

# CLIMATE RISK MANAGEMENT IN AGRICULTURAL EXTENSION SYSTEM IN ETHIOPIA

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Workshop Report



# Climate Risk Management in Agricultural Extension System in Ethiopia

## Workshop Report

Accelerating Impact of CGIAR Climate Research for Africa (AICCRA)

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# Acknowledgment

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. 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.

## About the authors

Esayas Lemma is a Director of Crop Development Directorate at the Ministry of Agriculture in Ethiopia.

Tolessa Denboba is a Senior Agronomist at the Ministry of Agriculture in Ethiopia.

## Introduction

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The Ethiopian agricultural system is rain-fed, which makes it more vulnerable to climate variability and change. Climate change is expected to increase the frequencies of extreme climate events such as drought, flood, dry spell, heat, and cold waves, becoming more severe challenges in agricultural activities. Addressing these problems requires improving climate risk prediction capacity, designing preparedness mechanisms, and integrating weathers and climate information services into improved seeds, feeds, and fertilizer technologies.

The Ministry of Agriculture (MoA) – with the support of the International Research Institute for Climate and Society (IRI) – initiated a project called Adapting Agriculture to Climate Today for Tomorrow (ACToday). This project collaborates with the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) East Africa to enhance climate risk under different management practices in agriculture sectors and strengthen the skill gaps. In this regard, MoA, in collaboration with International Livestock Research Institute (ILRI), IRI, National Meteorology Agency (NMA), and Ethiopian Institute for Agricultural Research (EIAR), conducted a 15-day long capacity building training on 'Climate Risk Management. The training included basic climate concepts, agro-meteorology advisory, agricultural extension services systems for federal agro-meteorology technical task force experts, and ATVET college instructors.

## Training Objectives

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The objectives of the Training of Trainers (ToT) session was to get the Agricultural extension experts:

- To familiarize with basic concepts of climate risk management;
- To familiarize with the basic science of climate and climate change and the impact of climate change on agriculture;
- To understand weather and climate systems affecting Ethiopia and rainfall regimes;
- To Understand weather forecast and local climate.
- To interpret weather forecast and application of agrometeorology advisory services; and
- To enable extension officers to access, understand and incorporate climate information into their sectors.

## Training Methodology

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The training was conducted at three levels in a cascading training model. The first level of activity was a training of trainers (ToT) for the federal agro-met technical task force (MoA, NMA, and EIAR) and two persons from ATVET colleges (Alage and Agarfa). The second level included federal, regional, and zonal levels. At last, the training would be conducted from Woreda agricultural offices and Development Agents (DAs) who training farmers at end-users with supporting finical with MoA.



ToT participants with the ACToday Ethiopia project lead. Photo: A.Mulatu/CCAFS

## **Trainers and Participants**

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The training course's expertise came from the International Research Institute for Climate and Society (IRI), Earth Institute, Columbia University, and inputs from the Ministry of Agriculture and the National Meteorological Agency of Ethiopia.

- James Hansen – a senior research scientist at IRI
- Tufa Dinku – ACToday Ethiopia project lead and senior research scientist at IRI
- Sylwia Trzaska - an associate research scientist at the Center for International Earth Science Information Network (CIESIN) at the Earth Institute in Columbia University
- Eunjin Han – an associate research scientist at IRI
- Gloriose Nsengiyumva – an expert in Participatory Integrated Climate Services for Agriculture (PICSA) research officer at IRI
- Amanda Grossi – ACToday project country manager Ethiopia and Senegal and researcher at IRI
- Esayas Lemma – director at crop production directorate at the MoA
- Asaminew Teshome – a senior meteorologist at the National Meteorological Agency of Ethiopia



Trainers engaging participants in discussions on climate risk management in the ag-extension system.  
Photo: A.Mulatu/CCAFS

## Training Outcomes

The 2-week course aimed at equipping agricultural extension officers and experts to access, understand and incorporate climate information into their professional work path. It was designed to provide foundational knowledge on climate and agricultural decision-making; and practical tools to analyze climate-related risks, use appropriate weather and climate information to support agricultural decisions, communicate complex climate information effectively with farmers, and integrate climate services into agricultural extension activities. At the end of the workshop, participants improved their skills in Ethiopia's weather and climate information. This would provide new opportunities for agricultural extension personnel to help farmers better manage the climate risks and adapt recommended technology packages to local climatic conditions.

