

# ADOPTION OF CLIMATE SMART COCOA PRACTICES IN THE ADJUST AND COPE CLIMATIC IMPACT ZONES OF GHANA

**WRITTEN AND COMPILED BY**

*Mustapha Alasan Dalaa , Eric Worlanyo Deffor, Rich Kofi Kofituo, Richard Asare*

# TABLE OF CONTENTS

<b>2</b>	<b>INTRODUCTION AND OBJECTIVES</b>
<b>3</b>	<b>ADOPTION STUDY RESULTS</b>
<b>4</b>	<b>ADOPTION OF CSC TECHNOLOGIES BY FARMERS</b>
<b>5</b>	<b>BENEFITS DERIVED FROM CSA ADOPTION BY CLIMATIC ZONE</b>
<b>6</b>	<b>ROLE OF WEATHER INFORMATION IN CSC ADOPTION/ (PERCEIVED ROLE OF WEATHER INFORMATION ON COCOA PRODUCTIVITY)</b>
<b>7</b>	<b>WHY FARMERS FAILED TO RECEIVE WEATHER INFORMATION</b>
<b>7</b>	<b>TIMING OF BMPS/CSC PRACTICES AND IMPACT OF WEATHER INFORMATION ON PRODUCTIVITY</b>
<b>8</b>	<b>CONCLUSION AND RECOMMENDATION</b>
<b>9</b>	<b>REFERENCES</b>

## **LIST OF FIGURES**

- **Figure 1: CSA Practices Adopted within the Climatic Impact Zone**
- **Figure 2: Benefits Derived from Adopting CSA within Climatic Impact Zone**

## **LIST OF TABLES**

- **Table 1: Tabulation of Training and Climatic Zone**
- **Table 2: Tabulation of Training and Adoption of CSA**
- **Table 3: Tabulation of adoption of CSA across Climatic Impact Zone**
- **Table 4: Multiple Response for CSA Practices Adopted within the Climatic Impact Zone**
- **Table 5: Multiple Response of the Benefits Derived from Adopting CSA within the Climatic Impact Zone**
- **Table 6: Receive Weather Information (RECWI) by Climatic Impact Zone**
- **Table 7: Reason for Farmer Not Receiving Information**
- **Table 8: Tabulation of best Channels to receive eather Information**
- **Table 9: Timing BMPS/CSC Practices**
- **Table 10: Perception of farmers on Impact of Weather Information on Productivity**

## About CCAFS

The Climate Change, Agriculture and Food Security (CCAFS) program of the Consortium of International Agricultural Research Centers (CGIAR) seeks to marshal the science and expertise of CGIAR and partners to catalyse positive change towards climate-smart agriculture (CSA), food systems and landscapes, and position CGIAR to play a major role in bringing to scale practices, technologies and institutions that enable agriculture to meet triple goals of food security, adaptation and mitigation. The three main objectives of the program is to Sustainably increase agricultural productivity, to support equitable increases in farm incomes, food security and development, Adapting and building resilience of agricultural and food security systems to climate change at multiple levels and Reducing greenhouse gas emissions from agriculture. In Ghana, the CCAFS program is being implemented in the cocoa sector by the International Institute of Tropical Agriculture (IITA).

## About IITA

The International Institute of Tropical Agriculture (IITA) is a non-profit institution that generates agricultural innovations to meet Africa's most pressing challenges of hunger, malnutrition, poverty, and natural resource degradation. Working with various partners across sub-Saharan Africa, we improve livelihoods, enhance food and nutrition security, increase employment, and preserve natural resource integrity. The Climate Change Agriculture and Food Security (CCAFS) program in IITA-Ghana is determined to develop tailor-made stepwise climate-smart management and finance packages to enhance the resilience and productivity of Ghanaian Cocoa farmers in the phase of the adverse effect of climate change on Cocoa production.

