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**BUILDING NETWORKS OF SMALLHOLDER CASSAVA FARMERS AROUND  
CASSAVA PROCESSING INDUSTRIES IN GHANA: THE CAVA EXPERIENCE 2019**



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### EXECUTIVE SUMMARY

Cassava: Adding Value for Africa (C:AVA) Project is a cassava value chain enhancement project implemented in five countries in Africa namely Ghana, Nigeria, Tanzania, Uganda and Malawi with funding from Bill and Melinda Gates Foundation in USA. One of the C:AVA project interventions in Ghana is “*Building networks of smallholder cassava farmers around cassava processing centers*” to help increase fresh cassava roots production and onward processing into high value cassava products such as HQCF, IGCF, HQCC, starch, ethanol and wet cake. The lack of secure markets for the cassava farmers has always led to high surpluses in the cassava system. In order to overcome this challenge, it was considered necessary to organize farmers around processors who require their fresh cassava so that they are assured of a ready market.

A participatory approach was used to implement the activity in Eastern, Central and Volta Regions. This report documents the implementation process, successes and challenges of the above stated C:AVA intervention. Using participatory approach has allowed key players in the industry namely; cassava farmers, processors, Agricultural Extension Agents (AEAs) and C:AVA staff to work together in a harmonious environment to achieve a common goal. This led to the formation of farmer groups in each location who were linked to the processing centers identified in each region. Working with the

AEAs has provided the needed impetus for the farmers to receive access to improved cassava planting materials and training on best agronomic practices with backstopping from CAVA staff. In total, six (6) farmer groups consisting of at least twenty (20) farmers each, were organised to supply fresh cassava roots to the six (6) processing centers identified with a total FCR intake capacity of 548 tons/month.

The network helped the farmers to increase cassava yield from an average of 12.4 tons/ha in 2016 to 38.2 tons/ha in 2018 representing a 208.1 % yield increase exceeding the 25% target of yield increase targeted in the project document. The benefit cost ratio of farmer groups identified increased significantly from 1.3 to 4.0 - which depicts a 207.7% increase.

Some key lessons were learned during the implementation process included the following; It was observed that female cassava farmers were maintaining their cassava farms better than their male counterparts probably because the males had bigger farms. It was also realized that farmers who were more involved in decision making processes turned out to be more committed in fulfilling their shared obligations.

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## LIST OF ABBREVIATIONS AND DEFINITIONS

AEAs	Agriculture Extension Agents
C: AVA II	Cassava: Adding Value for Africa Phase II
CSIR	Council for Scientific and Industrial Research
FCRs	Fresh Cassava Roots
HQCC	High Quality Cassava Chips
HQCF	High Quality Cassava Flour
IGCF	Industrial Grade Cassava Flour
MoFA	Ministry of Food and Agriculture

**Non-traditional cassava products:** refer to all cassava products except the traditional cassava products namely, *agbelima*, *gari*, *kokonte*, *yakayake*, *atseke* and *agbelikaklo*. Specifically, nontraditional cassava products refer to HQCF, HQCC, IGCF, starch, ethanol and wet cake.

## **1.0 INTRODUCTION**

### **1.1 Background**

Cassava Adding Value for Africa Phase II (C:AVA II) was a project funded by The Bill and Melinda Gates Foundation in USA. The project was implemented in five countries across Africa namely, Ghana, Nigeria, Tanzania, Malawi and Uganda. The project was hosted in Ghana by CSIR - Food Research Institute. CAVA II aimed at increasing incomes and improving livelihoods of smallholder cassava farmers by creating and expanding markets along the cassava value chain. The project was implemented in six regions: Volta, Eastern, Central, Ashanti, Northern, and Brong Ahafo Regions. These regions are noted for producing high volumes of fresh cassava roots annually (IFPRI and PBS, 2007).

Cassava is a major calorie source in developing countries (Gil and Buitrago, 2002) and most people in Ghana depend on cassava for their daily calorie allowances (FAO-ESPD, 2000). Most farmers in Ghana cultivate cassava as either a major or a minor crop (FAO, 2000). Annual production output of cassava roots in 2012 was 14,592,900 metric tons (SRID, 2013) and total land area cultivated was 869, 000 hectares (SRID, 2013). Cassava is the most important staple root crop, in terms of volume of production and food security wise, in Ghana (Murugan *et al.*, 2012) with per capita consumption of about 152.9 Kg/head/year in 2005 (SRID, 2010). Postharvest losses of fresh cassava roots is about 35% – 40% annually (FAO, 2011).