In general, the participants were able to:

- Easily identify climate risk in agriculture;
- Understand concepts of climate, weather, and climate changes;
- Understand climate and weather information;
- Weather and climate systems affecting Ethiopia and rainfall regimes;
- Understanding weather forecast and local climate;
- Interpretation of weather forecast and application of agrometeorology advisory services.

## Training Schedule

Module	Time	Content	Speaker	Time allocation
<b>Day 1</b>				
Introduction Module	9:00 – 9:15	Registration of participants		15 minutes
	9:15 – 10:00	Welcoming and opening remarks, including acknowledgment of dignitaries and guests	Essays Lemma – Ministry of Agriculture; Tufa Dinku – IRI; Dawit Solomon – CCAFS	45 minutes
	10:00 – 10:30	Overview of the training module	Tufa Dinku	30 minutes
Morning coffee break				30 minutes
Module 1 – Section 1	11:00 – 12:00	Presentation - Introduction to Climate Services - The ENACTS approach - Overview of ACToday project	Tufa Dinku	60 minutes
	12:00 – 13:00	Group discussion on: - value of climate services - contributing institutions - examples and reflection from participants' organizations	Participatory	60 minutes
Lunch				60 minutes
Module 1 – Section 2	14:00 – 14:30	Presentation - Basic concepts of weather, climate, and climate change - Means of measuring weather and climate	Sylwia Trzaska	30 minutes
Module 1 – Section 3	14:30 – 16:00	Presentation - Main features of the Ethiopian climate system - Factors affecting climate in Ethiopia	Sylwia Trzaska	90 minutes
Afternoon coffee break				15 minutes
Module 1 – Section 3	16:15 – 17:00	Presentation - Variability of climate in Ethiopia – El Nino and Indian ocean dipole	Sylwia Trzaska	45 minutes
	17:00 – 17:15	Wrap-up summary session	Participatory	15 minutes



Day 2				
Module 1 – Section 3	9:00 – 9:15	Review of Day 1	Tufa Dinku	15 minutes
	9:15 – 10:00	Activity - exercise related to basic concepts of weather, climate, and climate change	Tufa Dinku and Asaminew Teshome	45 minutes
	10:00 – 10:30	The Climate of Ethiopia	Asaminew Teshome	30 minutes
Morning coffee break				15 minutes
Module 1 – Section 3	10:45 – 11:45	Activity - exercise related to climate in Ethiopia	Tufa Dinku and Asaminew Teshome	60 minutes
	11:45 – 12:30	Activity - exercise related to climate variability in Ethiopia	Tufa Dinku and Asaminew Teshome	45 minutes
	12:30 – 13:00	Discussion and reflection	Tufa Dinku and Asaminew Teshome	30 minutes
Lunch				60 minutes
Module 1 – Section 3	14:00 – 14:45	Presentation - Climate data versus climate information	Sylwia Trzaska	45 minutes
	14:45 – 15:30	Presentation - Statistical concepts in climate (mean, median, variance, correlation, probability of exceedance/ non-exceedance)	Sylwia Trzaska	45 minutes
Afternoon coffee break				15 minutes
Module 1 – Section 3	15:45 – 16:30	Presentation - Climate forecasting	Sylwia Trzaska	45 minutes
	16:30 – 16:45	Wrap up summary session and preview of Day 3	Participatory	15 minutes
Day 3				
Module 1 – Section 3	9:00 – 9:15	Review of Day 2	Participatory	15 minutes
	9:15 – 10:15	Activity - exercise related to climate data and information	Tufa Dinku, Asaminew Teshome	60 minutes
Morning coffee break				15 minutes
Module 1 – Section 3	10:30 – 11:30	Activity - exercise related to main statistical analyses	Tufa Dinku, Asaminew Teshome	60 minutes
	11:30 – 12:30	Activity - exercise related to climate forecasting	Tufa Dinku, Asaminew Teshome	60 minutes
	12:30 – 13:00	Debriefing on module 1 - summary of main concepts, themes, and topics covered	Tufa Dinku, Asaminew Teshome	30 minutes
Lunch				60 minutes
Module 2 – Section 1	14:00 – 14:15	Presentation	Tufa Dinku	15 minutes

