

A woman wearing a wide-brimmed straw hat and a blue cardigan over a grey turtleneck is looking off to the side. She is holding a white notebook. The background is a lush green field under a blue sky with white clouds. The entire image is framed by a large, stylized circular graphic with concentric arcs in shades of yellow, orange, and green.

# Workshop Report

**Subnational Training on Use of the Kenya  
Meteorological Department's ENACTS Maprooms:  
Coastal Kenya**

November 2022



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



### **To cite this workshop report**

Grossi A, Ruirie O, 2022. Subnational Training on Use of the Kenya Meteorological Department's ENACTS Maprooms: Coastal Kenya. AICCRA Workshop Report. Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA).

### **About AICCRA**

Accelerating Impacts of CGIAR Climate Research in 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. Explore AICCRA's work at [aiccra.cgiar.org](http://aiccra.cgiar.org)

### **Contact Us**

Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA). Email: [aiccra@cgiar.org](mailto:aiccra@cgiar.org)

**Photos:** Amanda Grossi, International Research Institute for Climate and Society (IRI), Columbia Climate School and Onesmus Ruirie, Kenya Meteorological Department (KMD)

**Disclaimer:** This workshop report has not been peer reviewed. Any opinions stated herein are those of the author(s) and do not necessarily reflect the policies or opinions of the IRI, donor agencies, or partners. All images remain the sole property of their source and may not be used for any purpose without written permission of the source.



This workshop report is licensed under a Creative Commons Attribution – NonCommercial 4.0 International License.

© 2022 International Research Institute for Climate and Society, Columbia Climate School

## **Abstract**

A three-day training workshop was implemented from to November 14-16, 2022, in Mombasa, Kenya by the Kenya Meteorological Department (KMD). The workshop, which was organized as part of the World Bank's Accelerating the Impact of CGIAR Climate Research for Africa (AICCRA) project and which was implemented by those trained in the October 31-November 4 training of trainers (ToT) on the same topic, brought together 13 county directors of meteorological services (CDMS) in the coastal region to be trained on KMD's existing suite of free online ENACTS Maprooms. The major objective of the workshop was to ensure that local institutions that play an important role in promoting the use of climate information and services and broader resilience of the agricultural sector are aware of and have the capacity to use best-available climate information products for decision-making. The ENACTS maproom products, which are freely available through KMD's website, provide location-specific (4 km grid) historical, monitoring, and forecast information that is important for activities related to planning, monitoring, and response for the agricultural sector and wider food system.

## **Keywords**

Kenya; agriculture; climate change; climate variability; food security; capacity development; climate-smart agriculture; climatology; monitoring systems; forecasting; Goal 2 Zero Hunger

## About the Authors

**Amanda Grossi** is a Senior Staff Associate at the International Research Institute for Climate and Society (IRI) of the Columbia Climate School. Within the AICCRA project, she is the IRI's Regional Manager for Africa where she coordinates the IRI's activities at the country-level in Ethiopia, Kenya, Zambia, Ghana, Mali, and Senegal. In this role, she provides critical support to the development and delivery of capacity building initiatives and digital innovations, including those associated with the IRI's Enhancing National Climate Services (ENACTS) approach.

**Onesmus Ruirie** is a Meteorologist and Climate Scientist in charge of Data Management Services at the Kenya Meteorological Department (KMD) in Nairobi, Kenya. He is also the AICCRA project's main focal point at KMD.

## **Acknowledgements**

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. IDA helps the world's poorest countries by providing grants and low to zero-interest loans for projects and programs that boost economic growth, reduce poverty, and improve poor people's lives. IDA is one of the largest sources of assistance for the world's 76 poorest countries, 39 of which are in Africa. Annual IDA commitments have averaged about \$21 billion over circa 2017-2020, with approximately 61 percent going to Africa.



# Highlights



1 Ensuring actors at the most local levels who play a role in promoting the use of climate information and services are aware of and have the capacity to use best-available climate information products for decision-making is critical for **building resilience of the agricultural sector**.



2 From November 14-16, 2022, a **three-day training** on the use of the Kenya Meteorological Department's Enhancing National Climate Services (ENACTS) Maprooms was implemented in Mombasa, Kenya for county meteorological service staff by Kenya Meteorological Department (KMD) staff trained in an earlier November 2022 training of trainers (ToT).



3 A total of **13 participants from the county KMD offices in Coastal Kenya were capacitated** on how to access, navigate, and use KMD's suite of free online Maproom products for analysing past, current, and future climate in relation to the agricultural sector.



