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# **An Assessment of the Effects of Root and Tuber Expansion Project (RTEP) on the Livelihood of Cassava Processors in Kwara State, Nigeria**

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## **Abstract**

The study was carried out to assess the effects of the Root and Tuber Expansion Programme (RTEP) on the livelihood of project beneficiaries in Kwara State, Nigeria. A 3-stage sampling technique was adopted for the study, selecting a total of 80 cassava processors from two Agricultural Development Programme (ADP) zones in the State. Structured interview schedule was used as instrument to elicit primary data from processors. Descriptive statistics was used to describe the socio economic characteristics of the respondents. The t-test was used to test the hypotheses on the relationship between the income and livelihood of RTEP beneficiaries and non beneficiaries, while those on the socio economic characteristics was tested using the Mann-Whitney (U) test. The findings of the study showed that RTEP provided more than 73 percent of total cassava processing equipment in the study area. The study further revealed that there was no significant difference in the socio-economic characteristics and livelihood of RTEP and Non RTEP participants. There was however a significant difference in their income. Amongst others, the study recommended massive investment in subsidizing critical cassava processing equipment, and provision of micro-credit at low interest rates to cassava processors.

### **Keywords:**

**Cassava, Processing, Livelihood, RTEP**

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## INTRODUCTION

Food security and employment generation are key issues every serious nation addresses. Nigeria's food policy has been hinged on the principle of self-sufficiency in all major staple food items. For this policy to generate the desired impact, food items should be readily available throughout the year, in quantity and quality, time and space and at competitive prices that are within the reach of the generality of citizens. This policy was almost a success until the 1970's when domestic food production witnessed a drastic downturn as a result of the shift from agriculture (CBN, 1997). The role of cassava in Nigeria's food security and employment generation can never be over emphasized. Cassava is an essential part of the diet of more than 70 million Nigerians (FAO, 2003). Cassava's starchy roots produce more food energy per unit of land than any other staple crop (de Figueroa *et al.*, 2001). The amount of carbohydrates contained in dry cassava roots is higher than maize or any other cereal except possibly for sugar cane and sugar beets, (www.gardeningplace.com). It supplies close to 40 percent of calorific requirement of Nigerians (O'Hair, 1995). Cassava is the sixth major source of staple foods in the world, amounting to 57 percent of tropical root and tuber in 1972. It supplies 38.6 percent of caloric requirement in Africa, 11.7 percent in Latin America and 6.7 percent in the Far East. In 1970, it was estimated that about 260 million people relied on cassava for most of their caloric requirements (Okigbo, 1980). Data by FAO (2003) showed that in Nigeria, the per capita consumption of cassava increased by 40 percent from 88 kilogram per person per year (1961-1965) to 120 kilograms per person per year (1994-1998). Over 350,000 farm families are directly involved in the cassava commodity system either in production, processing or marketing. Cassava is not only used in many food preparations for human consumption, but of importance in industries (starch, textiles, fuel, confectionery etc), and animal feed.

The first major intervention in cassava production in Nigeria came with the Cassava Multiplication Programme (CMP) in 1987, when the Federal Government sought and obtained

loan assistance from the International Fund for Agricultural Development (IFAD). The programme had the overall objective to multiply and promote improved cassava varieties to about 350,000 farmers in order to increase productivity and income. The programme closed in 1997, and it was successful in placing Nigeria as the foremost cassava producer in the world, with an annual output of about 30 metric tons (IFAD, 1999). The Presidential Initiative on cassava production, Processing and Export was inaugurated in July 2002. The broad objective of the initiative is to assist Nigeria in producing cassava products to meet domestic food and industrial needs as well as realize an income of USD 5.0 billion annually from the export of dry cassava products such as chips, pellets, starch and adhesives (FMA & RD, 2004). The root and tuber expansion programme (RTEP) was implemented in 25 States of Nigeria from 2001 to 2009. The main objective of RTEP is to increase small-holder production of root and tuber crops, especially cassava as well as their end-products, as a means of ensuring national food self reliance, improving household food security and increasing incomes of rural households. The thrust of the programme is value addition (processing) through diversification of processing options and marketing. RTEP has 5 main components; the largest and strongest component is processing which has close to 60 percent of project base cost allocated to it (IFAD, 2000). The programme covers 25 states and the FCT including Kwara. The estimated rural population of the project area is 35 million and about 560,000 households were to benefit directly from the programme. The total cost of RTEP is USD 36.09 million with the Federal Government as the Principal Borrower, while the State Governments are the Secondary Borrowers.

