

# **National Climate Outlook Forum**

## **Kiremt 2022 Impact Assessment and Bega 2022/23 Climate Impact Outlook**

**Asaminew Teshome | Teferi Demissie**

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Report



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## **Kiremt 2022 Impact Assessment and Bega 2022/23 Climate Impact Outlook**

**Accelerating Impacts of CGIAR Climate Research for Africa  
(AICCRA)**

**September 2022**

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Titles in this series aim to disseminate interim climate change, agriculture, and food security research and practices and stimulate feedback from the scientific community.

### **About AICCRA**

The Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) project is supported by a grant from the International Development Association (IDA) of the World Bank.

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## **Acknowledgments**

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## **About the authors**

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## Background

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Ethiopia meteorological Institute (EMI) established as an autonomous government organization in 1980 under proclamation No 201/1980. The mission of EMI is to provide weather, climate and early warning services that contribute to socio-economic activities of the nation, and protect lives and property. This will be achieved by collecting, analyzing, forecasting and communicating meteorological and related information. The institute mainly focuses on three strategic pillars. The first is to ensure meteorological data coverage, quality and access, which include data collection, data quality control, meteorological instrument calibration data communication and data management activities. The second one is meteorological forecast and early warning advisory service which aims to improve forecasting and early warning systems; to expand sector focused advisories on forecasts to reach all communities of the country, as well as increasing understanding of the effect of meteorological parameters on agricultural development; to increase the use of hydro-meteorological observations and forecasts to drive development; to improve health and insurance services; and to improve aviation services. The other focus is meteorological research and training which aims to strengthen operational research on weather and climate systems affecting Ethiopia to improve its services and capacity building activities.

EMI prepare seasonal weather and climate its effect assessment and climate outlook for upcoming season and organize National Climate Outlook forum three times every for each seasons in Ethiopia; - namely Bega, Belg and Kiremt and Disseminate it's early and advisory services with governmental and nongovernmental stakeholders. The National climate outlook held at Kereyu hotel, Adama/Ethiopia on 22nd and 23rd of September 2022.

## Agenda

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The Agenda of the forum is

1. Assess Kiremit 2022 climate condition and forecast verification
2. Assess Kiremt 2022 weather and climate impact on different socio-economic sectors
3. Climate outlook for Bega 2022/23
4. Possible impact of Bega 2022/23
5. Discussion and conclusion

## Proceedings

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### Program Introduction

According to pre-scheduled program participant of the forum registered as EMI head quarter and regional Service Center, National and Regional stakeholders at registration arranged for each by assigned committee. After registration and participant take their sit, the master of the forum AsaminewTeshome(Dr.) introduce the program of the forum. Then Dr. Asaminew Invited Mr. FeteneTeshome Director General of EMI to deliver opening remark and invite the guest of honor for opening speech.

## **Presentations**

### **Ethiopian Meteorology Institute**

The very first presentation of the forum was delivered by Mr. Kinfe Hailemariam , Deputy Director General of Ethiopia Meteorological Institute.

### **AICCRA Overview**

This introductory presentation was given by Dr. Teferi. Dr. Tafari in his presentation explained about the AICCRA project as;- the project is implemented in 6 African country and focus on climate information service, scaling-up climate smart agriculture and it mainly focus on climate information Services including

- i) Data collection and analysis to support this we gave training on CDT and ADT. Currently we working on data risqué(Data digitizing),
- ii) Meteorological forecasting is another focus area of the project. For this we work on
  - a) Seasonal forecast

To support seasonal forecasting we scale up existing activities by giving capacity building training on PYCPT and we are also planning to give training on PYCPT second version at Zanzibar very soon.

- b) Medium range Forecast

Regarding medium range forecasting we have been working with Met. Norway and a group of expertise visited EMI and gave training on Met. Norway's experience in medium range forecasting system, on modeling experience, forecast dissemination mechanism and technology usage and we are also planning to invite six participant from EMI, to visit Met Norway to get capacity building training and learn from Met Norway experience.

- c) Short range forecast

Regarding short range forecasting we have been working in implementing NMP and we are also planning to give capacity building trainings on WRF-Hydro, which will help in flash flood forecasting system.