4 The participants who were trained on climate basics and KMD's Maprooms will **share the knowledge, skills, and resources** gained from the training with their county level counterparts with whom they work, to support agricultural actors including farmers.



5 The training had participation from local county meteorological service staff who are vital for **extending the reach and co-production of climate information to the most local levels** and also integrating it within decision-making processes and planning at the most local levels.



6 The **hands-on, practical training** covered climate basics and how to use Maprooms to analyze past, current, and future climate information to meet the needs of adaptive decision-making for the agricultural sector in both the near and long-term.

# 1: Introduction

Improved availability and quality of climate data and information has been necessary but not sufficient in the development of effective, decision-relevant, sustainable, and locally-led climate services for the agricultural sector in Kenya. In particular, while the Kenya Meteorological Department (KMD) has long produced high quality information available at high resolution, this has not been enough to ensure that it is easily accessed, understood, or able to be used at the sectoral level in decision-making for agriculture. Rather, intentional efforts to both promote the translation (contextualization) and transfer (communication) of this information alongside capacity building for its use have been needed.

An important platform for facilitating the access and wider use of climate information in decision-making by governments, as well as the public and private sectors, is the IRI's [Climate Data Library](#). The Data Library is a powerful and freely accessible online platform that allows users to view, analyse, download, and share hundreds of terabytes of multidisciplinary climate-related data through a standard web browser (Blumenthal et al., 2014). ICT solutions like this and especially co-created map visualizations such as the IRI's interactive "Maproom" visuals and graphs of climate data can play a large role in making climate information more usable by translating past, present, or future conditions into expected impacts and management advisories for different decision-makers (Christel et al., 2018; Daron et al., 2015).

*Participants of the November 2022 Subnational Training on Use of the Kenya Meteorological Department's ENACTS Maprooms in Coastal Kenya pause for a photo outside the Sarova Whitesands Hotel in Mombasa.*

In Kenya, the Enhancing National Climate Services (ENACTS) initiative has helped the country overcome gaps in its meteorological records by combining quality-controlled station records with proxies (satellite data for precipitation and climate model reanalysis data for temperature) that are freely available from global sources. In doing so, it has enabled the provision of long-term (more than 35 years for rainfall and 50 years for temperature) daily and decadal (10-day) gridded time series data at a 4-km resolution.

This downscaled location-specific climate information, made possible through the [ENACTS approach](#) (Nsengiyumva et al., 2021), represents a huge stride in climate information availability for the country because it is important for informing a wide variety of choices and planning decisions at the farm level in Kenya's various agro-ecological zones, from planting date to cultivar selection, timing of fertilizer application, and other practices affected by the crop calendar (Grossi & Dinku, 2022a).

However, it is the ensuing activities of the ENACTS initiative that move beyond data availability to promoting its access and use through freely available online visualizations and analyses ("Maprooms"), alongside capacity building to promote the use and co-production of new products, that have enabled and will continue enable the information to become locally relevant services at scale.

"Maprooms," or visualizations and automations of climate analyses derived from these gridded datasets, in particular, have been instrumental in co-producing and communicating locally-relevant and demand-driven analyses in the 22 countries where the ENACTS initiative has been implemented, including Kenya.

The subnational training described in this report, which took place from November 14-16, 2022, in Mombasa, Kenya aimed to ensure that county KMD staff that play an important role in promoting the use of climate information and services and broader resilience of the agricultural sector in coastal Kenya are aware of and have the capacity to use best-available climate information products for decision-making through [KMD's suite of online "Maprooms"](#) (Kenya Meteorological Department, 2022).



It was a follow-on training to the first training of trainers (ToT) workshop conducted from October 31-November 4, 2022, in Nairobi, Kenya to ensure capacity is built beyond the national level to reach even the most local levels in Kenya. As such, the training was conducted by KMD staff trained during the earlier ToT.

The ENACTS maproom products which were the subject of the training are freely available through KMD's website, and provide location-specific (4 km grid) historical, monitoring, and forecast information that is important for activities related to planning, monitoring, and response for the agricultural sector and wider food system.

The maps, graphs, and other visualizations that comprise the ENACTS maprooms are not pre-made or ready-made maps but are rather generated live based on the analysis that any user would like to do.