Essentially, cassava processing refers to those agro-industrial activities which are related to the transformation of the root crop with a view to modifying its physical, chemical and rheological characteristics thereby enhancing its value (Olomo, 2006). The purposes of cassava processing are to facilitate the transportability of processed products, reduce perishability, reduce toxicity, enhance edibility and nutritive

quality, adapt to alternative uses, stabilize the product for storage and guarantee higher prices for farmers through price stability. Processing will add value, enhance product diversification and competitiveness. Cassava still remains a traditional crop of the poor, and investment in the downstream (processing and marketing) sector can bring direct economic benefit to the poor rural farmers. The cassava transformation coming up in Nigeria depends upon processing and finding additional markets for increased production. Yet cassava processing both for traditional food and industrial products to a large extent is still being undertaken by small-scale processors using simple/traditional processing methods. For informed investment on the industrial development of the cassava sub-sector, there is need for commercialization approach to cassava production and processing.

According to Kwara ADP (2009), about 246 assorted cassava processing equipment were procured and distributed to RTEP project beneficiaries during implementation of the project in the two agricultural zones. The total value of the equipment was put at about N7.03m, and they comprised of prime movers (mostly diesel engines), cassava graters, cassava chippers, pressers (screw and hydraulic), fryers and combined mills. RTEP is therefore a major intervention, and it is desirable to assess the effects of the project on the livelihood of the beneficiaries.

### Objectives of the study

The general objective of the study is to assess the effects of the root and tuber expansion programme (RTEP) on the livelihood of cassava processors in Kwara State.

The specific objectives of the study include:

- (1) describe the socio-economic characteristics of cassava processors in Kwara State;
- (2) determine the processing methods adopted by cassava processors in Kwara State; and
- (3) Assess the influence (effects) of RTEP on the livelihood of cassava processors.

### Hypotheses

The following hypotheses were tested:

H<sub>0</sub>1: There is no significant difference in the

socio-economic characteristics of participants and Non-participants in RTEP;

H<sub>0</sub>2: There is no significant difference in the income of RTEP and Non RTEP participants as measured by the value of their processed products;

H<sub>0</sub>3: There is no significant difference in the livelihood of participants and Non-participants of RTEP as measured by their socio-economic possessions.

## MATERIALS AND METHODS

### Study Area

This study was conducted in Kwara State of Nigeria. The State is located in the North-Central geographical zone, and has a land mass of about 32,500 square kilometers (Km<sup>2</sup>). It is situated between the coordinates 6.50° and 11.50° North latitudes of the Equator and longitudes 2.80° and 7.50° East. The average temperature varies between 27°C to 35°C. The rainfall pattern follows a tropical type, with mean annual rainfall varying between 1000 mm and 1500 mm. The raining/wet season usually starts in early April and ends towards end of October, while the dry (harmattan) season starts in November and ends in March. To facilitate extension delivery, the state has an Agricultural Development Programme (ADP). The ADP has four agricultural zones with headquarters located at Kaiama for zone A, Patigi for zone B, while the seat for zones C and D are respectively located at Igbaja and Malete. The study was carried out in zones C and D which occupies 12 out of the 16 LGAs and constitutes over 80 percent of the entire population of the state.

For the purpose of comparison, and to properly appreciate the impact of RTEP, two categories of cassava processors were sampled; namely the Treatment Group, which are the RTEP beneficiaries and the Control Group, which are Non-beneficiaries of RTEP. A 3-stage sampling technique was adopted for the study. The first was the purposive selection of two (C and D) out of the four agricultural zones, because they are noted for cassava production. In the second stage, 20 RTEP beneficiaries were randomly selected from each of the two zones (40 respon-

dents). The third stage involved random selection of 20 Non RTEP beneficiaries from the 2 zones (40 respondents), making a total of 80.

Structured interview schedule was used as instrument to elicit primary data from processors. Data captured by the instrument included the socio economic characteristics of the processors, processing methods adopted, type of processing equipment used, income generated from processing enterprises, the benefits of RTEP and constraints to cassava processing. Descriptive statistics such as frequency counts, percentages and means were used to describe the socio economic characteristics. The t-test was used to test the hypotheses on the relationship between the income and livelihood of RTEP beneficiaries and non beneficiaries, while those on the socio economic characteristics and processing methods were tested using the Mann-Whitney (U) test.