Moreover we work on supporting the implementation of NFCS and scale up this experience in South Africa and East Africa Regions as SA-RFCS and EA-RFCS respectively.

Furthermore we our future plan focus are, HPC Configuration, capacity building for EMI and for Regional Meteorological Service Centers.

### **Assessment of Kiremt 2022**

By TamiruKebede Under Introduction about Kiremt Season and highlighted the forecast given for Kiremt 2022. After introduction he presented the rainfall performance for each months of the kiremt Season decade by decade with respect to rainfall distribution and their percent of Normal. Mr. Tamiru also presented the heavy fall recorded in kiremt season and compared with ever recorded and he also discussed the adverse impacts occurred by climate hazards within the season Finally Mr. Tamiru presented the forecast verification, the forecast given for the season and actual happened condition.

### **Kiremt 2022 Agro-meteorological impact assessment**

This one is presented by Ms. SintayehuTewabe and in introduction part Ms. Sinatayehu introduce about agricultural activities in Kiremt Season, moisture status index(Rainfall/PET) for each Decade of months of the kiremt Season until September fist Decade.Also WRSI and NDVI was presented in similar fashion. NDVI deviation for region and Rangeland WRSI is presented in % and SPI as well. Adverse weather and climate effecton agriculture were also presented.

### **Kiremt 2022 Hydro-meteorological impact assessment**

Presented by Mr. Tamirat Yohannes, He Introduced the Kiremt season according to water sector, major river basin of the country, Aridity Index. The AI for each decade of the four months was displayed till the first decade of September 2022. He also presented the Heavy falls in each river basins month by month.The river level of each major river was displayed finally he concludes and finish his presentations.

### **Climate Outlook for Bega 2022/23**

From this part onward the forum was chaired by Mr. KinfeHailemariam, who is the deputy Director general of EMI.

The Climate outlook for Bega 2022/23 was presented by Dr. Asaminew Teshome, Lead researcher and Meteorological Forecasting and Early Warning CEO at EMI.

In introduction part Dr. Asaminew introduced about Seasons in Ethiopia, Bega season specifically, rainfall climatologically pattern of Bega season, monthly rainfall climatologically for the four months in Bega season, Seasonal Rainfall Climatology of Bega season, Below Normal and Normal and Above Normal Rainfall Threshold for rainfall eight rainfall regimes in Bega season and Percent of contribution of Bega Season for annual rainfall in each areas of the country.

Dr. Asaminew also explained as introduction about Monthly temperature and frost, Bega Seasonal Climatology divers and Global and regional drivers,

Then he presented the assessed current status and projected global features of Bega climate indicators like, Global SST departures from the last four weeks, Selected Analogues Years based on NINO 3.4 SST, 2007/08, 2010/11, 2022/23, Model Analysis, ENSO (ONDJ) forecast, IOD (ONDJ) forecast and summarized as ENSO Alert System Status: La Niña Advisory, Equatorial sea surface temperatures (SSTs) are below average across most of the Pacific Ocean, Cool anomalies are present in the north-west of the Indian Ocean basin close to the Horn of Africa, while weak warm SST anomalies continue across the east of the Indian Ocean, negative Indian Ocean Dipole (IOD) is under way, latest Indian Ocean Dipole (IOD) index value, ( $-0.79^{\circ}\text{C}$ ) and Northern Atlantic Ocean and the Mediterranean sea (SST is colder than normal condition, Generate cold frontal and less interactive weather, Less occurrence of Unusual rain, dry Bega and High occurrence of frost)

Selected analogue years based SST were displayed as 2007/08, 2010/11 and 2021/22and probability of being dry in Bega season of areas during ENSO LANINA and IOD negative is spatially displayed.

Then different global and regional model forecast outputs were assessed and displayed including multi-model ensemble (MME) Temperature forecast

Finally Bega 2023 National Climate Outlook is presented with 8 rainfall regimes and consensus tercile probabilistic forecast for the season .

At last but not least Dr. Asaminew conclude as

- Late onset of the Bega seasonal rainfall across Southern and South-eastern portions of Ethiopia.

- The anticipated Negative IOD and La Niña episode during the coming months increase the chances of below average Bega's rainfall in Southern Ethiopia.