Cassava production and processing are major sources of livelihoods for a colossal number of rural folks (Falade and Akingbala, 2008). The demand for processed products from cassava is increasing and the industrial potential of cassava is gaining high recognition (Jumah *et al.*, 2006 and Collares, *et al.*, 2012); however, the potential of cassava to alleviate rural poverty has not been fully exploited (AATF-IITA, 2005). It is for this reason CAVA II project was implemented. Cassava was promoted as an industrial raw material for HQCF, HQCC, IGCF, starch, and ethanol production during the implementation of the C:AVA II project. The reason for targeting these products is that they have long value chains and, therefore, their ripple effects in combating poverty are expected to be huge. These would cause demand for fresh cassava roots to be very high and create a supply at a competitive price.

Smallholder farmers would be motivated to produce more cassava to feed the processing industries. Indicatively, this means that sustainable increase in cassava output would not be a function of only increasing farm size but would also involve using improved cassava varieties and adopting best agronomic practices. However, prior to the implementation of the intervention, interviews conducted with the farmers with fields visits and estimates revealed that average yield of fresh cassava roots was 12.4 tons/ha. This production was low as benefit-cost ratio was 1.3. This is one of the reasons why the implementation of the C:AVA Project intervention: “*Building networks of smallholder cassava farmers around cassava processing centers*” within the project catchment areas in the regions (Eastern, Central and Volta) was timely. It has made it possible for the farmers to receive adequate training in best agronomic practices to help produce high quality cassava roots and yield per hectare. Again, this was very important because processing of cassava roots into industrial products such as HQCF requires the use of fresh and high quality cassava roots devoid of any sign of rot (Dziedzoave *et al.*, 2006).

This report documents the implementation process, successes and challenges of this C:AVA project activity in the Eastern, Central and Volta regions of Ghana.

The objectives for the activity implementation were as follows:

1. To provide a secure and competitive market for the cassava farmers.
2. To provide the processing centers with consistent and uninterrupted supply of fresh cassava roots for processing.
3. To demonstrate how network building translates to increased performance of the value chain actors.
4. To provide information to guide other potential implementers of cassava value chain interventions.

## **2.0 STRATEGIC APPROACH**

### **2.1 Identification of Cassava Processing Centers**

The identification process started with scoping the regions to identify processing centres that transform fresh cassava roots into non-traditional products such as HQCF, starch, IGCF, ethanol and HQCC. Key persons that were contacted during the identification process were the Regional and District MoFA Directors, Agricultural Extension Agents (AEAs) and community leads. The



contacts were made through personal visits, emails and phone calls. Internet search was also very beneficial in providing clues.

## **2.2 Selection of Implementation Sites**

The criterion for selecting the implementation sites was the existence of a processing center in the area. The implementation sites identified were located at Kwamoso, Amaarkrom, Amanase, and Kwasi Nyarko (Eastern Region), Asebu and Oguaakrom (Central Region) and Abutia Kissifli (Volta Region). Implementation was done from May 2016 to November 2018.

## **2.3 Organizing and Training Smallholder Cassava Farmers to Increase Productivity**

For farmers to be effectively networked to processors, their produce (FCR) need to be competitively priced and this requires that they adopt good agronomic practices that will give them better yields. As part of building a network of farmers around processing centers, the farmers need to be trained in good agronomic practices. Having discovered the processing centers in the catchment area (Table 1), it was possible for cassava farmers to be organized around the processing centers so they could cultivate and supply fresh cassava roots to the processing centers. This engagement was established through a participatory approach with the processors, farmers and agricultural extension agents (AEAs) in the catchment areas. The meetings led to the organisation of cassava farmers into groups to enable C:AVA Ghana team offer technical support and training to them. Providing them with technical know-how in best agronomic practices was found to be key if the farmers were to increase productivity per unit of land. Furthermore, the smallholder cassava farmers were attached to AEAs who visited them on regular bases and guided them in applying best agronomic practices. The farmers were also provided with phone numbers of the AEAs to facilitate communication between them. Furthermore, through the AEAs, the farmers were linked to sources of improved and high yielding cassava planting materials and agro-chemicals. The improved cassava planting materials were *Ampong*, *Bankye hema*, *Afisiafi* and *Sika bankye*. In addition, the farmers were linked to tractor operator services.

Data was collected on the number of processing centers discovered, the numbers of farmer groups formed and linked to processing centers, total cassava yield per hectare on farmers' farms, total cost of production per hectare, and the total quantity of fresh cassava roots supplied to the

processing centers. In addition, the benefit cost ratio was also computed for farmers before and after the intervention. Total cassava yield per hectare and total cost of production per hectare were used to calculate farmers' total income, net income, percentage yield increase and benefit cost ratio. The benefit cost ratio was calculated using the following formula:

$$i. \textit{Benefit-Cost Ratio} = \frac{\textit{Net Income}}{\textit{Total cost of production}} \quad (\textit{Gittinger \& Price, 1982}).$$

The results of the analysis are presented in the tables below.