## RESULTS AND DISCUSSION

### Socio economic characteristics

The socio economic characteristics considered were age, processing experience, gender, marital status, educational background, and household size. The results in Table 1 showed that majority of the processors (40 percent for RTEP and 50 percent for Non RTEP) were between 41–50 years of age, while 27.5 percent (RTEP) and 11 percent (Non RTEP) were between 31 and 40 years. This implies that cassava processors were ageing, and therefore the need for active and productive youth to get more involved in cassava processing. The result in table 1 also showed that 57.5 percent and 40 percent, respectively, of RTEP and Non RTEP processors had cassava processing experience of less than 10 years, while 32.5 percent (RTEP) and 42.5 percent (Non RTEP)

Table 1: Distribution of Cassava Processors Based on their Socio Economic Characteristics

Characteristics	*RTEP N=40		NON-*RTEP =40	
	Frequency	Percentage	Frequency	Percentage
<b>Age (years)</b>				
<30	4	10.0	-	-
31-40	11	27.5	11	11
41-50	16	40.0	20	20
51-60	9	22.5	5	5
>60	-	-	4	4
<b>Experience in Processing</b>				
<10	23	57.5	16	16
10-20	13	32.5	17	17
21-30	1	2.5	5	5
31-40	3	7.5	2	2
<b>Gender</b>				
Male	21	52.5	14	14
Female	19	47.5	26	26
<b>Marital Status</b>				
Married	35	87.5	33	33
Widow	3	7.5	4	4
Single Mother	2	5.0	3	3
<b>Educational Level</b>				
No formal education	7	17.5	14	14
Quranic education	4	10.0	5	5
Adult education	4	10.0	3	3
Primary education	17	42.5	12	12
Post primary education	-	-	2	2
Tertiary education	8	20.0	4	4
<b>Household size</b>				
<3 members	2	5.0	1	1
3-5 members	8	20.0	9	9
6-8 members	20	50.0	11	11
>8 members	10	25.0	19	19

Source: Field Survey, 2010

Note: \*RTEP: Root and Tuber Expansion Programme



Table 2: Availability of Processing Equipment

EQUIPMENT	NUMBER			PERCENTAGE	
	*RTEP	Non *RTEP	Total	*RTEP	Non *RTEP
Prime Mover	95	41	136	69.9	30.1
Grater	88	35	123	71.5	28.5
Chipping Machine	17	2	19	89.5	10.5
Presser	122	40	162	75.3	24.7
Fryer	126	43	169	74.6	25.4
Milling Machine	16	3	19	84.2	15.5
Total	464	164	628	73.9	26.1

Source: Field Survey, 2010

Note: \*RTEP: Root and Tuber Expansion Programme

had experience of between 10–20 years. Generally, experience is known to have positive effect on processors' managerial capacity, technical know-how, and adoption of extension packages (Achem and Akangbe, 2011). Table 1 further revealed that cassava processing is undertaken by both gender, but RTEP has majority of males (52.5 percent), while females are in the majority (65.0 percent) for Non RTEP. The equipment and other support from RTEP seem to be a likely explanation for this trend. Most processors were married (RTEP 87.5 percent and Non RTEP 82.5 percent), while the widowed constituted only 7.5 percent (RTEP) and 10 percent (Non RTEP). This agrees with the findings of Nenna (2009) that the vast majority of any society consists of married people. The analysis in Table 1 further revealed that most RTEP processors (42.5 percent) had primary education against 30 percent for Non RTEP, while 35 percent of Non RTEP processors had no formal education as against 20 percent of RTEP. Education is known to be a weapon of change. It is directly related to the level of information dissemination, adoption, transfer and the application process of agricultural innovations (Aphunu and Atoma, 2010; Achem and Akangbe, 2011). Table 1 also indicated that 50 percent of RTEP processors had household size of 6–8 members, while 47.5 percent of Non RTEP processors had household size of more than 8 members. Large household size suggests that more family labour could be made available for cassava processing, consequently reducing the amount spent on hired labour.