- Moreover, La Niña episode may be contribute to the dry and cool weather for northern half of Ethiopia

- Above-normal to slightly near-normal temperature expected over the eastern, central and soothe eastern and

- Enhanced probabilities of below-normal temperatures are forecasted for much of northern, north western and soothe western during the forecast period. Thus, frost is likely to occur across highlands of Northern, North-eastern, Eastern and southern parts of the country.

- In general, in view of the prevailing and projected climate scenarios, dry Bega season is anticipated to dominate much of the south and southeastern parts of the country in ONDJ 2022/23.

- IOD index will return to negative IOD levels during October. All models indicate a return to a neutral IOD pattern by December.

- In association to this, the coming Belg season will have near normal seasonal rain across southern and southeastern Ethiopia. However, the seasonal rainfall onset maybe affected by the current systems.

- Finally, EMI will give seasonal update forecast before the onset of Belg season.

#### 4.2.7. Alternative water source

This part was presented by Dr. Tamene from Ethiopia Water Technology Institute. His presentation includes, Water Demand and Supply, Demand for dry period, Monthly climatology, Annual rainfall in mm in each wereda, Frequency of Occurrence Supply Storage A and Storage P, Package of domestic roof water harvesting system and Design criteria, Type of storage, Smart pumps performance parameters, Household water treatment option, Required materials, Conclusion, Objective of the pilot project, Delivery system, Water lifting system, Cost, Borena experience and final Conclusion

#### 4.3. General Discussion

This session is lead by H/E Dr. E/r Habtamu Itafaa minister for ministry of Water and Energy and His Excellency Mr. FeteneTeshome DG of EMI Summering and Indicating importance of the seasonal forecast opened the session for discussion

Question and comments

1. Dr. Tamengen Thanks chair, EMI forecast last year more 80% accurate. Cloud seeding is in what stage currently? Dr. Taferi is doing good job and shall continue this, extreme heavy fall and should be supported by research , Dr. Tamene good echnology usage, there were initiatives like this before and we need to work strongly on water harvesting technology usage

2. Abdursemad from MoA

We do not go as usual; the farmer is currently aware and will need climate information for planning

MoA in reform and planning to have agro-meteorology Desk

NFCS agreed and started to implement

We need to work together and to enable the grass root to get this information

We need to discuss on how to support Belg growing areas

Water harvesting technology is related and we need to work

3. Parliament member (NFCS should include EPA), It is good the MoWE and sectors are working together. Areas that has shortage of rainwater has no ground water resource problem. Hence we need to utilize it and the MoWE and should work on it. We need to use also solar pumps effectively.

4. Melese Lemma Water harvesting good technology. On suitability map we have seen on western part and we highly need it in southeastern lowlands where the evaporation high how we can able to use it in this areas

5. Nesibu from DRMC we need to work on enabling the information to reach the grass root community. The forecast given was meet the observed ground truth and this shows the forecasting skill is increased and we need to work on implementing the forecasts, there are the possibilities of occurrence of problems we phased in the past years. The water harvesting is very important we need to implement the humanitarian activities to development activities

6. Zerihun the EWTI should work with EMI and produce water resource

7. Genebesh encouraging the activities of EMI, implementing the climate/weather information and related advisory has gap. The EMI workers at lower level should work coordinately with the community

8. From Alaba we do not have in doing research and presenting it. The problem is implementing the result and findings of the research to solve the problem of our community. Infrastructure problem

9. Tesfaye Weldayes forecast accuracy improved, the forecast should downscale to woreda level to all the country. should develop dissemination strategy e.g. should work with development agent and it should be indicated in their job description.

The Question and comment was addressed by EMI DG and the minister

Session Three parallel Sessions

1) Water and Health Sector parallel sessions

Chairman for this session was Mr. Kass Fekadu

Reporters for the session were Mr. Bekele Kebebe and Mr. Dereba Muleta

Participants in this section are participants from national and regional water sector and health sectors and from hydro met and Biomet of EMI headquarter and regional service centers.