## Correct Citation for CCAFS Finance Strategy:

Dalaa M, Deffor E.W, Kofituo R, Asare R. 2020. Adoption of Climate Smart Cocoa Practices in the Adjust and Cope Climatic Impact Zones of Ghana. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

## Introduction and Objectives

Cocoa (*Theobroma Cacao*) remains an important crop to the Ghanaian economy, due to its historical contribution to revenue, foreign exchange and the creation of direct and indirect jobs. The sector, however, continues to face production challenges such as ageing cocoa trees, reduced soil fertility, pest and disease infestations and recently the effects of climate change. These threaten the productivity and sustainability of cocoa in Ghana. The introduction of Climate Smart Cocoa (CSC) practices for designated climate impact zones in Ghana thus offer a significant avenue for improving productivity and livelihood of cocoa farmers (IITA, 2019).

Promoting the adoption of Climate Smart Cocoa (CSC) practices among farmers is central to sustaining the crop, improve livelihood and resilience of farmers, and mitigate the emission of greenhouse gas (GHG) (Bunn et al., 2019). Although cocoa farmers are being introduced to CSC practices, their adoption is likely to be influenced by various factors. In Ghana, Akrofi-Atiotianti et al. (2018) established that factors such as the age and location of farms, farmers' age, residential status and access to extension services influence adoption of Climate-Smart Agriculture (CSA) by cocoa farmers.

Another key variable relevant to the adoption of Climate Smart Cocoa practices is timely access to weather information by cocoa farmers. The provision of weather stations data to farmers can assist them to identify climate trends and improve their climate change risk assessments (UTZ, 2016). Such weather information can be made available to farmers either through the sharing of information within farmer groups or through mobile phone applications. This report presents the factors that influence CSC adoption among selected cocoa farmers in two Climatic Impact Zones in Ghana. It also established how critical farmer access to weather information influences cocoa productivity. Such studies will advise policymakers and help initiate practicable strategies that will facilitate the successful adoption of these practices by farmers.

The CCAFS CSC( IITA and Rainforest Alliance) project team adopted the 5Q approach [1]to rapidly access CSC adoption rates among cocoa farmers across two climatic impact zones ( Cope[2] and Adjust[3] ).

[1] The 5Q Approach is a Smart Monitoring tool used by projects to monitor progressive adoption of new technologies by end-user and it is based on a concept of asking 5 Smart Questions about the technologies being introduced. A simple sets of 5 ( or a little more) questions form the basis of the methodology.

[2] The Cope zone is one in which climatic conditions are predicted to be relatively favourable for cocoa production with less significant changes to cocoa suitability.

[3] The Adjust Zone is the climatic impact zone with higher annual average temperature, weaker dry season (short, with contemporary higher rainfall in the driest quarter) and comparatively higher annual rainfall.

The main aim was to see if the stepwise CSC Approach[4] being promoted was yielding the desired results and to understand cocoa farmers perceptions on what these gains could be. A Semi-structured questionnaire was administered to 200 cocoa farmers all of whom are part of CSC trials in 4 cocoa-growing communities across two climatic impact zones ( Cope and Adjust ) managed by AGRO ECO[5]. This brief report encapsulates the CSC adoption rates and farmers perceptions on the benefits derived from CSC.

### Adoption Study Results

The data for the CSC adoption had a total of 204 sampled farmers, 203 of them indicated they received training in CSC practices. All (100%) of the sampled farmers within the COPE Climatic Impact Zone, indicated they received training in CSC, 99 per cent of the farmers from the ADJUST Climate Impact Zone received training on CSA. See Table 1. Out of the total farmers that had received training in CSA, 94 per cent adopted CSA practices. This reflects high rate of CSA adoption among the sampled farmers. See Table 2. The breakdown across the two Climatic Impact Zones show that 47 per cent of farmers are in the Adjust zone with 53 per cent in the COPE zone. Hence CSC adoption is relatively higher among farmers in the COPE zone compared to the farmers in the ADJUST zone. See Table 3 for details.