### Processing method adopted

The processing method adopted is mostly determined by the type of processing equipment used, and availability of water. Table 2 showed that a total of 628 assorted processing equipments were available to RTEP and Non RTEP processors in the study area, out of which RTEP contributed 464 representing 73.9 percent. Fryers constituted most (169) of the equipment (RTEP 74.6 percent and Non RTEP 25.4 percent). This can be explained by the fact that gari frying is the most popular cassava processing activity (COSCA, 1991). Local round fryers were mostly procured by Non RTEP processors, while RTEP processors owned most of the communal fryers. There were 162 Pressers (RTEP 75.3 percent and Non RTEP 24.7 percent). Pressers could be hydraulic or screw, but RTEP procured only the hydraulic type for project participants. Dewatering, which is carried out by pressing, is a critical activity for most cassava products. Prime movers which could be motorized, diesel or petrol powered were 136, with RTEP having 69.9 percent and Non RTEP 30.1 percent. Graters were 123, while chipping and milling machines were 19 respectively. The study noted that in most communities, the equipment were used to provide custom services.

Water is a critical requirement in cassava processing, and it has enormous implications. Cassava processing should begin with washing the roots even before peeling; else product quality will be compromised. Table 3 indicated that 40 percent of RTEP processors sourced their water from local wells as against 30 percent of Non RTEP. Pump water and boreholes provided a

Table 3: Availability of Water for Processing

Water Source	*RTEP N=40		Non *RTEP N=40	
	Frequency	Percentage	Frequency	Percentage
Pump Water	12	30	3	7.5
Bore Hole	8	20	2	5
Well	16	40	12	30
Rain Water	2	5	12	30
River	2	5	11	27.5

Source: Field Survey, 2010

Note: \*RTEP: Root and Tuber Expansion Programme

total of 50 percent for RTEP processors, while for Non RTEP, it is only 12.5 percent. Only a total of 10 percent RTEP processors source their water from rain and river as against 57.5 percent Non RTEP processors. RTEP intervention in providing portable water for its project participants would have accounted for this trend.

### Income from processing

A major factor that affects the income of processors is the quantity of roots processed. Table 4 showed that 82.5 percent of RTEP processors handled 1–2 Pick-up loads of cassava roots per cycle, as against 27.5 percent of Non-RTEP. Majority (70 percent) of Non RTEP processors handled less than 1 Pick-up per production cycle. A pick-up weighs averagely between 2.0 and 2.5 tons depending on the vehicle, while a production cycle is one round of processing starting from the purchase of roots until you have the final product.

Table 4 further revealed that for RTEP processors, majority (65 percent) handled 4–5 production

cycles per month, for Non RTEP, majority (62.5 percent) handled 2–3 production cycles per month. Only RTEP processors (2.5 percent) handled more than 7 production cycles in a month. Generally, analysis in table 4 showed that RTEP processors processed more cassava roots into various products

### Hypotheses testing

$H_01$ : There is no significant difference in the socio-economic characteristics of participants and Non-participants in RTEP.

A test relationship between the nominal socio-economic characteristics (gender, marital status, educational level etc.) of participants and non-participants in RTEP was carried out using the Mann-Whitney (U) test. The result of analysis in table 5 revealed that there is no significant difference in the selected socio-economic characteristics (gender, marital status, educational level etc.) of RTEP processors and their Non-RTEP counterparts. The decision is therefore to accept the null-hypotheses  $H_01$  as stated. The

Table 4: Distribution of Respondents by Quantity of Root Processed

ITEM	*RTEP P (N = 40)		NON – *RTEP (N = 40)	
	Frequency	Percentage	Frequency	Percentage
No of pick-up per cycle				
< 1	-	-	1	2.5
1 – 2	33	82.5	11	27.5
2.1 – 3	6	15.0	1	2.5
>3	1	2.5	-	-
No of cycles per month				
<2	-	-	1	2.5
2 – 3	9	22.5	25	62.5
4 – 5	26	65.0	12	30.0
6 – 7	4	10.0	2	5.0
>7	1	2.5	-	-

Source: Field survey, 2010.