Proceeding

Presentation one Hydromet Impact outlook for Bega 2022/23(ONDJ)

By Mr. Tamirat Yohannes

Introduction

Under introduction Mr. Tamirat discussed

- Bega season is the driest season, covers from (ONDJ) October-January, is mostly a dry season for most parts of the river basin except for Ogaden, lower Wabe Shebele as well as middle and lower Genale Dawa and lower Rift Valley.

- Most of the river basins are dominated by Sunny and windy condition.
- Runoff starting to decrease and low flow occurred.
- Springs and ponds start to dry up after mid Bega season.
- Aridity Index and Status are categorized as follows

Mr. Tamirat presented Aridity status (RF/PET)\*100 for analogue years

He Summarized the analogue year AI as follow:-

October:- all main river basins especially over most part of Abay, BaroAkobo, OmoGibe, GenaleDawa and upper Wabishebele, middle and lower Rift Valley catchments have experienced humid to wet condition. This condition has positive impact for water availability over both Kiremt and Bega Benefiting catchments.

November:-The Humid moisture condition has decrease from the northern and north west and shift to south and south western catchments, especially towards some parts of Bega benefiting catchments. In line with this except 2021 and 2007 analogue years, the rest of shows most part of GenaleDawa and upper Wabishebele upper and middle BaroAkobo, OmoGibe, middle and lower Rift valley, have had sub-Humid to humid condition.

December:- During this month, most part of catchments have had arid aridity index except 2021 analogue year. This situation has negative impact on the activities need water availability especially for Irrigation and drinking water. Therefore, harvesting available water is essential.

January:-This is the last month of Bega season and almost all of the Bega benefiting catchments have had arid aridity index in the selected analogue years except for 2021/22, which has got sub humid to humid condition over upper most part of BaroAkobo, OmoGibe, eastern and southern Abay, upper Genaledawa, catchments.

POSITIVE IMPACTS:-

- Enhance water availability on hydropower, water supply and Irrigation dams in the coming Oct
- Enhance water level on rivers for small irrigation farms and livelihood.
- Improve availability of moisture condition for water resources Oct and Jan

NEGATIVE IMPACTS:-

- Lower Riftvalley, Genaledawa and Wabishele catchments are will received semi arid to sub-Humid, it may cause dry springs, ponds, reservoirs and Dams.
- Domination of Arid condition may cause low inflow and decrease Runoff over south and southeastern river basins.
- The performance of Water availability in south and southeastern catchments can be Negatively affecting due to arid conditions in the basin
- Early depletion of water resources; may lead to scarcity on surface and ground water resources.
- The rise in maximum temperature may cause the rate of evaporation over most of catchment

ADVISORY:-

Finally Mr. Tamirat given the advisory for Bega 2022/23 as follow

- Adopt water conservation techniques, for sustainable water resource for different socioeconomic activities.
- Undertake and properly manage the Early gained water harvesting resource to take advantage of the moisture stress

- Immediately disseminate Hydromet (early warning) weather and climate information to decision makers and potential users.
  - Reservoir and dams found in the south and southeastern Basins will have less probability to capture water in this ONDJ 2022/23 season.
  - We advise the responsible bodies to be prepared to control before these hazards affect the socio-economic activities of the country.
  - We advised using Hydromet early warning and forecast information updates as provided by the Ethiopia meteorology Institute (EMI) website and other medias
- Kiremt 2022 Climate Impact Assessment and impact outlook on water sector for Bega 2022/23  
Presented by: ShiferawDemissie, Ministry of water and Energy

#### Impact Assessment

##### Positive impact

- Wet Kiremt season that contribute better for water storage in most Reservoir's
- Observed high rainfall enhance availability of water in rivers, ponds and springs
- Most dams including GERD water level showed that better water storage with comparison of long mean,
- Enhance development in power generation, Irrigation and domestic Water supply

##### Negative Impacts

- Malka-wakena Dam, Tendaho, Gibe III and GenaleDawa Dams are below their expected level
- Heavy rain fall which leads high runoff and affected and damaged infrastructures (Addis Ababa-Lemi Kura,)
- Displaced peoples in some flood prone areas (Gambella, Afar)
- Due to heavy rainfall, Flood was occurred on different part of the country due to blockage of the stream channel in Addis Ababa flood damages and reported died 9 person
- Causes for landslides (Jima, Kombolcha)
- Flash and river Flooding occurs in areas like Libo, Fogera, Dera.