		- Introduction to Module 2		
	14:15 – 15:00	Demonstration - locating, downloading, and explaining the use of specific climate information products from the NMA website	Asaminew Teshome	45 minutes
	15:00 – 15:30	An overview of the ENACTS map rooms	Tufa Dinku	30 minutes
	15:30 – 16:00	Activity - navigating through ENACTS map rooms	Participants	30 minutes
Afternoon coffee break				15 minutes
Module 2 – Section 2	16:15 – 16:45	Demonstration - climate analysis map room (daily, monthly, decadal analysis)	Gloriose Nsengiyumva and Tufa Dinku	30 minutes
	16:45 – 17:00	Activity - exploration of the climate analysis map room in groups	Participants	15 minutes
	17:00 – 17:15	Wrap up summary session and preview of Day 4	Participatory	15 minutes
Day 4				
Module 2 – Section 2	9:00 – 9:15	Review of Day 3	Participatory	15 minutes
	9:15 – 10:15	Demonstration - climate analysis map room (seasonal analysis, trends, and extreme analyses)	Tufa Dinku	60 minutes
Morning coffee break				15 minutes
Module 2 – Section 2	10:30 – 11:00	Activity - exploration of the Climate analysis map room (seasonal analysis, seasonal trends, extreme analyses)	Participants	30 minutes
	11:00 – 11:30	Demonstration - The climate analysis map room continued (ENSO, IOD)	Tufa Dinku	30 minutes
	11:30 – 12:00	Activity - exploration of ENSO, IOD map rooms	Participants	30 minutes
	12:00 – 13:00	Demonstration - Climate monitoring map room (decadal, monthly, seasonal analysis, SPI)	Tufa Dinku	60 minutes
Lunch				60 minutes
Module 2 – Section 3	14:00 – 15:00	Activity - exploration of climate monitoring map room	Participants	60 minutes
	15:00 – 16:00	Demonstration - climate forecasting map room	Gloriose Nsengiyumva and Tufa Dinku	60 minutes

Afternoon coffee break				15 minutes
Module 2 – Section 4	16:15 – 17:00	Activity - exploration of climate forecasting map room	Participants	45 minutes
	17:00 – 17:15	Wrap up summary session and preview of Day 5	Participatory	15 minutes
Day 5				
Module 2 – Section 4	9:00 – 9:30	Review of Day 4	Participatory	30 minutes
	9:30 – 10:30	Demonstration - Climate and agriculture map room (daily analysis, onset/cessation, length of growing season/seasonal rainfall totals)	Tufa Dinku	60 minutes
Morning coffee break				15 minutes
Module 2 – Section 4	10:45 – 11:30	Activity - exploration of agriculture map room	Participants	45 minutes
	11:30 – 13:00	Activity - preparation presentation slides	Participants	90 minutes
Lunch				60 minutes
Module 2 – Section 4	14:00 – 15:30	Work on presentation continues	Participants	90 minutes
Afternoon coffee break				15 minutes
Module 3 – Section 1	15:45 – 16:45	Presentation - introduction to module 3 – climate-sensitive farm decisions	James Hansen	60 minutes
	16:45 – 17:00	Wrap up summary session and preview of Day 6	Participatory	15 minutes
Day 6				
Module 3 – Section 1	9:00 – 9:15	Review of Day 5	Participatory	15 minutes
	9:15 – 10:15	Plenary discussion - by selecting one existing extension recommendation, discussion on appropriateness across different types of farmers and climate conditions, and ways to make it more appropriate	Esayas Lemma and Tufa Dinku	60 minutes
Morning coffee break				15 minutes
Module 3 – Section 1	10:30 – 13:00	Activity - using a decision tree to represent cultivar and N-fertilizer options	Esayas Lemma and Tufa Dinku	150 minutes
	12:45 – 13:00	Debriefing - decision tree activity with a brief presentation by participants	Esayas Lemma and Tufa Dinku	15 minutes
Lunch				60 minutes

