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# AFRICA'S CLIMATE HELPING DECISION-MAKERS MAKE SENSE OF CLIMATE INFORMATION





GENERAL READERS

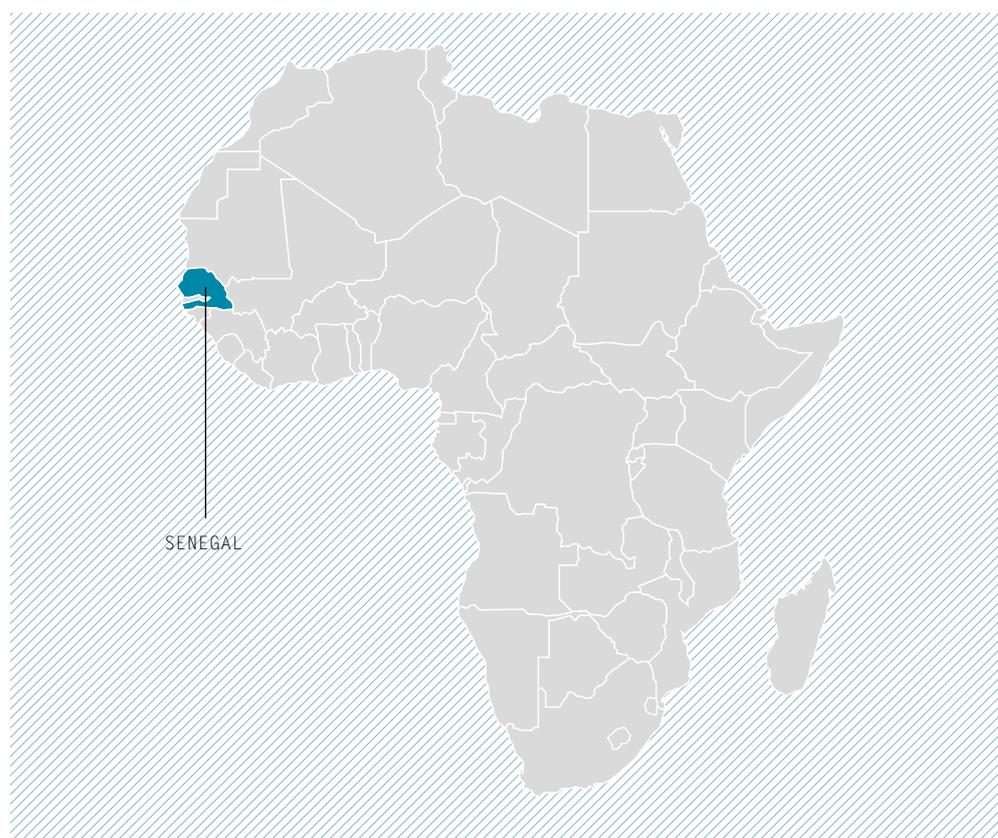
**SENEGAL**  
COUNTRY  
FACTSHEET

# CLIMATE INFORMATION AND AGRICULTURAL PLANNING

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## AUTHORS

Ndjido Kane, Benjamin Sultan,  
Laure Tall, Emma Visman,  
Gino Fox



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## NEED TO KNOW

Climate information needs to be packaged in a way that is widely and easily accessible to those who need it most. This factsheet considers:

- the need for climate information for agricultural planning to be appropriate to the timescales (for instance, seasonal planting, as well as longer-term infrastructure planning), and zoomed in to the right local scale
- the need for it to be accessible and understandable, while being frank about the uncertainties inherent in the science of modelling the future climate
- how policy-makers craft national and regional policies that account for extreme events, as well as the uncertainties in forecasting.

**To better tackle the effects of climate variability, national and regional policies should take into account extreme events and uncertainty in forecasts**

### AGRICULTURE, CLIMATE, AND PLANNING FOR CHANGE

West Africa has experienced some of the most extreme rainfall variability anywhere in the world in recent decades. This has impacted on food security in Senegal, owing to the fact that extreme weather events (particularly droughts and heavy rainfall) have impacted on agricultural yields. Climate change and rapid population growth can make this even worse. Better access to reliable climate information underpins effective planning towards mitigation and adaptation within the agriculture sector.

However, agriculture planners in Senegal do not always trust or use climate information in their decision-making and planning. This is because:

- climate information doesn't meet stakeholders' needs, in terms of the time and geographical scales of the information
- there is uncertainty in climate projections, and climate impacts
- the information isn't accessible, because it is not well distributed (rural people, in particular, don't know where to find climate information).

To better tackle the effects of climate variability, national and regional policies should take into account extreme events and uncertainty in forecasts.

The government of Senegal invests more than 10% of its Gross Domestic Product (GDP) in agriculture each year. The sector employs more than 70% of the population and supplies the main source of livelihood and income in rural areas at risk of food insecurity. The country has therefore identified agriculture in its long-term vision, the Emerging Senegal Plan, as the primary driver for food security and socio-economic growth by 2035.

Senegal's agriculture is based both on cash crops (groundnuts, cotton, horticultural products), and food crops (mainly cereals). The country has vast arable lands, important water resources, and capacity to switch from being a net importer of food products, to an exporter.

### SENEGAL'S CLIMATE: PAST, PRESENT, AND FUTURE

#### Climate change is already happening here

Historically, west Africa has recorded decades of severe drought, interspersed with cycles of above average rainfall. This has reduced agricultural production significantly. Climate changes in Senegal are communicated through precipitation and temperature data.

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The analysis of rainfall from 1921 to 2014 showed a clear downward trend, albeit with improved annual totals from 1999. The decrease in annual quantities is thus accompanied by some irregularity that is manifested by a succession of years of deficit and surplus phases.