#### Measurement taken

To mitigate flood risk some measure are taken

- Mobilized Resources in four regions (Afar, Amhara, Gambella, Oromia)
- Prepared flood preparedness plan with DRM commission
- Awareness created for Regions to cascade the plan
- Flood protection structures constructed and maintained
- For drought response support resources (Logistics and finance) in collaboration with partners and stakeholders
- Due to Flood for IDPs Water supply and WASH items distributed
- Early warning and awareness created for minimizing flood risk

#### Expected Impact Outlook of Bega 2022/23 on water sector

##### Expected Positive Impact Outlook

- Availability of water Resource can have the opportunity for hydropower generation, water supply and Irrigation.

##### Expected Negative Impact Outlook

- Domination of below normal to normal condition may cause Water shortage and decrease soil moisture.

- Upper Wabshebelle and GenaleDawa basins rainfall performance was below normal
- Lower part of Wabshebelle and GenaleDawa basins was under water stress
- The drought condition extended for 5 consecutive rainy seasons in lower basin of Wabshebelle and GenaleDawa

#### Sectorial Advisory for Baga 2022/23

- Implement appropriate water allocation for sustainable utilization of available water .
- Undertake and properly manage the Early gained water harvesting resource to take advantage of the moisture stress
- close monitoring on the availability of water resource and aware stakeholders to take appropriate measure
- Implement water conservation measures like roof water harvesting, construction of private and community ponds.
- Proper follow up on Reservoir and dam operation
- Drill and construction of new Borehole in drought affected areas.

#### Biomet Kiremt 2022 impact Assessment and Bega 2022/23 impact outlook

By Mr. Desalengtarekeng

#### Introduction

In introduction part Mr. Desaleng explained about, Malaria, Climate Factors, Non climatic factors, Climatology for malaria transmission, Method used, RTH performance and THI (Human comfort index)

#### Summarized as

- During June 2022, the climatic conditions were favorable for breeding and spread of Malaria over; Northern, Western and South western Ethiopia.
- During July 2022, the climatic conditions were favorable for breeding and spread of Malaria over; Northern, Western, Southwestern, Central and Eastern central Ethiopia.
- During August 2022, the climatic conditions were favorable for breeding and spread of Malaria over; Northern, Western, Southwestern, Central, Eastern central and Central Southern Ethiopia.
- During June 2022, over 76% was Comfort and 18% Moderate .Except Afar and D/Dawa (6% uncomfortable)
- During July 2022, Over 78% was Comfort and 18% Moderate. Except Afar, Benishangulgumuz and Gambela (5% Uncomfortable).
- During August 2022, Over 80% was Comfort and 16% Moderate. Except Afar (4% Uncomfortable).

#### RTH Performance for Selected Analogue Years

- Oct; Suitable Climatic Condition were Observed in: W.Amhara, Beni.Gumuz, Oromia, Gambela, SNNPR/Sidamo/SER and W. Somalie.
- Nov; Suitable Climatic Condition were Observed in: Gambela , Western SNNPR/SER and Western Oromia
- Dec; Suitable Climatic Condition were Observed in:, Eastern Gambela and Western SNNPR/SER.

- Jan; Suitable Climatic Condition were Not Observed.
- Cold stressed; weather condition will be happen in highland parts of the country. Esp. in Bale highland, North shewa, Wello highland, highlands of north Gondar and south Gondar.
- Heat stress; weather condition will be happen in lowlands of Eastern Afar, Southern Somalie and Northern parts of Amhara.
- THI for cattle
- Moderately stressed weather condition will be happen in eastern parts of Afar region and the cow's in-calf rates and milk production will seriously affect.
- Mild stressed weather condition will be happen in most parts Afar, Southern Somalie and Northern border of Amhara Regions and the cow's will experience in heat stress.