## 2: Approaches and Methods

Towards its overarching goal of ensuring that county meteorological staff which play a key role in promoting the use of climate information and services in the agricultural sector and also supporting its co-production to meet the needs of users are aware of and have the capacity to use best-available climate information products for decision-making, the workshop aimed to achieve the following:

- 1) Provide foundational knowledge about climate concepts, data, common data analyses, and the forecast, as well as local and global factors that influence Kenyan climate (climate basics)
- 2) Introduce participants to basic analytical tools and visualizations for understanding historical climate (climatology) for any given area of interest ([“Climate Analysis” maprooms](#))
- 3) Introduce participants to basic analytical tools and visualizations for understanding current climatic conditions (monitoring), including identification of extremes and anomalies ([“Climate Monitoring” maprooms](#))
- 4) Introduce participants to basic analytical tools and visualizations for understanding future climatic conditions (forecasting), including the flexible forecast format for communicating uncertainty for agricultural decision-makers ([“Climate Forecast” maprooms](#))
- 5) Expose participants to analytical tools and visualizations available from the IGAD Climate Prediction and Applications Centre (ICPAC) for understanding longer-term climate change in Kenya ([“Climate Change” maprooms](#))
- 6) Introduce participants to Maprooms for understanding how climate interacts with particular sectors, namely the agricultural sector ([“Agriculture and Food Security” maprooms](#)), and how these Maprooms and the other aforementioned maprooms can be used to answer common questions confronting the agricultural sector, such as crop suitability for a given area.

The workshop was a follow-on to an earlier training (Grossi & Dinku, 2022b) of trainers (ToT) of national and county-level KMD staff, as well as other relevant national institutions such as KALRO and the MoA, with an eye towards cascading capacities to the most local levels. It was the first of a series of four subnational workshops targeting Western, Central, Northern, and Coastal Kenya.

Cascading such capacities to the most local levels in Kenya through counties is important not just due to the government’s strong emphasis on devolution of services, but because counties are increasingly responsible for developing county climate services information plans which include a variety of actors from the MoA and even input suppliers who must be made aware of tools such as Maprooms for planning and climate risk management.

Awareness of climate information tools such as Maprooms at the most local levels with KMD county staff and their relevant MoA counterparts also helps to ensure that the development of new climate services such as Maprooms meets the real and not just perceived needs of the agricultural sector, and that climate services are truly locally-led.

The Subnational Training on Use of the Kenya Meteorological Department’s ENACTS Maprooms in Coastal Kenya provided an important forum for achieving these goals.

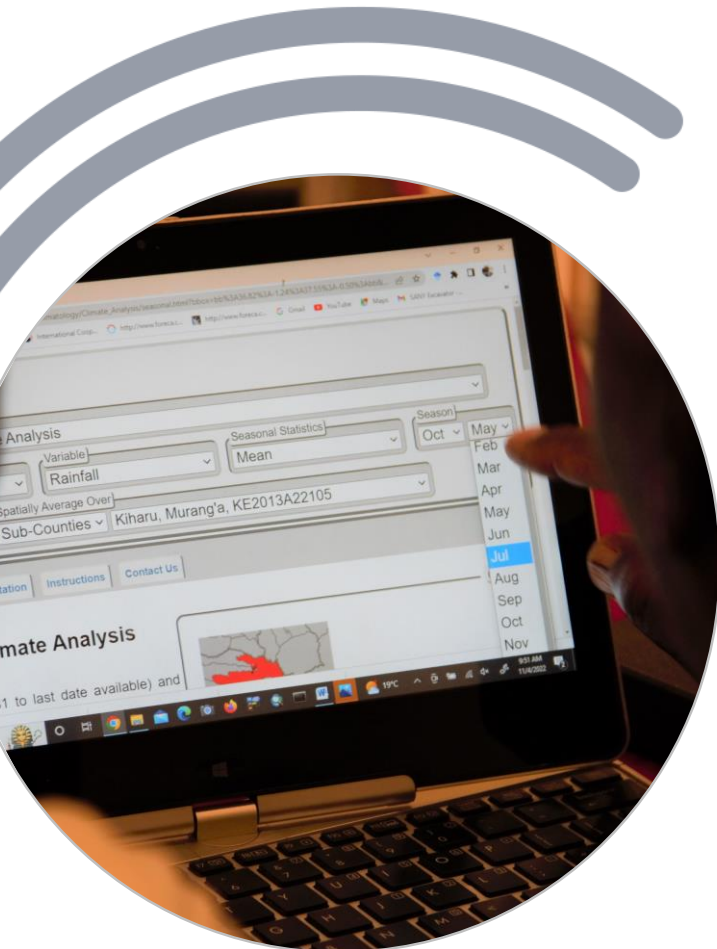
A full list of participants and their affiliate institutions can be found in **Box 1**, while the list of trainers and support staff can be found in **Box 2**. The full agenda for the workshop can be found in **Section 6 (Agenda)**.