Extreme weather events across the west African region in recent years appear greater than can be explained by the natural climate variability: land surface temperature has increased by 0.5°C or more, on average, during the past 50 to 100 years; there is also a significant increase in the temperatures recorded on the hottest days and coolest days, in some parts, according to the 2013 United Nations Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report.

In terms of rainfall, the latest trends show the most significant change has happened in the semi-arid regions. Projections indicate a 20% reduction of the length of the growing period in 2050, and early end-dates of rainfall that are now negatively impacting locally on agriculture.

In summary, these climate variations observed in Senegal and across west Africa agree with the IPCC scenarios and indicate that climate forecasts could be used with 'moderate confidence' for agricultural planning.

### **More climate change to come**

Climate modelling projections suggest that the average temperature here will increase by between 3°C and 4°C by 2050, that there will be an increase in the number of hot days. There is likely to be a decrease in rainfall over the Sahel region.

These changes will contribute to a likely shortening of the agricultural growing season by about 20% by 2050. The rainy season will end earlier than normal, which will have negative consequences for agriculture.

The observed changes in climate in Senegal and across west Africa are in step with the IPCC's scenarios for future climate change here. This confirmation of the robustness of the information suggests that policy-makers can use them in agricultural planning with a good degree of confidence.

### **Climate variability, and costs of extremes events**

Climate variability will worsen existing stresses on west African agriculture: higher temperatures and increased potential evapotranspiration will make farming systems less productive and more vulnerable.

Integrated assessment studies suggest that damages from climate change, relative to population and GDP, will be far more significant in Africa than in any other region in the world. For example, a mean temperatures rises of 2°C by 2060 will cost the equivalent of 3.4% of Africa's GDP. Adaptation costs in Africa are estimated at US\$ 20–30 billion per annum over the next 10 to 20 years. Simulations made to support Senegal's national climate commitment, the Intended Nationally Determined Contribution (INDC) to the United Nations, estimate at US\$ 14.6 million the total cost of adaptation options to climate change by 2035, of which US\$ 1.6 million are in the agriculture sector.

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## **TOWARD A FITTING POLICY**

Policy-makers and other stakeholders are acutely aware of the implications of climate change for the region's agriculture. Without appropriate adaptation measures, climate change could affect food production in Senegal negatively. Policy-makers therefore need access to reliable

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climate information, including better assessments of the likely impacts of climate change. With this, they can create the necessary policies, and prioritise interventions to support the most vulnerable.

In 2006, Senegal initiated an adaptation and mitigation policy in line with intentional trends, including a National Adaptation Programme of Action (NAPA).

A National Committee on Climate Change (COMNACC) was appointed by presidential decree in order to create a central platform for co-operation on climate change, and to integrate climate information to support decisions and national strategies. As a result, climate change is linked to the promotion of sustainable development as defined in the Emergent Senegal Plan.

### **Analysing the African climate to empower policies and decision-making**

Researchers who are focusing on the implications of climate change for the west African monsoon (see below), aim to:

- build a dialogue with the stakeholders' community
- develop methodologies for using climate and impacts models
- use pilot sites in Senegal and Burkina Faso to demonstrate the benefits of climate risk management.

Since west African countries share similar climate challenges, the approach is to take these local-level solutions, and apply them more broadly across the region and in other sectors, such as health, energy, and water resources.

Using more refined and accurate climate information, researchers will work with decision-makers, stakeholders, and technologies that can support policies in the mid- to long-term.

A pilot study in Senegal will experiment with ways of adapting the agriculture within the context of the African monsoon, to enhance productivity and resilience across the region.

Researchers hope to provide decision-makers with science-based climate information that addresses:

- the potential of biodiversity to adapt to climate extremes
- intensified and agro-ecological agricultural practices and planning adapted to climate projections
- ways to mitigate dry spells, and developing heat-resistant varieties.

These will help build climate-resilient frameworks for agricultural planning.

# FCFA'S AMMA-2050 PROJECT

## Project objectives

AMMA-2050 will improve understanding of how the west African monsoon will be affected by climate change in the coming decades – and help west African societies prepare and adapt. The AMMA-2050 team will investigate how physical processes interact to cause 'high impact weather events' such as storms and heawaves that affect lives and livelihoods. Not only will they look at how the total amount of rainfall is likely to change – but also at how rainfall is likely to be distributed throughout the wet season. For example, heavy rainfall concentrated in just a few hours places great stress on human settlements, infrastructure and agriculture. By applying expert judgement, they will identify adaptation options in water resources and agriculture. See [www.futureclimateafrica.org/project/amma-2050](http://www.futureclimateafrica.org/project/amma-2050)

## The organisations involved in AMMA-2050 are:

- Centre for Ecology and Hydrology (UK)
- National Agency for Civil Aviation and Meteorology (Senegal)
- Félix Houphouët – Boigny University
- University of Cape Coast
- Senegalese Institute for Agricultural Research
- VNG Consulting Limited
- University of Leeds
- Met Office (UK)
- University of Sussex
- Institute for Development Research – Hydrology and Environment (France);
- Pierre Simon Laplace Institute – Oceanic and Climate Laboratory
- French Agricultural Research Centre for International Development
- National Centre for Meteorological Research – the Meteorological Atmosphere Study Group (France)



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# CONTACT US

## Future Climate for Africa

Jean-Pierre Roux, Manager  
CDKN Africa / SouthSouthNorth  
55 Salt River Road  
Salt River  
Cape Town 7925  
South Africa  
+27 21 447 0211  
Email: [info@futureclimateafrica.org](mailto:info@futureclimateafrica.org)

 [@future\\_climate](https://twitter.com/future_climate)  
[www.futureclimateafrica.org](http://www.futureclimateafrica.org)

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