WORLD METEOROLOGICAL ORGANIZATION

REGIONAL CLIMATE CENTRE FOR WEST AFRICA AND THE SAHEL

The Regional Climate Centre for West Africa and the Sahel (RCC-WAS) is hosted by the Centre Régional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationelle (AGRHYMET), a specialized institution of the Comité permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel (CILSS), located in Niamey, Niger.

Linkage with Global Climate Centres

RCC-WAS utilizes materials from the Data Library of the International Research Institute for Climate and Society (IRI), the National Centers for Environmental Prediction of the United States of America's National Oceanic and Atmospheric Administration, the Met Office of the United Kingdom and the European Centre for Medium-Range Weather Forecasts (ECMWF) to perform the seasonal prediction and climate monitoring functions.

Linkage with WMO Regional Climate Centres

RCC-WAS maintains regular contacts with the WMO African RCC to jointly organize the two Regional Climate Outlooks Fora (RCOFs) in West Africa that are listed in the next section. It also collaborates with the WMO RCC Intergovernmental Authority on Development.

Linkage with WMO Regional Climate Outlook Fora

RCC-WAS has organized two RCOFs annually since 2012:

- Prévisions Climatiques Saisonnières en Afrique Soudano-Sahélienne (PRESASS) in late April
- Prévisions Climatiques Saisonnières pour les Pays du Golfe de Guinée (PRESAGG) in late February.

Mandatory functions

All WMO RCCs fulfill a set of mandatory functions related to seasonal prediction, climate monitoring, data services and training. Listed below are those performed by the RCC-WAS.

Seasonal prediction

The Centre provides:

- Monthly and seasonal prediction of precipitation and temperature
- Seasonal prediction of agro-hydro-climatic characteristics (rainfall, onset and cessation dates of rainy season, dry spells, river flows).

The prediction products are performed with the IRI Climate Predictability Tool (CPT) or the Python CPT (PyCPT).

OVERVIEW

Domain of responsibility: West Africa and the Sahel

Languages: French, English, Portuguese and Arabic

Status: Demonstration phase initiated in September 2021

Climate features

The geographical domain of West Africa and the Sahel extends from the Sahara in the north to the tropical forests to the south. It comprises three agroclimatic zones that follow a latitudinal rainfall gradient.

The rainfall regime is linked to the seasonal movement of the Intertropical Convergence Zone, where hot and dry northeast trade winds in the Northern Hemisphere converge with humid southeast winds from the Southern Hemisphere.

The phases of the El Niño Southern Oscillation and the sea surface temperature anomaly pattern in the Tropical Atlantic Ocean and Indian Ocean are important drivers of the West African monsoon activity. In addition to these global phenomena, the effect of continental surface processes on the dynamics of the monsoon, such as vegetation, soil moisture, water cycle or albedo, are also important.

Agroclimatic zones	*Rainfall and seasonality*	*Average temperatures of the coolest and hottest months (1991–2020 climatological period)*
Sahelian zone	Rainy season: June–October Maximum rainfall: July-September	January: 27.2 °C May: 39.5 °C
Sudano-Sahelian zone	Rainy season: May–October	January: 19.4 °C May: 35.6 °C
Sudano-Guinean zone	Two rainy seasons: March–July and September–December	January: 18.5 °C May: 28.1 °C

Social media:

Climate monitoring

RCC-WAS provides the following monthly climate monitoring products:

- Sea-surface temperature indices
- 10-day latitudinal position of the Intertropical Front
- Precipitation totals and anomalies
- Maximum, minimum and mean temperatures
- Standardized Precipitation Index
- Monthly outlooks describing the evolution of the Intertropical Front position, rainfall amounts and anomalies and temperature anomalies.

It performs analyses of climate extremes, conducts 10-day briefing and issues advisories on drought, flood and crop pest risk as well as on food and nutritional security.

RCC-WAS also contributes to the annual WMO report on the State of the Climate in Africa.

Data services

Historical records of several climate variables are available in the regional database. The records are of diverse lengths and completeness depending on the parameter, the station and/or the country. The database includes daily rainfall, maximum and minimum temperatures, maximum and minimum relative humidity, wind speed, sunshine duration, water vapor pressure, river flow and rainfall-derived data on the onset and cessation dates of rainy seasons.

The longest, most updated records are for daily rainfall, which started in 1897 and run to the present day.

AGRHYMET generates merged data on rainfall and temperature (satellite and station data), using the Climate Data Tool (CDT). The data are available in NetCDF format.

Training

RCC-WAS conducts diverse training events:

- Workshop on data management (CLIDATA, Climsoft, HYDROMET)
- Workshop on seasonal prediction (CPT, PyCPT, R-Instat)
- Workshop on climate analysis and monitoring (R-Instat, CDT)
- Workshop on data homogenization and quality control (RClimdex)
- Training in agrometeorology, hydrology, instrument maintenance and microcomputing, climate change and sustainable development

Recommended functions fulfilled

WMO RCCs are recommended to perform certain functions. Listed below are those performed by RCC-WAS.

Climate prediction and climate projection

RCC-WAS produces forecasts for dry spells, the onset and cessation dates of rainy seasons and on river flow during PRESASS and PRESAGG sessions and when these are updates.

Subseasonal predictions of total rainfall, consecutive dry days, number of rain days, maximum and minimum temperatures and evapotranspiration are produced with the support of the Climate Hazards Center of the University of California, Santa Barbara.

Flash flood alerts are issued with the Operational Flood Forecasting and Alerts Tool (FANFAR). Desert locust invasion alerts are also provided during the rainy season.

Non-operational data services

RCC-WAS makes its database management systems available to all the National Meteorological and Hydrological Services (NMHSs) in the region.

Coordination

RCC-WAS helps NMHSs in maintaining their MESA and PUMA stations. It receives rainfall and temperature data from most of them for agricultural monitoring.

The media is also provided with training on the outcomes of RCOFs and climate information at both regional and national levels.

Training and capacity building

RCC-WAS financial resources and technical assistance support NMHSs in organizing national communication workshop on the outcomes of RCOFs.

The staff of NMHSs regularly receive on-the-job trainings in diverse application areas – seasonal prediction, numerical weather prediction, climate monitoring, crop monitoring, climate change scenarios and impact assessments, etc. – at RCC-WAS. In addition, RCC-WAS conducts national training workshops when requested by the NMHSs.

Research and development

RCC-WAS performs climate change assessment studies on observed temperature and rainfall trends and on the potential impacts on crop yields and water resources using the Coupled Model Intercomparison Project 5 (CMIP5) projections.

It has also organized two international conferences on climate change in West Africa and in the Sahel, the latest in 2022, to discuss the achievements and needs in climate research and its impacts on the agricultural sector.

Success story

RCC-WAS provides seasonal climate prediction and monitoring products to inform the meetings on Prévention et Gestion des Crises Alimentaires au Sahel et en Afrique de l'Ouest (PREGEC) and Réseau de Prévention des Crises Alimentaires (RPCA), organized by CILSS and its partners.

It has recently developed two mobile applications:

- ClimObs for keying meteorological observations and sending data to a central server
- e-AgriMet to send climate and agrometeorological information to agricultural producers.