## 3: Key Results and Findings

All 13 participants from the county KMD offices, were successfully capacitated on how to access, navigate, and use KMD's suite of free online Maproom products for analysing past, current, and future climate in relation to the agricultural sector.

This was evidenced in a culminating group project and presentation whereby groups created 10-slide PowerPoints to answer a series of questions related to: rainfall and temperature seasonality, La Niña's impact on seasonal rainfall, interpretation of the seasonal forecast, and crop suitability given specific parameters related to total rainfall, temperature tolerance, dry spell tolerance, and wet spell requirements.

## 4: Conclusions and Recommendations



*Participants explore the Seasonal Climate Analysis Maproom, one of KMD's free online products to explore and analyse climate data for any given location.*

On recommendations for improvements for future implementation, because Maprooms are co-produced products between KMD and users in the agricultural sector such as the MoA, rather than just training the KMD met staff in these regions on this platform and tools, it would be advantageous to also train the decentralized MoA staff, to encourage co-production of new products (or improvement of existing products) that are meeting the needs of the sector at the most local levels, and to encourage more sustained interactions and dialogue between those who produce and those who use climate information.

Moreover, because these counties develop county climate service information plans which include not just met staff but also MoA staff and even input suppliers, all relevant actors should be made aware of and competent in use of these tools for planning. When Kenya does finally validate and launch its National Framework for Climate Services (NFCS), it will be critically important for these capacities and network of actors to be in place beyond just at the national level, especially given the strong government emphasis on devolution of services.

Such investments would be important for sustaining and expanding local capacity to harness climate information for agricultural decision-making.

In terms of next steps, the county directors of meteorological services (CDMS) will work to integrate the climate information and analysis for their specific locations within decision-making processes and planning at the most local levels.

These include activities related to planning, monitoring, and response for the agricultural sector and wider food system.

## 5: List of Participants and Trainers

### Box 1

No.	Name	Gender	Organization/ Structure
1	Michael Suter	M	CDMS
2	Justin Nghuwi	M	CDMS
3	Bahati Benjamin	M	CDMS
4	Geoffrey Ogutu	M	CDMS
5	Kalu Nyale	M	CDMS
6	Jonathan Ngungi	M	CDMS
7	Edward Amoni	M	CDMS
8	Kennedy Thiong'o	M	CDMS
9	Jane Wairimu Myogothuri	F	CDMS
10	Samuel Mutai	M	CDMS
11	Daniel Mbithi	M	CDMS
12	Robinson Asira	M	CDMS
13	Edward Ngure	M	CDMS

There were a total of 13 trainees, 1 of whom was a woman (8%) and none of whom was a youth (under the age of 35).

## Box 2

No.	Name	Gender	Organization/ Structure	Email
1	Onesmus Ruirie	M	KMD HQ	ruirie.o@gmail.com
2	Christine Mahonga	F	KMD-HQ	comahonga@gmail.com
3	Peterson Ngari	M	KMD-HQ	pngari09@gmail.com
4	Beth Njoroge	F	ILRI	B.Njoroge@cgiar.org



## 6: Agenda

Day 1 (Monday, November 14)	
Time	Activity
08:30 - 09:00	<b>Registration</b>
09:00 – 09:30	<b>Welcome and opening</b> Introductions and house-keeping
09:30 – 10:30	<ul style="list-style-type: none"> <li>• Introduction to the training</li> <li>• Intro to Climate Services and ENACTS</li> <li>• Climate Basics               <ul style="list-style-type: none"> <li>◦ What defines local climate</li> <li>◦ Climate Variability</li> </ul> </li> </ul>
10:30 – 11:00	<b>Coffee Break and group photo</b>
11:00 – 12:30	Presentations: County climate and OND 2022 Forecast
12:30 – 13:30	<b>Lunch</b>
13:30 – 14:30	Presentations: County climate and OND 2022 Forecast
14:30 – 15:30	Climate Basics: Data vs information
15:30 – 16:00	<b>Coffee break</b>
16:00 – 17:00	Exercise on data vs information

