

## Short Communication

### TRANSFORMING RURAL LIVELIHOODS THROUGH CASSAVA VALUE ADDITION, A CASE STUDY OF CASSAVA ADDING VALUE FOR AFRICA PROJECT (C:AVA)

Ogunyinka O<sup>1\*</sup>, Guwelamgomba V<sup>2</sup>, Kaitira L<sup>3</sup>,  
Oguntuase A<sup>4</sup>, Otim D<sup>5</sup>, and K Twum-Adaboh<sup>6</sup>



**Ogunyinka Ola**

\*Corresponding author email: [o.m.ogunyinka@greenwich.ac.uk](mailto:o.m.ogunyinka@greenwich.ac.uk)

<sup>1</sup> Natural Resources Institute, University of Greenwich, Kent, UK

<sup>2</sup> Chancellor College, University of Malawi, Zomba Malawi

<sup>3</sup> Tanzania Food and Nutrition Centre, Dar es Salaam, Tanzania

<sup>4</sup> Federal University of Agriculture, Abeokuta Nigeria

<sup>5</sup> Africa Innovations Institute, Kampala, Uganda

<sup>6</sup> Food Research Institute, Accra Ghana

## ABSTRACT

With the support of the Bill and Melinda Gates Foundation, the Cassava Adding Value for Africa (C:AVA) project is transforming the lives of cassava small holder farmers in the five countries of Ghana, Malawi, Nigeria, Tanzania and Uganda. The C:AVA project has encouraged good agronomic practices and provided farmers with higher yielding and disease tolerant cassava varieties. These have resulted in higher yields (ranging from about 16 percent in Ghana to over 100 percent in Uganda), which have contributed to an increase in the incomes of the small holder farmers and community processors through their participation in profitable and sustainable value-added cassava chains. Rather than rely solely on income from processing fresh roots into traditional products, community groups and large industries have shifted focus to adding value to the roots through processing into new chains being promoted by the Project. These new value chains include high quality cassava flour and grits for bakery, confectionery and brewery industries as well as chips and grits as feed mix into the livestock industry including poultry. Other chains being promoted include starch and ethanol. Mobilisation into new value chains ranged from just over 2 percent in Tanzania to a 100 percent in Malawi in the first year of project operations. By the third year, mobilisation into the new chains has significantly increased to about 70 percent and above in all countries; 69 percent in Nigeria and 100 percent in Uganda. Collectively, the five countries have mobilised close to a million tons of fresh cassava roots that have been processed into both traditional and new value chains. Over 70 percent of these volumes have gone into the new chains. These value chains have generated an income of over USD 57 million into these rural communities assisting to raise the living standards of the resource poor households and providing employment opportunities in the participating countries.

**Key words:** smallholder farmer, transformation, value chains, cassava value addition

## INTRODUCTION

Global production of cassava in 2014 was estimated at 268 million tons out of which Africa produced about 54%. Nigeria alone produced about 55 million tons which is estimated to be about 21% of total global production [1]. The Food and Agricultural Organisation (FAO) projects that by the year 2020, over 60% of global cassava production will be from sub-Saharan Africa [1].

In Africa, cassava is the single most important source of dietary energy for a large proportion of the population living in the tropical areas [2]. It is also estimated that more than 700 million people are highly dependent on cassava as a food source [3,4]. The fresh roots of cassava contain 30-40 percent dry matter and have a starch content that comprises about 85 percent of its dry matter [3].

Most of the cassava produced in Africa (88%) is used for human food, with over 50% used in the form of processed products [5]. Other uses are in form of animal feed and industrial raw material purposes (starch, ethanol) are as yet very minor (Table 1). Cassava is thus a very important crop in Africa. It has the potential to increase farm incomes, reduce rural and urban poverty and help close the food security gap.

To increase farm income to small holder farmers (SHFs), other uses for cassava besides the traditional ones need to be developed hence the Cassava Adding Value for Africa Project.

### **The Cassava: Adding Value for Africa (C:AVA) Project**

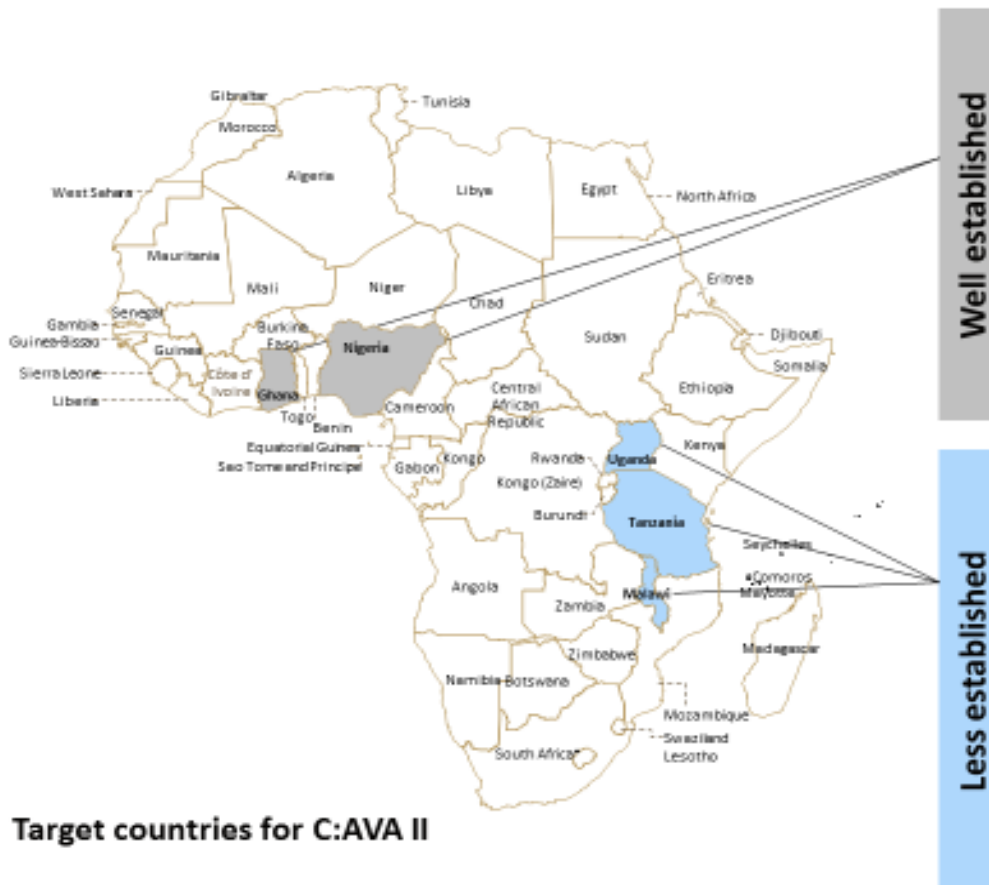
With support from the Bill and Melinda Gates Foundation (BMGF), the main focus of the first phase of the project was to promote alternative uses for fresh cassava roots through processing into high quality cassava flour (HQCF) which could be used as a wheat substitute in the bakery industry. High Quality Cassava Flour is a flour of industrial quality that can be used in multiple applications such as partial substitute for wheat flour in the baking industry or substitute for maize flour, maize or cassava starch in other industries.

The first phase [6] paid particular attention to increasing production at farm level through the encouragement of the adoption of higher yielding varieties and improved agronomic practices by targeted farmers.

During this phase, the Project met its original target of benefiting 90,000 SHFs across the five countries of Ghana, Malawi, Nigeria, Tanzania and Uganda. The projected income to SHFs through increased farm yield was estimated at over US\$33.3 million during the life of the project [4].

The current phase, C:AVA II is a partnership of five African organisations (Figure 1), one United Kingdom based university (the University of Greenwich) and a CGIAR centre, the International Institute for Tropical Agriculture (IITA) with headquarters in Nigeria.

The premise of this phase (C:AVA II) of the project is that if new markets for fresh cassava roots can be developed and SHFs linked to them at scale, then farmers are likely to adopt new productivity enhancing technologies, increase productivity and increase their incomes.



**Figure 1: Project focus countries**

### Project Strategy

Some of the strategies that the Project has employed include the following:

- a) Improving SHF productivity through the uptake of improved technologies (introduction and distribution of higher yielding and disease tolerant planting materials, encouraging the adoption of improved agronomic practices through establishment of demonstration plots, organisation of farmers' field days);  
The improved agronomic practices include farmers' adopting the correct plant spacing on their fields, weeding at the right times and using fertilisers to increase yield.
- b) Expanding and developing processing techniques by adapting a combination of drying technologies that best fit the smallholder and end-use models in each

- country (use of sun drying; a traditional method or facilitating the development of business models that encourage use of flash drying as appropriate); and
- c) Expanding products options, market opportunities and geographies through working with partners to explore and develop new market opportunities for fresh cassava roots by building and linking smallholder farmers to large markets in starch, ethanol, plywood, paperboard, milling and the livestock (including aquaculture) feed sector.

### Project Activities

The Project has conducted Training of Trainers (capacity building) on improved agronomic practices to ensure that the SHFs have up to date skills and knowledge to improve their farming practices. This ultimately has led to improved productivity through increasing area under cultivation and achieving higher yield per hectare cultivated.

In addition, the supply chain for fresh cassava roots for small and medium scale enterprises (SMEs) has been improved through facilitating linkages between the SHFs and the SMEs. This is done through strategic clustering of SHFs around the SMEs thus cutting down transportation costs and increasing profit margins for the two groups.

Furthermore, SMEs have been encouraged and partnered with to develop business plans that will enhance operations and improve access to credit.

Finally, drying technologies have been improved to cut down on weather dependent methods, minimise delays, move volumes and increase efficiency. These technologies range from solar drying in Uganda, bin drying in Ghana to the very expensive and efficient flash drying in Nigeria.



**Figure 2: Cassava drying technologies: Solar drying in Uganda (left) flash drying in Nigeria (right)**

A key focus of the Project is to open up alternative markets besides the traditional uses for fresh cassava roots to absorb increases in production. Some of the new value chains being promoted include:

- i. High quality cassava flour/industrial grade cassava flour with uses in the bakery and confectionery industries

- ii. Brewery industry
- iii. Composite flour and wet mash
- iv. Chips and grits for animal feed and aquaculture
- v. Industrial chain for starch and ethanol.

For instance, in Uganda a private entrepreneur (Adyaka Farms in Lira) who had been processing his cassava mash into HQCF through sun drying was encouraged and supported to purchase a flash drier. Prior to the acquisition of the more efficient drier, his monthly HQCF production was an average of 8.8 tons. Upon the commissioning of the drier, his monthly production has increased to 29.6 tons while providing additional employment for 28 people.



**Figure 3: High quality cassava flour produced in Nigeria**

## Project Contributions

### Productivity

Average yield per hectare has increased in Project areas across all the five participating countries (Table 2) with the highest increase being recorded in Uganda where there is a complementary Cassava Seed System (CSS) in place. The CSS was funded by the BMGF and was aimed at improving food security, increase profits and timely access to disease-free cassava planting material by small-scale farmers' resident in cassava brown streak disease (CBSD) and cassava mosaic disease (CMD) affected areas of Uganda. The aim was to establish cassava planting material multiplication fields in Lira, Soroti/Amuria, Nakasongola/Nakaseke, Arua, Kabarole and Mukono areas to improve farmers' access to high quality certified cassava planting materials of improved cassava varieties (NASE 14, NASE 19 and NAROCASS 1), which are high yielding and disease tolerant.

Smallholder farmers have been given access to higher yielding varieties which are also clean. Besides, farmers are applying most of the improved agronomic practices being promoted. These practices include type of material to plant, appropriate spacing to

increase the number of plant stands per hectare and frequency of weeding to mention a few.

### Supply of Fresh Cassava Roots

The Project has mobilised slightly over 1 million tons of fresh cassava roots into the value chains being promoted (Table 3). Nigeria, being the largest producer of cassava in the world has mobilised close to 600,000 tons.

Over 60% of this mobilisation has gone into the production of high quality cassava flour and industrial grade cassava flour for use in composite flour in the bakery industry, brewery and plywood [7]. Overall, mobilisation into the new chains being promoted by the Project has steadily increased significantly over the last 3 years.

In the first year of Project operation, mobilisation into the new chains was about 2 percent in Tanzania compared to a 100 percent in Malawi (Table 3). By the third year, mobilisation in Tanzania has increased to 84 percent while the country with the least mobilisation into the new chains was Nigeria with just over 69 percent; (one of the main reasons for the low value in Nigeria was the need to feed the internally displaced people fleeing the war in the north east of the country as a result of the Boko Haram terrorism). In addition, mobilisation efforts in Nigeria have shifted to the industrial uses of starch and ethanol due to inconsistency in the policy environment towards high quality cassava flour use in the bakery industry.

Uptake of cassava roots by the animal feed industry (including aquaculture) has also been very low. This ranges from 1.3% (Nigeria) to 6.3% (Malawi) in 2016 [7].



**Figure 4: Women peeling fresh cassava roots in Malawi**

### **Beneficiary Numbers**

As Table 4 shows, a total of slightly over 36,000 smallholder farmers are direct primary beneficiaries of Project intervention with nearly half of this figure being females. The participation of such a high percentage of female farmers and processors has helped to improve their economic independence and ability to participate in household decision making.

### **Income Generation into Rural Communities**

A total of about USD 57m (Table 5) has been injected into the rural communities in the five participating countries. This is from the sales of the mobilised FCR into the value chains that the Project promotes. Additional income will be derived from the sales of processed products into both new and traditional products as value addition has taken place which has led to higher prices for these products.

This amount has helped to improve the livelihood of the SHFs within these communities in the different countries through the provision of income to meet family commitments and basic needs including food security.

Even though no empirical evidence exists as at now in relation to the impact of the Project, basic data from gross income accruing to the rural communities indicate that disposable income of the SHFs has increased and quality of life of the resource poor farmers will improve.

### **CONCLUSION**

The Project has helped to transform these rural communities in the five participating countries by injecting more disposable income into the communities to meet basic needs including food security, providing employment opportunities through increased production, processing and end market uses.

At the macro level, the Project has helped these countries to improve balance of trade payments by assisting to reduce imports of wheat and conserving foreign exchange uses for such imports.

For a Project of this nature to achieve its full potential, a few suggestions should be followed:

- 1) Extension systems need to be strengthened as most farmers still lack adequate knowledge on the benefits of use of/access to improved planting materials thereby limiting their productivity.
- 2) Aside from planting for home use, agriculture should be viewed as a business in which all activities are costed, and proper records kept. Availability of proper records enhances access to credit.
- 3) There needs to be a better policy environment for access to credit for farming to encourage increased production for commercial purposes.



**Table 1: World utilization patterns of cassava** (Figures are percentages of total production)

Area	Human food:		Animal	Starch	Export	Waste	Stock
	fresh	processed	feed				
World	30.8	33.8	11.5	5.5	7	10	1.4
<b>Africa</b>	<b>37.9</b>	<b>50.8</b>	<b>1.4</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>9.5</b>	<b>&lt;1</b>
Americas	18.5	23.9	33.4	9.6	<1	14	<1
Asia	33.6	21.7	2.9	8.6	23	6.3	3.9
Asia (without Thailand)	45.7	27.9	3.9	11.7	2.3	8.6	<1

Source: Adapted from Cock [2]

**Table 2: Average yield values in Project countries**

Country	Yield figures (tons/ha)	
	Baseline (2015)	2016
Ghana	18.1	20.9
Malawi	7.1	16.4
Nigeria	18	26
Tanzania	11	14
Uganda	16	32.5

Source: C:AVA [7]

**Table 3: Fresh cassava roots mobilisation into value chains**

Country	Project FCR mobilisation (tons)					
	2014		2015		2016	
	Volume of roots	% into new chains	Volume of roots	% into new chains	Volume of roots	% into new chains
Ghana	121,975	18.4	106,473	31.0	71,133	76.4
Malawi	4,393	100.0	8,502	100.0	18,807	94.9
Nigeria	178,756	53.6	227,861	80.3	181,256	69.3
Tanzania	38,861	2.3	15,713	45.6	27,999	84.2
Uganda	7,823	97.6	16,485	100.0	31,677	100.0

Source: C:AVA [7]

**Table 4: Project beneficiaries by country**

Country	Male	Female	Total
Ghana	3,573	3,407	6,980
Malawi	1,211	2,158	3,369
Nigeria	7,869	2,434	10,303
Tanzania	2,174	2,496	4,670
Uganda	5,004	5,695	10,699
		<b>Grand total</b>	<b>36,021</b>

Source: C:AVA [7]

**Table 5: Gross income into rural communities from sales of FCR**

---

<b>Income generated into rural communities</b>	
<b>Country</b>	<b>Income from FCR sales (USD)</b>
Ghana	14,412,056
Malawi	1,612,323
Nigeria	35,153,055
Tanzania	3,886,409
Uganda	1,940,172
<b>Grand total</b>	<b>57,004,015</b>

---

Source: C:AVA [7]

## REFERENCES

1. **FAOSTAT.** Food and Agricultural Organization of the United Nations database of crop statistics Available from: <http://faostat.fao.org> 2014.
2. **FAOSTAT.** Food and Agricultural Organization of the United Nations database of crop statistics Available from: <http://faostat.fao.org> 2013.
3. **Cock J H** Cassava: a basic energy source in the Tropics **In:** Howeler RH (Ed) The Cassava Handbook, A reference manual based on the Asian Regional Cassava training course held in Thailand 2011: 23-27.
4. **Rosenthal DM and DR Ort** Examining cassava's potential to enhance food security under climate change. *Topical Plant Biology* 5 2012; (1): 30-8.
5. **Westby A** Cassava utilisation, storage and small-scale processing **In:** Hillocks RJ, Thresh JM and Bellotti AC (Eds) Cassava; Biology. Production and utilisation *CAB International* 2002: 281-300.
6. **C:AVA** Annual Report 2014.
7. **C:AVA** Annual Report 2016.