Module 3 – Section 2	14:00 – 14:20	Presentation - Analyzing farmers' options with crop models and decision support tools	James Hansen and Eunjin Han	20 minutes
	14:20 – 15:00	Demonstration and activity - walk-through SIMAGRI decision support tool	Eunjin Han	40 minutes
Afternoon coffee break				15 minutes
Module 3 – Section 2	15:15 – 16:15	Presentation - Analyzing farmers' options with enterprise budgets	James Hansen	60 minutes
Module 3 – Section 1	16:15 – 17:00	Debriefing - decision tree activity with a brief presentation by participants	Participants	45 minutes
	17:00 – 17:15	Wrap up summary session and preview of Day 7	Participatory	15 minutes
Day 7				
Module 3 – Section 2	9:00 – 9:15	Review of Day 6	Participatory	15 minutes
	9:15 – 10:15	Activity - Using SIMAGRI, simulate response to cultivar and N fertilizer application decisions	Esayas Lemma and Tufa Dinku	60 minutes
Morning coffee break				15 minutes
Module 3 – Section 2 and 3	10:30 – 13:00	Activity - Using SIMAGRI, simulate response to cultivar and N fertilizer application decisions - Using enterprise budgeting, analyze cultivar and N fertilizer application decisions	Participatory	150 minutes
Lunch				60 minutes
Module 3 – Section 4	14:00 – 15:00	Presentation - Analyzing farmers' options with risk analysis	James Hansen	60 minutes
Afternoon coffee break				15 minutes
Module 3 – Section 5	15:15 – 16:15	Presentation - Index-based agricultural insurance	James Hansen	60 minutes
Module 3 – Section 2 and 3	16:15 – 17:00	Debriefing - participants debrief on SIMAGRI and enterprise budget activities	Participants	45 minutes
	17:00 – 17:15	Wrap up summary session and preview of Day 8	Participatory	15 minutes
Day 8				
Module 3 – Section 4	9:00 – 9:15	Review of Day 7	Participatory	15 minutes
	9:15 – 10:15	Activity	Esayas Lemma and Tufa Dinku	60 minutes

		- Using E-S analysis to identify risk-efficient cultivar and fertilizer management options		
Morning coffee break				15 minutes
Module 3 – Section 5 and 6	10:30 – 13:00	Activity - Using E-S analysis to identify risk-efficient cultivar and fertilizer management options - Analyze a weather index insurance contract	Participants	150 minutes
Lunch				60 minutes
Module 3 – Section 5 and 6	14:00 – 15:00	Debriefing - participants debrief on SIMAGRI and enterprise budget activities	James Hansen	60 minutes
Afternoon coffee break				15 minutes
Module 4 – Section 1	15:15 – 16:15	Presentation - introduction to module 4 – climate service communication strategies	James Hansen	60 minutes
	16:15 – 16:45	Activity - Identify communication channels that would support climate services in a given location - Summarize results in plenary	Participants	30 minutes
Module 3 – Section 3	16:45 – 17:15	Plenary discussion - What to include in a preliminary plan to incorporate climate services into agricultural extension activities - preview of Day 9	James Hansen	30 minutes
Day 9				
Module 4 – Section 2	9:00 – 9:15	Review of Day 8	Participatory	15 minutes
	9:15 – 10:15	Presentation - seasonal forecast training, communication, and planning process	James Hansen	60 minutes
Morning coffee break				15 minutes
Module 4 – Section 2	10:30 – 13:00	Activity - Practice steps in a participatory seasonal forecast communication and planning workshop	Participants	150 minutes
Lunch				60 minutes
Module 4 – Section 2	14:00 – 15:00	Activity continued - Practice steps in a participatory seasonal	Participants	60 minutes