Day 2 (Tuesday, November 15)	
Time	Activity
09:00 – 10:30	<ul style="list-style-type: none"> <li>• Intro to ENACTS Maprooms</li> <li>• Demonstration: Climate Analysis Maproom</li> </ul>
10:30 – 11:00	<b>Coffee Break</b>
11:00 – 12:30	<ul style="list-style-type: none"> <li>• Intro to Reading Maps and graphs</li> <li>• Activity: Exploring the Climate Analysis Maproom</li> </ul>
12:30 – 13:30	<b>Lunch</b>
13:30 – 15:00	<ul style="list-style-type: none"> <li>• Demonstration: Climate and Agriculture Maproom</li> <li>• Activity: Exploring the Climate and Agriculture Maproom</li> </ul>
15:00 – 15:30	<b>Coffee Break</b>
15:30 – 17:00	<ul style="list-style-type: none"> <li>• Demonstration: Climate Monitoring and Forecast Maproom</li> <li>• Activity: Exploring the Climate Monitoring and Forecast Maproom</li> </ul>

Day 3 (Wednesday, November 16)	
<i><b>Time</b></i>	<i><b>Activity</b></i>
09:00 – 10:30	Project work
10:30 – 11:00	<b>Coffee Break</b>
11:00 – 12:30	Project work (cont.)
12:30 – 13:30	<b>Lunch</b>
13:30 – 15:00	Project presentation
15:00 – 15:30	<b>Coffee Break</b>
15:30 – 17:00	Discussion and closing

# References

Blumenthal, M.B., Bell, M., del Corral, J., Cousin, R., and Khomyakov, I. (2014). IRI Data Library: enhancing accessibility of climate knowledge. *Earth Perspectives*. 1, 19.

Available at: <https://doi.org/10.1186/2194-6434-1-19>

CARE. Practical Guide to Participatory Scenario Planning. (2018). CARE Climate Change.

Available at: <https://careclimatechange.org/practical-guide-to-participatory-scenario-planning-seasonal-climate-information-for-resilient-decision-making/>

Christel, I., Hemment, D., Bojovic, D., Cucchiatti, F., Calvo, L., Stefaner, M., and Buontempo, C. (2018). Introducing design in the development of effective climate services. *Climate Services*. 9, 111–121.

Available at: <https://doi.org/10.1016/j.cliser.2017.06.002>

Daron, J.D., Lorenz, S., Wolski, P., Blamey, R.C., and Jack, C. (2015). Interpreting climate data visualisations to inform adaptation decisions. *Climate Risk Management*. 10, 17–26.

<https://doi.org/10.1016/j.crm.2015.06.007>.

Available at: <https://doi.org/10.1016/j.crm.2015.06.007>

Dinku T, Grossi A. (2022). Status Report: NFCS implementation in Kenya. Accelerating Impacts of CGIAR Climate Research for Africa;

Available at: <https://cgspace.cgiar.org/handle/10568/119811>

Grossi A, Dinku T. (2022a). From research to practice: Adapting agriculture to climate today for tomorrow in Ethiopia. *Frontiers in Climate*. 4.

Available at: <https://www.frontiersin.org/articles/10.3389/fclim.2022.931514>

Grossi A, Dinku T. (2022b). Training of Trainers (ToT) on Enhancing National Climate Services (ENACTS) Maprooms for Users in Kenya. AICCRA Workshop Report. Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA).

Available at: <https://hdl.handle.net/10568/126763>

ICPAC. (2022). ICPAC Map Room.

Available at: <http://digilib.icpac.net/maproom/index.html>

Kenya Meteorological Department. (2022). KMD Map Room.

Available at: <http://kmddl.meteo.go.ke:8081/maproom/index.html>

Nsengiyumva G, Dinku T, Cousin R, Khomyakov I, Vadillo A, Faniriantsoa R, et al. (2021). Transforming Access to and Use of Climate Information Products Derived from Remote Sensing and In Situ Observations. *Remote Sensing*. Multidisciplinary Digital Publishing Institute;13:4721.

Available at: <https://doi.org/10.3390/rs13224721>

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.



**Citation:**

Grossi A, Ruirie O, 2022. Subnational Training on Use of the Kenya Meteorological Department's ENACTS Maprooms: Coastal Kenya. AICCRA Workshop Report. Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA).

Available online at [aiccra.cgiar.org](https://aiccra.cgiar.org)



Research supported by:

