Training on Climate-Smart Agriculture for Sunflower Value Chain in Tanzania

John Recha | Teferi Demissie

Workshop Report

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Accelerating Impacts of CGIAR Climate Research for Africa

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May 2023

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To cite this workshop report

Recha J, Demissie T. 2023. Training on Climate Smart Agriculture for Sunflower Value Chain in Tanzania. Workshop Report. Accelerating Impacts of CGIAR Climate Research in Africa (AICCRA).

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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

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.

About the authors

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1. Introduction

Tanzania is the major sunflower producer in the East Africa region. It has a market dominance of 78%, followed by Uganda (21%). It is an important cash crop in Tanzania and has been attributed to the low cost of production relative to other oilseeds. Moreover, sunflower accounts for 35% of oilseeds produced in the United Republic of Tanzania. Sunflower variety grown in Tanzania has been characterized as resistant to drought conditions and low susceptibility to diseases and pests. Sunflower grows well in semi-arid central plateau regions (Singida, Iringa, Dodoma, Njombe and Rukwa), lake region (Mwanza, Kigoma, Mara, Kagera, Geita, Shinyanga, Simiyu), and eastern region (Mtwara, Lindi, Morogoro) of Tanzania. For instance, sunflower is the second most popular crop after maize in Dodoma and Singida, and the latter region produces about 20% of the cash crop. In addition, commercial sunflower is produced by 75% of the households in Singida, and the land allocated is estimated to be 23,4149 hectares. Central regions like Dodoma, Njombe and Rukwa have collectively allocated more than 84,000 hectares.

However, several limitations prevent achieving optimum sunflower yields, such as insufficient support from climate extension services, ineffective farming techniques, low sale prices at the farm level, competition from imported edible oil, insufficient processing infrastructure, inadequate technological advancements, and limited access to financial and lending facilities.

Despite the relatively good production and business environment for producing sunflower, Tanzania remains a net importer of edible cooking oil. The sunflower oil produced by local processors only meets 40% of the national cooking oil requirements (Zhihua Zeng, 2017).

To improve sunflower productivity in Tanzania, the Climate Resilient Agribusiness for Tomorrow (https://crafteastafrica.org/) project has been working with the value chain actors since 2019 to empower them. Given this training workshop for sunflower value chain actors was held on 29th and 30th May 2023 in Morogoro and involved government administrators, policymakers and the media (https://www.youtube.com/live/6AW0Zov_9yk?feature=share). The training involved:

- How is climate likely to change in the future in the sunflower growing areas?
- How does climate change in suitable areas for production impact sunflower crop yield, quality, and value chain actors?
- Adaptation strategies currently in use to deal with climate change in business cases
- Other strategies needed to be better prepared for changes in the future
- Opportunities and barriers to scale up sunflower production in Tanzania
- Government policies related to sunflower production and policy influencing strategies

2. Climate change projections for Sunflower Production in Tanzania

2.1 Past trends in temperature

The temperature trend (from 1961-2005) for both the short (October, November, December) and long rain season (March, April, May) show that temperature in Tanzania has been increasing for the past few decades by more than 0.5°C (Figure 1). In particular, the temperature trend in the short rainy season has increased by 1°C - 1.3°Celcius, over the country's central, north-western, western, and south-western parts.

2.2. Temperature change in future

During both the short and long rainy seasons, the projection model for mid-century (2050s) shows a temperature rise of about 2.8°C and 2.5°C for western and eastern parts of Tanzania, respectively. (Figure 2). The rate of warming in Tanzania is such that temperature over the western part rises greater than the east by about 0.3°C. Temperatures in the southern highlands and central corridor would also increase but less than in the furthest western part of the country.

2.3 Precipitation change in future

The seasonal mean rainfall in both the short and long rainy seasons is projected to increase in northern Tanzania by as much as 20-30% by mid-century (Figure 3). In the country's central, southern and eastern portions, the seasonal mean rainfall is also expected to increase slightly by up to 10%, especially in the long rainy season. Similarly, northern Tanzania's longest consecutive wet days increase by about one day. However, the rest of the country will experience a decrease in the length of the longest wet spell. In the northern part of the country, the increase in the seasonal mean rainfall accompanied by an increase in the number of consecutive wet days could translate into enhanced extreme rainfall.

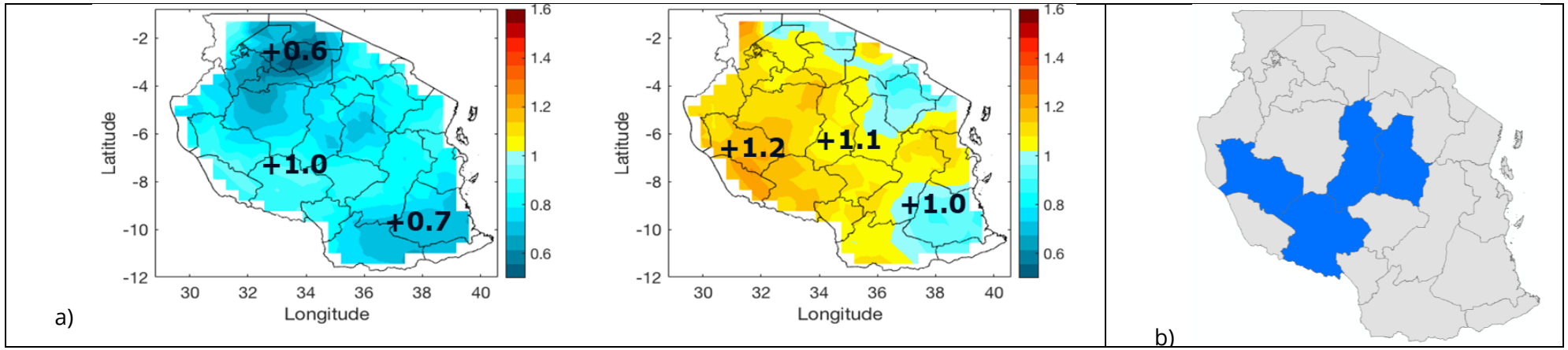

Figure 1: Historic seasonal temperature trend from 1961 to 2005 (a) of sunflower growing regions in Tanzania (b).

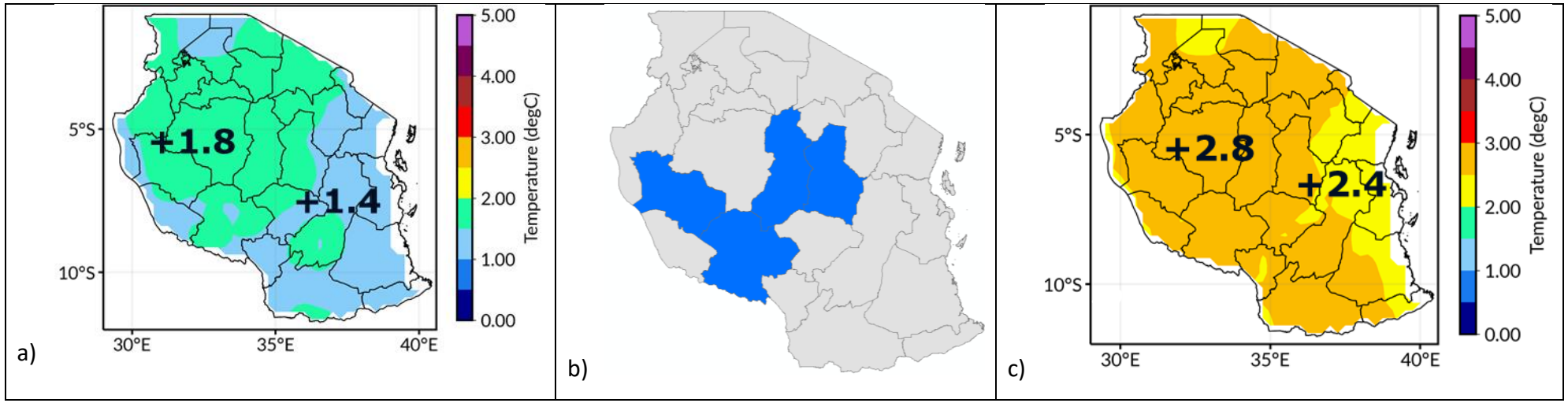

Figure 2: Future scenario of seasonal temperature (November, December, January, February, March, April) increase in 2030 (a) and 2050 (c) in business as usual region (b).

2.4 Drought

The projection of the longest consecutive dry days (CDD) shows that dry spells will last longer for mid-and-end of the century for most of Tanzania, with much longer dry spells projected (by about five days) over central, western and southern parts of the country. However, the CDD decreases (by about one day) in the northern and northeastern parts of the country. The projected increase in CDD in most parts of the country in both rainy seasons, along with a decrease in wet spells and seasonal rainfall, could lead to a high incidence of drought, significantly impacting rainfed agriculture. In summary, during both the short (OND) and long (MAM) rainy seasons, the model projections for the 2050s show that temperature is expected to rise in all parts of Tanzania, ranging from 2.0°C to 2.8°C. A likelihood of more dry spells with more incidences of agricultural drought is expected over most parts of Tanzania by the 2050s.

2.5 Climate change impact

Climate change will likely erode existing opportunities for yield increases in sunflower seeds considerably. Figure 6 (Baseline) shows that farmers can achieve yields of between 3 – 4 tonnes per hectare under current climatic conditions by applying optimum nutrient, pest and disease management options. However, Figure 6 also shows the result of a modeling study (RCP 8.5) indicating that by the 2050s, farmers are unlikely to achieve yields of more than 2.6 tonnes per hectare even under optimum nutrient management conditions and biotic control. Further yield increases will have to be achieved by adopting improved sunflower varieties and applying irrigation.

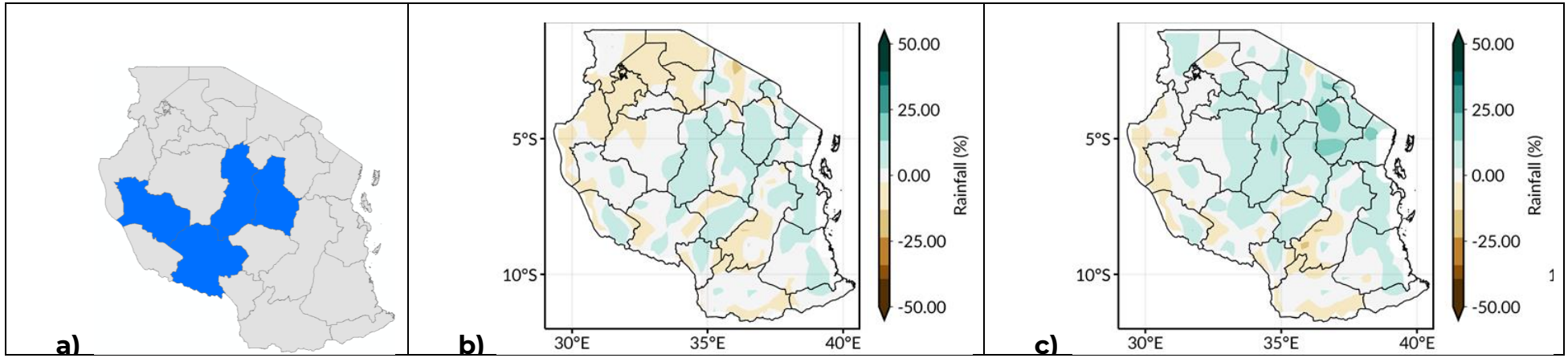

Figure 3: Sunflower growing region in Tanzania (a), future seasonal rainfall distribution in 2030 (b) and future seasonal rainfall distribution in 2050 (c) for the months of November, December, January, February, March and April.

3. Climate Smart Agriculture Practices and Technologies for Sunflower

Based on insights into climate change projections and participants' adaptive capacity, different CSA practices and technologies were discussed and found appropriate for future climate conditions.

- Boreholes for irrigation.
- Drip irrigation (male, female farmers, processors).
- Improved farming practices (plowing, weeding).
- Improved seeds (drought tolerant, shorter growing cycle (agro-dealers, processors).
- Use of improved post-harvest handling practices for harvesting, threshing, winnowing, transportation, packaging, storage and processing.
- Diversifying income-generating activities (agro-dealers).

The CSA practices with potential benefits for the entire value chain were further explored from a business perspective. Climate-smart business ideas were discussed to address climate-related risks and improve the value chain's viability. The climate-smart business ideas addressing high-medium climate change risks that were mentioned include the use of boreholes for irrigation for SHF who live away from water bodies, capacity-building training events including Farmer Field Days of SHFs, use of improved seeds, and appropriate mechanization like the use of plowing equipment.

Annex 1: Training Workshop Programme

Tanzania Sunflower Climate Changes Risks Assessment Workshop Programme
Venue: Antique Hotel-Morogoro
Dates: 29th and 30th May 2023

TIME	ACTIVITY	LEAD
DAY ONE		**Moderator: Godfrey**
08:00 – 09:30	Registration	CRAFT
09:30 – 10:00	Introductions, agenda setting & ground rules	Godfrey Kabuka
10:00 – 10:15	Welcome remarks & CRAFT Overview	Menno – Project Manager
10:15 – 10:40	Opening remarks by the GoH	Regional Administrative Secretary -Morogoro
10:40 – 11:10	What is climate change, and how do we know that climate is changing	John Recha- ILRI
11.00 – 11.30	**Tea Break**	
11:30 – 13:00	How is climate likely to change in the future in the sunflower growing areas? Presentation on: • Temperature, precipitation, drought/ floods, start /length of growing season, extremes (drought/ flood) Probing questions to check to what extent these changes are already happening	John Recha - ILRI
13.00 – 14.00	**Lunch Break**	
14:00 – 15:00	Presentation on how crop yield/quality and VC actors are impacted by climate change (Sunflower) and suitable areas for production (Sunflower) • How is climate change expected to affect sunflower yield? • How will climate change affect other value chain actors and activities? What are suitable areas for sunflowers in the future?	John Recha - ILRI
15:00 – 17.15	Group discussions on i) adaptation strategies currently in use to deal with climate change in the business cases, ii) other strategies needed to be better prepared for changes in the future, and iii) opportunities and barriers to strategy implementation (Sunflower)	John Recha - ILRI
17:15 – 17:30	**Evening Tea-end of Day one**	**ALL**
DAY TWO	**Potato climate change policy work**	**Moderator: Godfrey**
08:30 – 09:00	Recap of day one	CRAFT-RAPHAEL
09.00 – to 10.00	Group presentation and plenary: • Adaptation strategies currently used and those that will be used in the future due to climate change, • Opportunities, and Barriers to strategy implementation (Sunflower)	All

10.00 – 10.30	Government Policy on CSA/Sunflower Opportunities & barriers to CSA implementation in Sunflower sub-sector	Godfrey- Godfrey (PO-LARG/MoA)
10:30 – 11:00	**Tea Break**	
11:00-11:25	Overview of the oil sector and sunflower sub-sector	Frank-TARI
11:25 – 13:00	Next steps - Ideas on how to address the identified opportunities and barriers to strategy implementation (Sunflower): Introduction to group work Group work (Divided as SHF, BCs, Regional, National, SPs and NGOs)	John Recha – ILRI All (categorized)
13:00 – 14:00	**Lunch**	**ALL**
14:00-14:50	Presentation of group work. Plenary discussion on the next steps	All John Recha - ILRI
14:50-15:25 15:25-15:35	GCF overview and involvement of CRDB Q&A	CRDB
15:35-16:00	Evidently/Profitable CS practices/Technologies and GM analysis of sunflower VC in Tanzania	Advisors/Emmanuel
16:00-16:10	Way forward	CRAFT (Godfrey)
16:10-16:20	Closing remarks & Group photo	Menno & Government official
16:20-16:40	Evening Tea and Departure	ALL

Annex 2: Participant List

AICCRA TANZANIA CLIMATE-SMART AGRICULTURE WORKSHOP FOR SUNFLOWER VALUE CHAIN			
No.	Name	Gender	Institution
1	Cuthbert Mwinuka	Male	DISTRICT COSS CHUNYA
2	Bernard Libata	Male	RS-MBEYA
3	Tumaini Elibariki	Male	FARM AFRICA
4	John Julius	Male	TEMNAR
5	Homphrey Emmanuel	Male	AYEGRO
6	Stephen Henry	Male	SUFA
7	Abdulaziz Mkwizu	Male	FORUMCC
8	Adelaida Tillya	Female	TASPA
9	Habiba Mtongori	Female	TMA
10	Rajabu Seif Msaga	Male	TEMNAR
11	Udifasse C. Yakisola	Male	KHEBHNDZA
12	Fidea luka Millanzi	Female	TEMNAR
13	Semen John Mwamlenga	Male	MPUI SACCOS LTD
14	Condrad Ally	Male	MPUI SACCOS LTD
15	Gindu Muya	Female	MOA
16	Phoebe Nhonya	Female	FARMER
17	Veronica Myovela	Female	MPUI SACCOS LTD
18	Salumu Saleh Hontoa	Male	MWENLE FUN FLOWERS
19	Magreth Kaimuka	Female	KMC
20	Samuel Majohya	Male	FARMER
21	Rehema C Ally	Female	FARMER
22	Maria O. Leshalu	Female	MPWAPWA
23	Helen Daniel	Female	KSR
24	Ruthu F. Njamasi	Female	MPWAPWA
25	Stephano A. Aggrey	Male	KMC
26	Shany Nuoma	Female	KMC
27	Bazilio Juluis	Male	NONDO
28	Tahsi Seleaani	Female	NONDO
29	Hadija Mabothi Kapiunga	Female	NONDO
30	Kazungu Peter	Male	WFP/FCMA
31	Vicky Sidney Peter Msamba	Female	AMDT
32	Evelyn Kagoma	Female	MOA
33	Apolonia Agaptus	Female	VPO
34	Witnesspeacequeen Kundi	Female	TARI
35	Faidha Salum	Female	MWENGE
36	Seif Sida	Male	MWENGE
37	Balbina Richard Paul	Female	TEMNAR
38	Bernard Abraham	Male	DODOMA RS
39	Frank Uomloa	Male	
40	Rajabus Mpoudi	Male	
41	Allan Ngakonda	Male	RUDI

42	Linus Kahendaguza	Male	PO-RALG
43	Methuseua M. Msanja	Male	PO-RALG
44	Pashal L. Tekui	Male	CONSULTANT SOIL ANALYSTS
45	Msafifu Mtupili	Male	TMA
46	Fidelis Ramoyo	Male	NOUDO INDUSTRY CO LTD
47	Sophia Kesy	Female	SNV
48	Emmanuel Nkenja	Male	SNV
49	Medavia Loveta Bernard	Male	KSR
50	Lucas Nachota	Male	KSR
51	Faraja Mwakajoka	Male	MPUI SACCOS LTD
52	Helen Daniel	Female	KSR
53	Khadija Yahya	Female	ASA
54	Edward Mbugu	Male	ASA
55	Nicholaus King	Male	WASAFI MEDIA
56	Emmanuel Mwakatobe	Male	TOSCI
57	Lawimce Rusole	Male	DMA LTD
58	Euphrasia Shayo	Female	ENVIROCARE
59	Lusayo Ukuku	Male	MA/WPP
60	Raymond Lyimo	Male	AGRITERA
61	Erica Francis	Female	GUARDIAN
62	Saukuru Materu	Female	ITV
63	Yamagaji Ddudi	Male	BYTRADE
64	John Recha	Male	ILRI
65	Benjamin Gerald	Male	SNV
66	Rey Buko	Male	SNV

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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

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