**Table 1: Tabulation of Training and Climatic Zone**

TRAINING	CLIMATE IMPACT ZONE		TOTAL
	ADJUST	COPE	
Yes	102 (99.03%)	101 (100%)	203 (100.0)
No	1 (0.97%)	0 (0.0%)	1 (100.0)
<b>Total</b>	<b>103</b>	<b>101</b>	<b>203</b>

Source: CCAFS CSC Field Data, 2020

**Table 2: Tabulation of Training and Adoption of CSA**

Training	ADOPTION OF CSA		TOTAL
	NO	YES	
Yes	13 (6.4%)	190 (93.6%)	203 (100%)
<b>Total</b>	<b>13</b>	<b>190</b>	<b>203</b>

Source: CCAFS CSC Field Data, 2020

[4] STEPWISE CSC APPROACH;-The stepwise climate-smart cocoa approach suggests good agricultural practices which follow an incremental investment pathway starting with least cost practices to the highest in a systematic and orderly way to aid cocoa farmers to realize the optimum potential of their investment through incremental increases of yields and income from their cocoa farms.

[5] Agro Eco - Louis Bolk Institute is a development institute interested in promoting sustainable agriculture practices through trainings, research and quality management. IITA and Agro Eco are partners in co-learning with smallholder cocoa farmers on climate-smart stepwise practices in the cope and adjust climatic impact zones of Ghana.

**Table 3: Tabulation of adoption of CSA across Climatic Impact Zone**

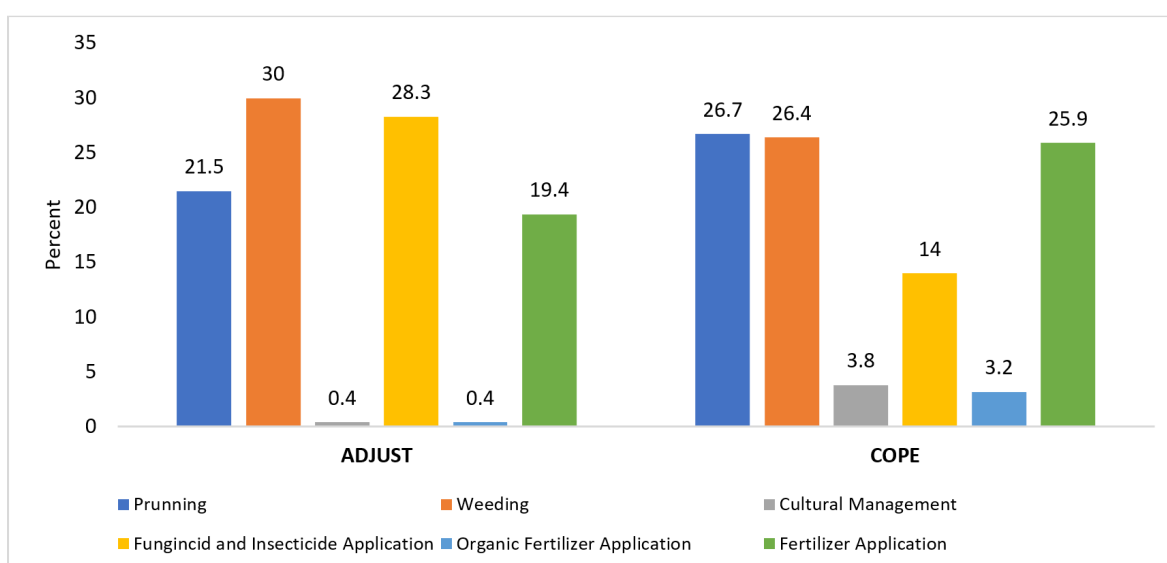
Adopt CSA	CLIMATE IMPACT ZONE		TOTAL
	ADJUST	COPE	
No	13 100.0	0 0.00	13 100.00
Yes	89 46.84	101 53.16	190 100.00
<b>Total</b>	<b>102</b> <b>50.25</b>	<b>101</b> <b>49.75</b>	<b>203</b> <b>100.00</b>

First row has frequencies and second row has row percentages

Source: CCAFS CSC Field Data, 2020

### 1.0 Adoption of CSC Technologies by Farmers

From Figure 1, the CSC Practices adoption by farmers in the two Climatic Impact zones is presented. In the Adjust zone, weeding, fungicide and insecticides application, weeding and fertilizer application are the most adopted CSC Practices. Cultural management and organic fertilizer application practices were the least adopted by farmers in the Adjust zone. The low adoption rates for cultural management organic fertilizer application is attributed to existential labour and resource challenges. For the COPE Impact zone, CSC technologies like pruning, weeding and fertilizer application were mostly adopted by farmers. Fungicide and insecticides application and Cultural practices other the other hand were the least adopted by the farmers in the COPE impact zone. This is because proper pruning (structural and sanitary) reduces the incidence of pest and diseases (Armengot et al, 2020) and the results in fig.1 under cope zone confirm this with farmers low usage of fungicides and insecticides. See Table 3 for details.



**Figure 1: CSA Practices Adopted within the Climatic Impact Zone**

Source: CCAFS CSC Field Data, 2020

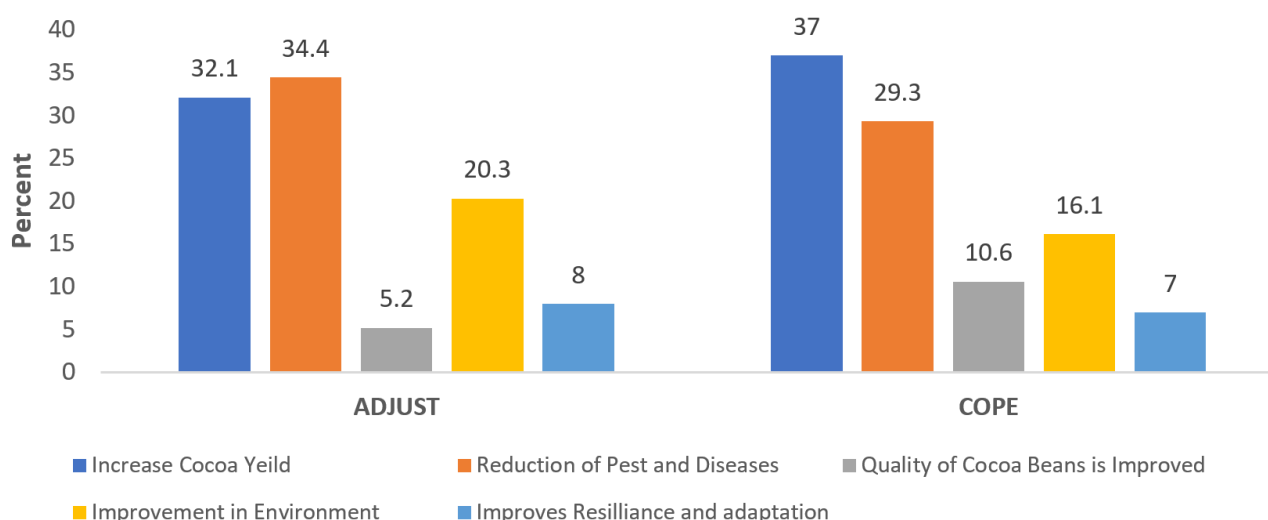
**Table 4: Multiple Response for CSA Practices Adopted within the Climatic Impact Zone**

CSA Practices Adopted	CLIMATIC IMPACT ZONE						TOTAL
	ADJUST			COPE			
	N	Percent of Responses	Percent of Cases	N	Percent of Responses	Percent of Cases	
Pruning	61	21.5	68.54	99	26.7	98.02	160
Weeding	85	30.0	95.51	98	26.4	97.03	183
Cultural Management	1	0.4	1.12	14	3.8	13.86	15
Fungicide and Insecticide Application	80	28.3	89.89	52	14.0	51.49	132
Fertility Management Practices	1	0.4	1.12	12	3.2	11.88	13
Fertilizer Application	55	19.4	61.80	96	25.9	95.05	151
<b>Total</b>	<b>283</b>	<b>100%</b>	<b>317.98</b>	<b>371</b>	<b>100.0</b>	<b>367.33</b>	<b>654</b>
Cases	89			101			190
Missing Cases							14
							204

Source: CCAFS CSC Field Data, 2020

### 2.0 Benefits Derived from CSA Adoption by Climatic Zone

Farmers in the two climate impact zones indicated the benefits of adopting CSC technologies. From the two zones, increased cocoa yield and reduction in pest and diseases are the main benefits stated by the farmers. The findings also show that farmers perceive that CSC technology improves the environment. Improvement in quality of cocoa beans and improvement in farmer resilience and adaptation were the least stated benefits of adopting CSA. The findings are presented in Figure 2 and Table 4 respectively.



**Figure 2: Benefits Derived from Adopting CSA within Climatic Impact Zone**

Source: CCAFS CSC Field Data, 2020

**Table 5: Multiple Response of the Benefits Derived from Adopting CSA within the Climatic Impact Zone**

Benefits	CLIMATIC IMPACT ZONE						TOTAL
	ADJUST			COPE			
	N	Percent	Percent of Cases	N	Percent	Percent of Cases	
Increase Cocoa Yield	68	32.1	76.4	101	37.0	100.0	169
Reduction of pest and diseases	73	34.4	82.02	80	29.3	79.21	153
Quality of cocoa beans is improved	11	5.2	12.36	29	10.6	28.71	40
Improvement in environment	43	20.3	48.31	44	16.1	43.56	87
Improves resilience and adaptation	17	8.0	19.1	19	7.0	18.81	36
<b>Total</b>	<b>212</b>	<b>100%</b>	<b>238.20</b>	<b>273</b>	<b>100.0</b>	<b>270.30</b>	<b>485</b>
Cases	89			101			190
Missing Cases							14

Source: CCAFS CSC Field Data, 2020

### 3.0 Role of Weather Information in CSC Adoption/ (Perceived role of Weather information on Cocoa Productivity)

A total of 201 farmers were sampled from the two Climatic Impact Zones (ADJUST and COPE). In Table 1, 74 percent of the sampled farmers indicated they had received weather information, 25 percent indicated otherwise. A cross-tabulation show that 55 percent of the farmers that received the weather information were in the COPE zone. There were more farmers in the ADJUST zone that indicated did not receive the weather information compared to the COPE zone. See Table 6.

**Table 6: Receive Weather Information (RECWI) by Climatic Impact Zone**

RECWI	CLIMATE IMPACT ZONE			ALL
	ADJUST	COPE	TOTAL	
No	35 (68.63)	16 (31.37)	51 (100.00)	51 (25.37)
Yes	68 (45.33)	82 (54.67)	150 (100.00)	150 (74.63)
<b>Total</b>	<b>103</b> <b>51.24</b>	<b>98</b> <b>48.76</b>	<b>201</b> <b>100.00</b>	<b>201</b> <b>100.00</b>

Source: CCAFS CSC Field Data, 2020



### 3.1 Why Farmers failed to Receive Weather Information

Among the farmers who did not receive weather information, the majority (98%) stated their inability to listen to the news on Television or Radio as the main hindrance to receiving weather information. See Table 7. Less than 2 percent indicated a lack of access to internet as a core limitation. Farmers also indicated the following channels as “bestway” to receive weather information. From Table 8, 93 percent of the farmers indicated “radio or Television” as the best way to deliver and access weather information. A few however indicated cell phone or internet and personal contacts.