#### Advisory

- Strengthen surveillance for early detection and timely action
- Educate local communities on health risks and prevention.
- Alert health professionals and local authorities to take precautionary measures
- Provide tailor-made public education and community awareness
- No standing water, Pet the right fish, Wear the right clothes, Use mosquito repellent creams and bands, Wear long pants and long sleeves to cover your skin, Use Mosquito netting over, beds and window nets, Use oil, Tents, sleeping bags.
- Schedule Work Time, Use overdressing, Use of warming foods and drinks, protect the ears, face, hands, and feet in extremely cold weather, Wear a hat and Boots
- Shelter(Shade), Ventilation, Holding and Cooling with water, Providing Drinking and Conducting water tracking, Providing animal feed and water Conduct Monitoring, control, and surveillance of animal diseases

#### Health sector Climate Impact Assessment of Kirmet 2022 and impact outlook of bega2022/23 Assessment

##### Positive Impact

- Number of malaria cases reduced in most part of the country
- Number of scabies cases reduced following ease water accesses for hygiene

##### Negative Impacts

- Flood and drought related displacement (IDP)
- Flood- Gambella, Afar, SNNPR
- Drought- Somali (Southern part), Oromia-(Bale, Guji, Harerge, Borena)
- malnutrition
- Communicable diseases like scabies, measles and respiratory infections
- Scabies increased in drought areas
- Number of malaria cases increased after intermittent rain
- Cholera cases detected in Bale zone of Oromia region
- Drought affected area
- OPV supported to reduce cases

##### Measures taken to cope up the negative Impact

- IRS conducted
- ITN distributed focused at affected areas
- Larvicide applied
- Case management

- Awareness creation and social mobilization
- PHEOC activated
- Capacity building
- o Logistic, technical and financial support provided
- Data monitoring and triangulation conducted
- Regular meeting-(daily/weekly)
- Early warning and alert message distributed

#### Recommendation(s)

##### EMI:

- Improve forecast accuracy
- Make specific the areas for forecast
- Timely communicate forecast finding
- Expand health met service beyond malaria and THI
- Conduct research to improve health met service
- Advocate EMI service to increase health met data use
- Expand and strengthen met stations
- Conduct coproduction status evaluation in mid-season
- Conduct assessment on the health met info utilization
- Cascade sectoral coordination to the branch offices
- Conduct international experience sharing visit
- o customize services and technologies

##### MOH/EPHI:

- Follow health met updates
- Update VRAM and EPRP considering health met information
- Intervene based on the health met information
- Cascade sectoral coordination to the lower structural level
- Conduct research to improve health met service
- Strengthen collaboration with other sectors

#### Expected Impact outlook of Bega 2022 Season

##### Expected Positive Impact Outlook

- Diarrheal disease expected to reduce
- Respiratory disease expected to reduce

##### Expected Negative Impact Outlook

- Malaria morbidity and mortality expected to increase
- Scabies mortality expected to increase
- Trachoma expected to increase
- Cold stress expected to increase in highland areas of the country
- Heat stress is expected in eastern and northern areas of the country
- Malnutrition cases expected in drought prone areas

#### Sectorial Advisory for BEGA 2022/223

- Disseminate early warning and alerting messages on time
- Conduct awareness creation and social mobilization
- Implement larva source management
- Distribute LLITNs to malaria prone areas

- o Ensure effective LLITNs utilization
- Strengthen disease and vector surveillance
- Follow updates on health met info

#### Question Raised During the Discussion

Q1: Kiremt 2022 had negative impacts on Tena Dam. But it had positive impacts on Koka dam. How it could be happen Koka dam is upper flow of the Tena dam?

Q2: The heavy rainfall is not the only cause of flood all places. But there is another causes to flood occurrence; like urbanization. How we can control the urbanization which caused for flash flood?

Q3: The selected analogues years during the Kiremt 2022 shows much (above normal) rainfall for river dam. But we didn't get the expected rainfall during the Kiremt 2022. What are the reason for that?

Q4: The October rainfall is more contribute for ONDJ 2022/23. Which areas are expected more positive impact on water Dam?



# AICCRA

Accelerating Impacts of CGIAR  
Climate Research for Africa



## About AICCRA

Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) is a project that helps deliver a climate-smart African future driven by science and innovation in agriculture.

It is led by the Alliance of Bioversity International and CIAT and supported by a grant from the International Development Association (IDA) of the World Bank.

Discover more at [aiccra.cgiar.org](http://aiccra.cgiar.org)

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