# Climate Data Tool for Regional Meteorological Service Center Data and Climate Experts

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**Workshop Report**

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

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**About CCAFS reports**
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 Impact 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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# Acknowledgment

# About the authors

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# Background

The National Meteorological Agency (NMA), in collaboration with the International Research Institute for Climate and Society (IRI), has embarked on Enhancing National Climate Services. The initiative aims to bring climate knowledge into national decision-making by improving the availability, access, and use of climate information. These new data sets have been used to develop. The purpose of the training was to provide the necessary basis use of the IRI Climate Data Tools (CDT) to generate and exploit ENACTS datasets. A brief official opening ceremony preceded the workshop on the morning of August 16, 2021. The opening remarks were presented by Mr. Henok Hailu, Meteorological Service Centers Coordination Office Directorate Director. Representatives of IRI also attended the ceremony.

The training brought together 35 participants, 10 Regional meteorological center expertise (2 from each region), and four from head office from meteorological service centers' data and climatology section. The objective of the NMA is to investigate and study the weather and climatic condition of Ethiopia to achieve beneficial effects for economic and social development.

The Climate Data Tool (CDT) is a powerful instrument for quality control of station data, merging station data with satellite and other proxies, and processing station and gridded data. CDT was an essential resource for Climate data for gridded data outputs, down manipulation, data extraction, spatial and temporal analysis, rainy dekadal, monthly, season, annual characteristics, and climate extremes indices like drought and flood events. NMA is the first in Africa to apply the application and interpretation of high-resolution map products and reach merged data for different socio-economic activities of the community on using CDT products. The workshop was conducted using a participatory approach with a mix of PowerPoint presentations and the participants having ample hands-on time exploring the tool.

## Training Objectives

The general objectives of CDT training for Regional Meteorological Center climate experts are:

- To enhance the capacity of climate data sets for each branch directorate;
- To introduce and create awareness on the application of CDT;
- To organize meteorological data and data quality control methods by CDT both rainfall and temperature;
- To create awareness on gridded data outputs; satellite rainfall estimation and reanalysis data downloading; downscaling and manipulation; data extraction, spatial and temporal climate analysis; developing potential evapotranspiration, water balance and grid data; analysis of rainy characteristics; calculation of climate extremes indices such as drought (SPI, SPEI, Decile)

## Training Participants and Methodology

The training was conducted with the collaboration of professionals from the International Research Institute for Climate and Society (IRI), Ministry of Agriculture's Meteorological Data and Climatology, and Meteorological Research and Studies directorates. The trainees included experts from 9 regional meteorological branch directorates as well as two dedicated climate experts and four MDCD expertise from head office.

Four groups working on a different part of climate data analysis existed during the training workshop. They were:

- Focus on the download RFE Station data quality control
- Focus on quality control of station data with a different method
- Focus on making merging RFE and reanalysis with station data
- Focus on climate data analysis, including drought detections



Training participants with NMA director-general during the training in Adama, Ethiopia. Photo: A. Mulatu/CCAFS



Trainers engaging participants in discussions on climate data tool (CDT). Photo: A. Mulatu/CCAFS

## Training Outcomes

After the training, the regional meteorological service center and meteorological data and climatology directorates expertise took a deep climate analysis for each Region and Ethiopia climate system using the most advanced climate data tools. NMA, CCAFS, and IRI expected the trainers to deliver on the following.

- Quality data collection with CDT to all branch office level
- Maintaining, building, and delivering better climate services for researchers and regional decision-making
- Upgrading their local and regional knowledge on the climate factor
- Giving a fast and clear response for the customers

The training results would be reported to the Director-General, his deputy, regional meteorological centers directorates, and meteorological data and climatology directorates. After the training, there is a need for continuous support to implement a better climate service to regional meteorological centers.

## Training Schedule – August 16-23, 2021

| Daily content |
|---|
| **Day 1** |
| Registration of participants |
| Welcoming and opening remarks |
| CDT installation |
| Introduction to CDT main menu |
| CDT data format, exportation, and importation |
| Downloading data using CDT |
| |
| **Day 2** |
| CDT data preparation menu |
| Time series aggregation |
| Spatial aggregation/disaggregation (Regriding) |
| Data extraction |
| Data format conversion |
| |
| **Day 3** |
| Data Quality Control procedures with CDT |
| Checking stations coordinates |
| Checking stations data availability |
| Rainfall and temperatures quality control |
| |
| **Day 4** |
| Reanalysis downscaling |
| Correcting systematic bias from satellite rainfall estimates data and reanalysis using CDT |
| Introduction to the methods used to merge station observation with satellite rainfall estimates data and reanalysis |
| |
| **Day 5** |
| Validation of method the method to be used to correct the bias and merge the station data with gridded data |
| Validation of rainfall satellite estimates products with station observation |

**Day 6**

Introduction to CDT data analysis and visualization:
- Derived climate variables (potential evapotranspiration and water balance)
- Climatology and anomalies
- Spatial analysis (mean, median, standard deviation, coefficient of variation, percentiles, frequency, trend)

**Day 7**

Introduction to CDT data analysis and visualization:
- Daily rainfall analysis (dry/wet days and spells)
- Rainy season analysis (onset, cessation, length of season, spells)
- Generating PICSA graphs and maps
- Climate extremes indices (ETCCDI's 27 core climate change indices)
- Drought indices (SPI, SPEI, Deciles)

**Day 8**

Training on the use of AWS web application:
- Recap of the training
- Discussion
- Certificate award
- Closing the training

# Annex 1: List of Participants

| | Name of facilitator | Organization | Contacts |
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