**Table 7: Reason for Farmer Not Receiving Information**

REASONS	FREQUENCY	PERCENT
I do not have access to internet	1	1.96
I do not listen to the news on TV or radio	50	98.04
<b>Total</b>	<b>51</b>	<b>100.00</b>

Source: CCAFS CSC Field Data, 2020

**Table 8: Tabulation of best Channels to receive eather Information**

CHANNELS	FREQUENCY	PERCENT
Cellphone or internet	1	1.18
Personal contact	5	5.9
Radio or television	79	92.9
<b>Total</b>	<b>85</b>	<b>100.00</b>

Source: CCAFS CSC Field Data, 2020

### 3.2 Timing of BMPs/CSC Practices and Impact of Weather Information on Productivity

Among the farmers that had received weather information, 77 percent perceive the timing of CSC practices to be appropriate whereas 23 percent perceived it not to the appropriate. See Table 9. In terms of the impact of the weather information on-farm productivity, most of the farmers indicated receiving weather information helps them to undertake good farm planning, helps them increase their yield and reduce pest and disease on their farms. The multiple responses are presented in Table 10.

**Table 9: Timing BMPS/CSC Practices**

TIMING BMPS/CSC PRACTICES	FREQUENCY	PERCENT
No	34	22.7
Yes	116	77.3
<b>Total</b>	<b>150</b>	<b>100.00</b>

Source: CCAFS CSC Field Data, 2020

**Table 10: Perception of farmers on Impact of Weather Information on Productivity**

INDICATOR	N	FREQUENCY	PERCENT
Increased Yield	54	33.13	51.92
Reduce Pest and Diseases	29	17.79	27.88
Good Farm Planning	80	49.08	76.92
<b>Total</b>	<b>163</b>	<b>100.00</b>	<b>156.73</b>
Valid Cases	104		
Missing Cases	97		

Source: CCAFS CSC Field Data, 2020

### Conclusion and Recommendation

Cocoa farmers in both zones generally recorded higher adoption rates for Climate Smart Cocoa and the perception of cocoa farmers in improving production, reduction in pest and disease incidence, and quality of cocoa beans is on the rise. However, there is still the need to promote the importance of CSC enhancing farmers resilience and adaptive capacity. Companies interested in scaling CSC will need to pay more attention to enhancing farmers knowledge on the benefits of CSC which ultimately has a bearing on CSC adoption. Providing CSC farmers with weather information will be very useful to them in deciding when to undertake key CSC practices that are dependent on Rainfall and Temperature.

## References

Akrofi-Atitianti, F.; Ifejika Speranza, C.; Bockel, L.; Asare, R. (2018) Assessing Climate Smart Agriculture and Its Determinants of Practice in Ghana: A Case of the Cocoa Production System. *Land*, 7, 30.

Armengot L.,Ferrari L., Milz J., Velasquez F., Hohmann P.,Monika Schneider .(2020). Cacao agroforestry systems do not increase pest and disease incidence compared with monocultures under good cultural management practices. *Crop Protection* Volume 130, 105047.

<https://doi.org/10.1016/j.cropro.2019.105047>

Bunn C, Fernandez-Kolb P, Asare R, Lundy M. (2019). Climate Smart Cocoa in Ghana Towards climate resilient production at scale. CCAFS Info Note. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).



RESEARCH PROGRAM ON  
**Climate Change,  
Agriculture and  
Food Security**



## Contact

CCAFS Cocoa Team

+233 303 931 023

Mustapha Alasan Dalaa

M.Dalaa@cgiar.org

Rich Kofi Kofituo

R.Kofituo@cgiar.org

Richard Asare

R.Asare@cgiar.org

This work was implemented as part of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), which is carried out with support from CGIAR Fund Donors and through bilateral funding agreements. For details please visit <https://ccafs.cgiar.org/donors> The views expressed in this document cannot be taken to reflect the social opinions of these organisations



Design by : Selom Akande  
[Sa.Akande@cgiar.org](mailto:Sa.Akande@cgiar.org)