### 3.0 OUTCOMES

#### 3.1 Cassava Processing Centers Identified

Six (6) cassava processing centers were identified during the scoping. Data was collected on the products being produced, the raw materials used, the production capacity (FCR intake per month), and different types of equipment and mode of drying. These are presented in Table 1 below.

Table 1: Cassava Processing Industries Identified, Types of Products being Processed and Industries' Capacity

Name	Products	Raw material	Capacity (Tons of FCRs)	Equipment & Mode of drying	Location
White Rose Ltd	HQCC, HQCF, Starch	FCRs	128 tons/month	Bin Dryer & Chipper	Kwamoso, E/R
Ifafa Ghana Ltd	Ethanol	Cassava Starch	FCR is not the primary raw material (50 tons/month)	Fractional Distillation equipment & boiler	Kwasi Nyarko, E/R
Hugo Commodities	Starch, Chips	FCRs	5 tons/month	Starch extractor Machine, sun drying	Amaakrom, E/R
Charity & Co (a subsidiary of Miva Lifeline Ltd)	Cassava wet mash	FCRs	90 tons/month	Graters, pressers	Amanase, E/R
Tropical Starch Company Limited	IGCF, HQCF	FCRs	225 tons/month	Graters, Millers, Bin dryer	Asebu, C/R
Bankyekrom	Cassava Chips	FCRs	25 tons/month	Chippers, Solar Dryer	Oguaakrom, C/R
Kissifli Cassava Processors Association	Cassava wet mash, Chips	FCR	25 tons/month	Graters, pressers, bin dryer	Abutia Kissifli V/R
<b>Total Processing Industry Capacity per month = 548 tons/month</b>					

### 3.2 Quantity of Fresh Cassava Roots Harvested Per Hectare and Corresponding Average Cost of Production

Table 2 provides the data collected regarding the cost of producing one hectare of cassava using the farmers' traditional agronomic practices vis-à-vis the total yield accrued from their method of production.

Table 2: Average Cost of Production Using Current Farmers' Practices

S/N	INPUT/ACTIVITY	FREQ	QUANTITY	UNIT COST (GH¢)	AMOUNT (GHC)	US \$ Equivalence (\$1 ≡ GH¢ 4.5)
1	Land Rent	1	1 Ha	250	250	56
2	Land Preparation: Clearing	1	15 man-days	15	225	50
3	Planting (local sources)					
	• Cost of planting material	1	100 bundles	free	N/A	N/A
	• Labor cost for planting	1	10 man-days	15	150	33
4	Weeding □ Manual	3	15 man-days	15	675	150
5	Harvesting	1	5 man-days	15	75	17
	<b>TOTAL COST OF PRODUCTION =</b>				<b>1,375.0</b>	<b>306</b>
	NOTE: Total Yield Using farmers' traditional Method (Average) =				<b>12.4 tons/ha</b>	

From Table 2 above, total cost of production from the traditional farmer's method of fresh cassava roots production estimated was GHC1,375.0 in which they were averaging 12.4tons/ha of FCR yield.

Table 3 provides the data collected regarding the cost of producing one hectare of cassava using best agronomic practices which the farmers acquired through CAVA II intervention vis-à-vis the total yield accrued by the farmers.

Table 3: Average Cost of Production Using Best Agronomic Practices

S/N	INPUT/ACTIVITY	FREQ	QUANTITY	UNIT COST (GH¢)	AMOUNT (GHC)	US \$ Equivalence (\$1 ≡ GH¢ 4.5)
1	Land Rent	1	1 Ha	250	250	56
2	Land Preparation					
	• Ploughing cost	2	1 ha	250	500	111
	• Cost of herbicide	1	5 liters	13	65	14
	• Labour Cost for application	1	3 man-days	15	45	10
3	Planting					
	• Cost of improved planting material	1	100 bundles	2	200	44
	• Labour cost for planting	1	10 man-days	15	150	33
4	Weeding					
	• Manual weeding	2	15 man-days	15	450	100
	• Herbicide cost	1	3 litre	13	39	8.7
	• Labour cost for application	1	3 man-days	15	45	10
5	Harvesting	1	10 man-days	15	150	33
<b>Total Cost of Production</b>					<b>= 1894</b>	<b>421</b>
NOTE: Total Yield Using This Method on farmers' field (Average) =						<b>38.2 tons/ha</b>

The total cost of production using best agronomic practices in Table 3, of fresh cassava roots production estimated was GHC1, 894, in which they were averaging 38.2tons/ha of FCR yield.

Table 4 provides the result of benefit cost ratio conducted for the yields accrued from farmers' old practices and new practice as indicated in Tables 2 and Table 3 respectively.

Table 4: Comparing the Results of Two Cassava Production Methods Indicated in Table 2 and Table 3

	<b>Production cost (in GH¢)/Ha</b>	<b>Total Yield in Tons/Ha</b>	<b>Price (in GH¢)/Ton</b>	<b>Total income (in GH¢)</b>	<b>Net income (in GH¢)</b>	<b>Benefit – cost ratio</b>
Table 2 Result	1,375	12.4	250	3100	1725	<b>1.3</b>
Table 3 Result	1,894	38.2	250	9550	7656	<b>4.0</b>

### 3.3 Famer Groups Formation

The formation of the groups started by contacting the AEA's at the respective District MOFA offices. The farmer groups formation in each district followed the steps below after contacting the AEAs;

- Obtaining the list of cassava farmers in each district
- Organizing a meeting with the cassava farmers
- Introducing the identified processors to the farmers
- Grouping the farmers based on their production areas
- Training the farmers in the best agronomic practices to obtain high yields
- Facilitating the market linkage of FCR supply from farmers to the processors

In Eastern region, four (4) groups of smallholder cassava farmers were formed and linked to four (4) processing centers namely White Rose Ltd at Kwamoso, Charity & Co at Amanase, Ifafa Ghana Ltd at Kwesi Nyarko and Hugo Commodities at Amaakrom. These farmer groups formed were contracted to supply fresh cassava roots to the processing centers on regular basis; thus, helping the processing centers to have consistent supply of fresh cassava roots.



*Plate 1: Formation and training of a farmer group at Amanase (for Charity and Co Ltd)*



*Plate 2: Formation of a farmer group at Kwamoso (for White Rose Ltd)*

In Central region, two (2) groups of smallholder cassava farmers were formed and linked to two processing centers which are Tropical Starch Company at Asebu and Bankyekrom at Oguakrom.



*Plate 3: Training and formation of a farmer group at Asebu (for Tropical Starch Co. Ltd)*



*Plate 4: Training and formation of a farmer group at Oguakrom*

Farmers in Abutia Kissifli in the Volta region were trained and grouped in two (2) to supply cassava to Kissifli Cassava Processors Association.



*Plate 6: Training and formation of a farmer group at Kissifli*



*Plate 7: On farm training for a farmer group at Kissifli*

It was deduced that the mean yield of cassava in 2016 by the farmers was 12.4 tons/ha, however with the intervention of CAVA activity, this mean yield rose to 38.2 tons/ha in 2018 representing a 208.1% yield increase; this percentage yield increase was far higher than the 25% yield initially proposed. The average yield obtained (38.2tons/ha) of fresh cassava roots could have been much higher, preferably to 50 tons/ha, but due to several challenges such as inadequate supply of improved planting materials and irregularities in the rainfall pattern.

### **3.4 Challenges and Lessons Learnt**

The following challenges were encountered during the formation of the farmer groups;

- With the signing of agreements between the processors and the farmers and the assurance given by the processors to the farmers of absorbing their FCR intake, some farmers were still skeptical about joining the farmer groups based on disappointments from similar initiatives undertaken in the past.
- Getting like-minded farmers to produce and supply to the processors was a problem as some farmers felt that they were better off on their own.

Some key lessons were learned during the project activity implementation process. For instance, it was realized that female farmers were able to maintain their cassava farms very well compared to their male counterparts probably because the males had bigger farms. It was also realized that



whenever farmers were actively involved in decision making, they in turn became more committed to fulfilling their shared obligations.

## **4.0 CONCLUSION AND RECOMMENDATION**

### **4.1 Conclusion**

The implementation of the activity was to large extent successful as all the objectives set for this activity were achieved. Six (6) farmer groups each consisting of at least twenty (20) members were formed and linked to six (6) processing centers to supply a total of 548tons of fresh cassava roots monthly. The farmers adopted some level of good agronomic practices and this translated into increase in yield with an average yield increase of 135.6% far above the 25% yield increase stated in the project results framework. This yield increase also translated to a net income of GHC7,656.00 per hectare and an increase in the benefit cost ratio from 1.3 to 4.0.

### **4.2 Recommendation**

The following are recommendations for improving on the output:

- The farmers need further training in best agronomic practices and some support to enable them obtain improved and high yielding cassava planting materials. This is because there are not enough improved planting materials currently to meet farmers' demand.
- The processors need further training in total quality assurance management strategies and profit maximization options within the cassava processing business.
- The processors are having challenges in marketing the processed products and there is the need for them to be assisted in obtaining sustainable markets for their products to encourage them to continue processing.
- Extensive scoping or prospecting must be carried out to discover other unknown processors in the project catchment areas. This will help mobilize additional cassava farmers and link them to the processing centers.

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