		forecast communication and planning workshop		
Afternoon coffee break				15 minutes
Module 4 – Section 2	15:15 – 16:45	Activity continued - Practice steps in a participatory seasonal forecast communication and planning workshop	Participants	90 minutes
		Debriefing - the participatory seasonal forecast communication and planning workshop exercise - preview of Day 10	Participants	30 minutes
Day 10				
Module 4 – Section 3	9:00 – 9:15	Review of Day 9	Participatory	15 minutes
	9:15 – 9:30	Activity - Climate services plan presentations	Esayas Lemma and Tufa Dinku	15 minutes
	9:30 – 10:15	Activity - Present and discuss climate services plans	Participants	45 minutes
Morning coffee break				15 minutes
Module 4 – Section 3	10:30 – 13:00	Activity continued - Present and discuss climate services plans	Participants	150 minutes
Lunch				60 minutes
Module 4 – Section 3	14:00 – 15:00	Activity continued - Present and discuss climate services plans	Participants	60 minutes
Afternoon coffee break				15 minutes
	15:15 – 15:45	Course evaluation	Participatory	30 minutes
	15:45 – 16:15	Closing - Summary and closing remarks, opportunity to present lingering questions	Participatory	30 minutes

## Annex 1: List of Participants

List of facilitators				
	Name of facilitator	Organization	Location/Base	Position/ Title
1	Esayas Lemma Hayi	Ministry of Agriculture	Addis Ababa	Director – Crop development directorate
2	Befekadu Birahne Tsehaye	Ministry of Agriculture	Addis Ababa	Expert – Soil and water conservation
3	Masresha Kebede Gebrehiwot	Ministry of Agriculture	Addis Ababa	Team leader – Agro-met
4	Tolessa Denboba Buli	Ministry of Agriculture	Addis Ababa	Senior agronomist
5	Berhanu Assefa Seyoum	Ministry of Agriculture	Addis Ababa	Director – Environment and climate change coordination directorate
6	Mustefa Abu	Ministry of Agriculture	Addis Ababa	Monitoring and evaluation expert – Climate Resilient Green Economy Strategy
7	Dawit Kassa Tadelle	Ministry of Agriculture	Addis Ababa	Monitoring and evaluation expert – Food Security
8	Fisseha Eskeziaw	Ministry of Agriculture	Addis Ababa	Curriculum expert
9	Girma Kibret Gashaw	Ministry of Agriculture	Addis Ababa	Climate-smart agriculture specialist
10	Kidus Belay Emiru	National Meteorology Agency	Addis Ababa	Agro-meteorologist
11	Yimer Assefa Yimam	National Meteorology Agency	Addis Ababa	Team leader – Agro-meteorology department
12	Nejeha Redi Alemar	Alage ATVET	Alage	Department head and instructor
13	Yayeh Alehegn Tiruneh	Agarfa ATVET	Agarfa	Department head and instructor
14	Endalew Assefa Abera	Ethiopian Institute of Agricultural Research	Bishoftu	Researcher – Agro-meteorology and natural risk management
15	Tilahun Dandesa Daba	Oromia Agriculture and Natural Resource Bureau	Addis Ababa	Agro-meteorologist



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