

JOURNEY TENDENCY OF CASSAVA PRODUCTION AND ITS COMPETING CROPS IN RELATION TO AREA, PRODUCTION AND PRODUCTIVITY IN IBADAN METROPOLIS, OYO STATE, NIGERIA

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ABSTRACT

Time series secondary data on area, production, productivity of cassava and other principal crops in Ibadan Metropolis were arranged into 3 groups P_1 (1980-81 to 1994-95), P_2 (1995-96 to 2009-10) and P_3 (1980-81 to 2009-10) respectively based on farm sizes. 150 households comprise 50 each from small, medium and large farm, spread over the three areas namely: ajibode, eleyele and ijokodo were conducted using pre-tested interview-schedule and pertain to the agricultural year 2010-11. Absolute relative changes, compound growth rate, component analysis, techniques were employed to analyze the collected data. Area, production and productivity of cassava and wheat increased during period P_1 and overall period P_3 but decreased in their second period P_2 . Area of cassava, wheat and sorghum decline during second period but due to increase in productivity, production increases. The production of cassava and yam shows negative growth in production and this was mainly attributed to higher decline in acreage of the crops despite of positive and significant growth in productivity. The component analysis revealed that yield contribution (55 to 86 per cent) was higher in change of cassava, wheat and maize production while area contribution was significantly higher in other selected crops.

Keywords: Trend, Cassava & Competing Crops, Area, Production and Productivity

INTRODUCTION

Cassava is a very important crop to Nigeria. It has comparative production advantage over other staples serves to encourage its cultivation even by the resources poor farmers. The crop production is generally thought is required less labour per unit of output than other majority staples. Cassava is able to grow and give reasonable yields in low fertile soils. It is a good staple the nationally required food security minimum of 2400 calories per person per day (World Bank Report, 2011). Recently, production figures ranked Nigeria as the leading producer of cassava in the world. In 2010, the estimated cassava output from Nigeria was approximately 34 million tones. This production performance had rated Nigeria as the largest cultivator of cassava in the world. This fact is sequel to the on-going cassava multiplication programmes in the country. In 2002, cassava suddenly gained prominence in Nigeria following the pronouncement of the presidential initiatives on the crops. This initiative was aimed at using cassava production as engine of growth in Nigeria.

In recent time, Government has encouraged the use of the crop to produce wide range industrial products such as ethanol, glue, glucose syrup and bread. Recently, the Nigerian government promulgated a law, making it compulsory for the baker to use composite flour of hundred percent cassava and ninety percent wheat for bread production. The new regulation which is effect, January, 2005, stipulated that the larger flour mills that supply flour to bakeries and confectioneries must pre-mix cassava flour with flour. World Bank (2011), also projected figures indicate that 63 percent of the estimated population of 430 Million will be found in urban centers of the West Africa by the year 2020. Most cities in developing countries are not able to generate sufficient (formal or informal) income opportunities for the quickly growing population. Urban agriculture is generally labour intensive and occurs in small plots but some concerns of rural agriculture such as transportation costs.

However, other production considerations are more serious when cultivation takes place in urban areas, such as tenure insecurity, theft and environmental consequences. Therefore since urban agriculture played a considerable role in providing for the ever increasing population and reduces some of the problems being encountered by rural agriculture. Having recognized the contribution of urban agriculture to some other countries. It has a great potential to boost the food needs of Nigerians whose urban population has continue to rise by the day through rural-urban migration. In order for these urban farmers' production to be enhanced. There is the need to estimate the trends of cassava production and its competing crops in relation to area, production and productivity in Ibadan Metropolis, Oyo State, Nigeria.

METHODOLOGY

Three years ending 2010-11 production data on area, production and yield of crops were used .Crops to be covered for the research work are: CASSAVA, MAIZE, YAM, MILLET, SORGHUUM, COCOYAM, POTATO, and WHEAT. The selected crops cover more than 75per cent of the gross cropped area of the state. The following analytical method was used:

1. Absolute changes= $Y_N - Y_0$
2. Relative Change (RC %) = $\frac{Y_N - Y_0}{Y_0} \times 100$

Where,

- Y_n = Triennium Current year i.e. average of last three years
 Y_0 = Triennium Base year i.e. average of first three years

3. