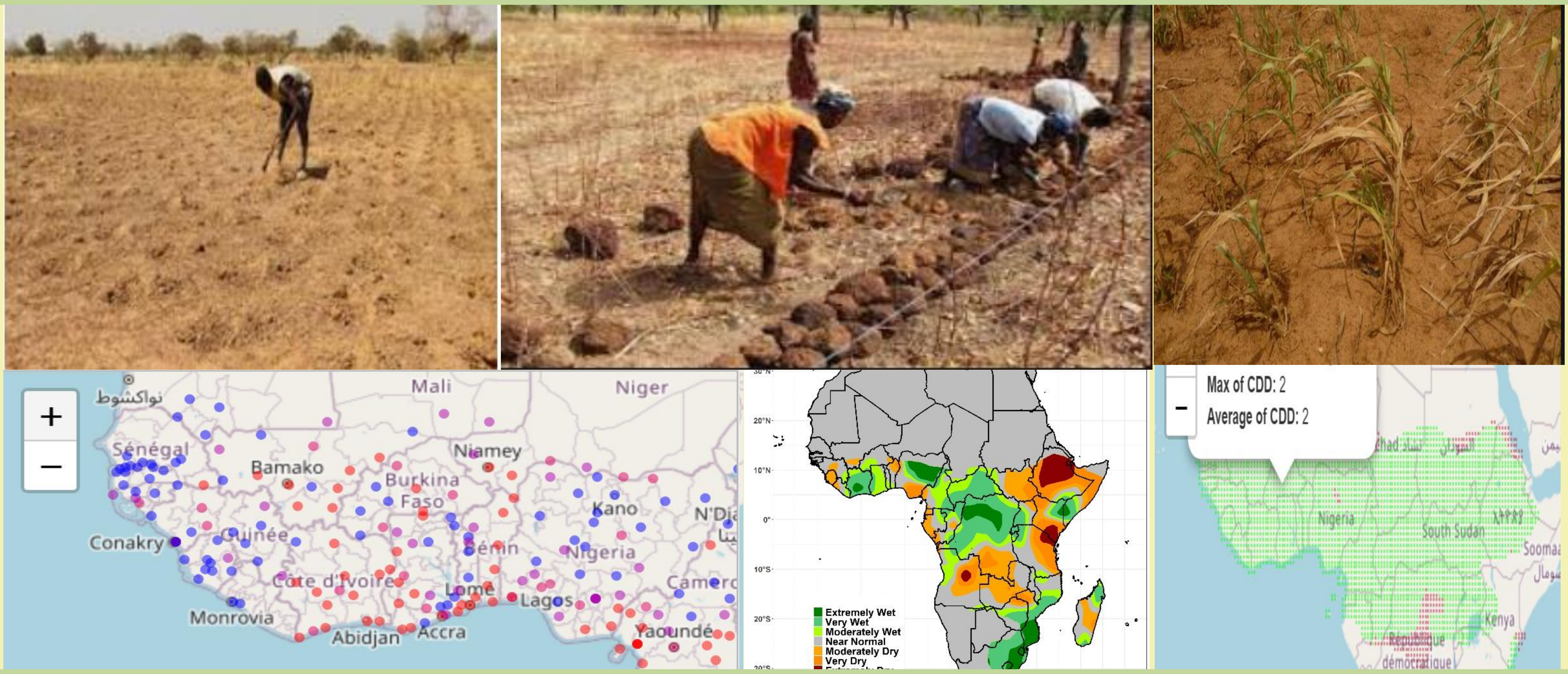
AIMS African Institute for Mathematical Sciences NEXT EINSTEIN INITIATIVE

ACMAD

Climate data analysis for resilient agriculture systems in Africa



MATHEMATICAL SCIENCES FOR CLIMATE RESILIENCE INTERNSHIP PROGRAM (MS4CR-IP)

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Abstract

The impacts of weather on crop yields is an important aspect of food security. The climate data was used through real-time algorithms that were developed to provide climate information products, services specifically tailored to the needs of agriculture, for customized decision support and season monitoring products.

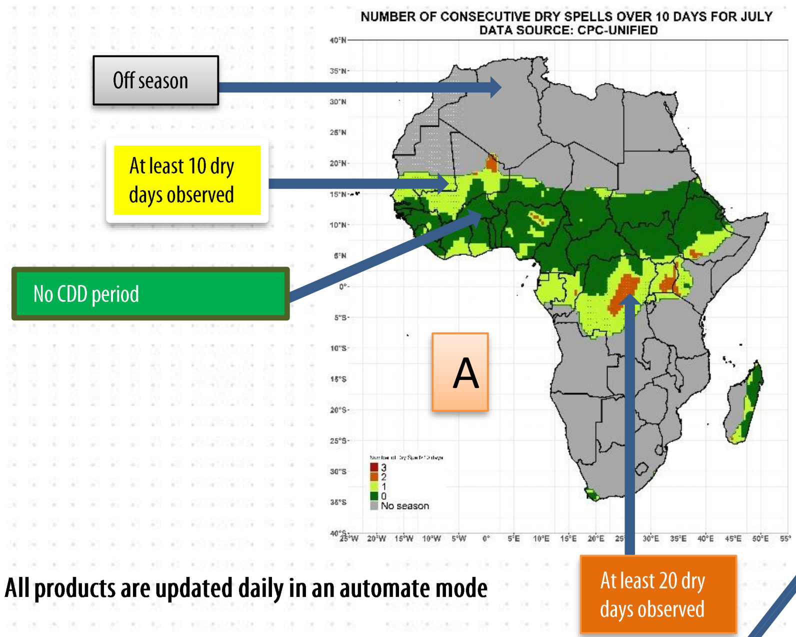
Introduction

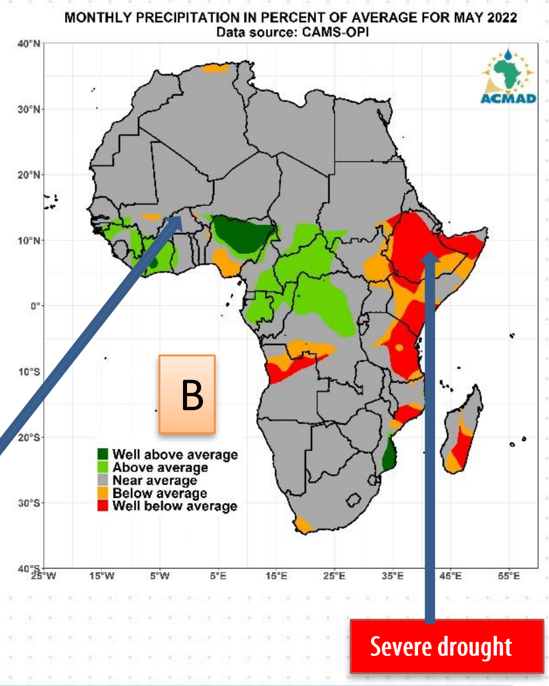
The impacts of drought periods on crops depend on when they occur during the growing season. Thus, detecting the onset of these drought periods, or even preventing them, would allow the farmer and decision-makers to adopt healthy and beneficial practices. In order to propose decision support tools, we have :

- Develop an algorithm to detect the beginning and end of the season
- Develop algorithms for drought monitoring
- Develop algorithms to detect dry spells
- Determine the number of wet days
- Build iterative maps to take into account all information in real time.

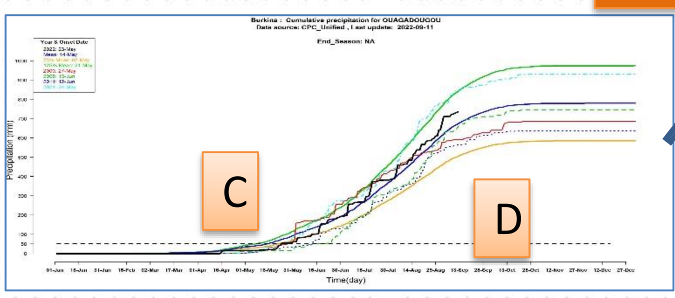
Methodology & data

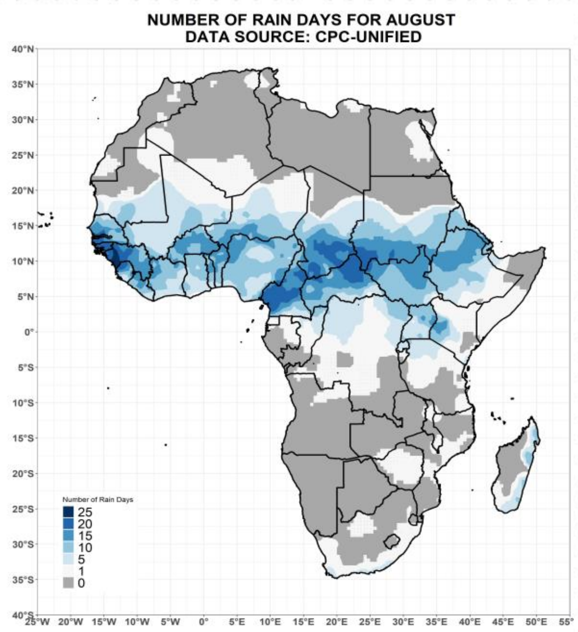
- **DATA SOURCES**: CHIRPS, CPC-UNIFIED and CAMS-OPI which provide daily data.
- The data were collected and processed online in an automatic way with the R 3.5.
- For the judgement criteria, we used:
  - Dry spells observed
  - The number of rainy days
  - Monthly Precipitation in Percent of Average and Soil Moisture Anomaly.
  - The dry spell trend
  - Determination of the beginning of the agricultural season and the end of the agricultural season
  - Static maps and iterative maps





All products are updated daily in an automate mode





Discussion

- ✓ Automatic detection and identification of drought formation:
- ✓ Establishes an early warning system capable of highlighting areas at risk of drought.
- ✓ Implementation of iterative maps that will be available on the website to give all the necessary information for the agricultural season
- ✓ Detection of the beginning and end of the season: it allows farmers to plant at the right time to avoid unnecessary seed losses.
- ✓ This should allow decision makers and farmers to take action before disaster strikes.

Results

A: Allows to observe the number of dry spells over 10 days for the July month

B: Allows to observe the anomaly of the cumulated rainfall for the month of May

C: Allows to observe the start of the season on the station of ouagadougou

D: Allows to observe the number of rainy daysthe month of August

Conclusion

- ❖ Climatic data have been used to develop decision support tools. These tools allow to follow the evolution of the agricultural season, to evaluate the risks in a continuous way.
- ❖ Other tools will be developed with the forecasting data to add dry spell and rainy day prediction.

References

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