Note: \*RTEP: Root and Tuber Expansion Programme

Table 5: Test of Significant Difference between the Socio-Economic Characteristic of Participants and Non-Participants in \*RTEP

Variable	N	Mean Rank	Sum of Rank	MANN-Whitney (U)	Wilcoxon (W)	Z	P	Level of Sig.	Remarks	Decision
<b>Gender</b>										
Non-RTEP	40									
RTEP	40	37.64	1505.50							
Total	80	43.36	1734.50	685.50	1505.50	-1.223	0.221	0.05	Not Sig.	Accept H <sub>0</sub>
<b>Marital status</b>										
Non-RTEP	40									
RTEP	40	39.49	1579.50							
Total	80	41.51	1660.50	759.50	1579.50	-0.589	0.556	0.05	Not Sig.	Accept H <sub>0</sub>
<b>Educ level</b>										
Non-RTEP	40									
RTEP	40	36.49	1459.50							
Total	80	44.51	1780.50	539.50	1459.50	-1.602	0.109	0.05	Not Sig.	Accept H <sub>0</sub>
<b>Source of funds</b>										
Non-RTEP	40									
RTEP	40	37.38	1495.00							
Total	80	43.63	1745.00	675.00	1495.00	-1.825	0.068	0.05	Not Sig.	Accept H <sub>0</sub>

Source: Field survey, 2010.

Note: \*RTEP: Root and Tuber Expansion Programme

implication is that RTEP may not have selective eligibility criteria for participation in the programme.

*H<sub>02</sub>*: There is no significant difference in the income of RTEP participants and Non-participants of RTEP as measured by the value of their processed products;

The t-test was used in testing the significant difference in the income of RTEP participants and non-participants. Income is the quantity of processed products multiplied by unit price (Q x P). The summary of t-test in Table 6 revealed that there is a significant difference in the income of RTEP processors and their Non-RTEP counterparts. The decision is therefore to reject the null hypothesis as stated. This implied that the provision of processing equipment to

RTEP processors may have empowered them to handle larger volumes of roots than their Non RTEP counterparts, even though product prices and markets are undifferentiated.

*H<sub>03</sub>*: There is no significant difference in the livelihood of participants and Non-participants of RTEP as measured by their socio-economic possessions.

Analysis in Table 6 revealed that there is no significant difference in the livelihood of RTEP participants and Non Participants, as measured by their socio-economic possessions like land, vehicles, electronics, and livestock etc. The decision therefore is to accept the null hypothesis as stated. This seems contradictory, if income is considered as a critical indicator for material acquisition. According to IFPRI (2012), this

Table 6: Test of significant difference between the income and livelihood of participants and Non-participants of RTEP

Variable	N	X	Std Dev.	SE Mean	t	Df	P	Sig.	Remarks	Decision
<b>Income</b>										
Non-*RTEP	40									
*RTEP	40	3.457	7.602	1.202	-9.915					
Total	80	17.550	0.755	0.755	-9.915	78	0.000	0.05	Sig.	Reject H <sub>0</sub>
<b>Socio-economic Assets</b>										
Non-*RTEP	40									
*RTEP	40	17.47	24.68	3.903	-1.096					
Total	80	24.07	29.05	4.586	-1.906	78	0.277	0.05	Not Sig.	Accept H <sub>0</sub>

Source: Field survey, 2010.

Note: \*RTEP: Root and Tuber Expansion Programme



can be attributed to the effects of other projects working to reduce poverty, improve livelihood etc. Farmers may also be doing other things unrelated to project that affect the outcomes, or changes in farmer's income arising from non-farm activity.

### CONCLUSION

From the foregoing, the following conclusions were made:

Majority of cassava processors (RTEP and Non RTEP) are in their productive age of between 30 and 50 years;

Cassava processing engages both genders, who are mostly married and fairly educated to enhance easy dissemination and adoption of innovations;

There is no significant difference in the socio-economic characteristics (gender, marital status, educational level etc) of RTEP processors and their Non-RTEP counterparts;

The intervention of RTEP made a significant difference in the income of RTEP participants and Non participants as measured by the value of processed products;

There is no significant difference in the livelihood of RTEP participants and Non Participants, as measured by their socio-economic possessions like land, vehicles, electronics, livestock etc.

### RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proffered:

There should be provision of micro credit at low interest rates, without stringent conditions, to ensure sustainability of the project. In this regard, Processors should be encouraged to form themselves into cohesive and viable Groups/Associations for easy access to micro-credit and collective procurement of processing equipment;

A second phase of RTEP loan (RTEP II) should be negotiated in order to consolidate on the gains of the first. Subsequent loan assisted facilities should emphasize greater intervention in provision of processing equipment that produces cassava products of high commercial value like HQCF, pellets and industrial starch;

Government should make massive investment in subsidizing critical cassava processing equip-

ment, and encourage diversification of processing options in the down stream sector.

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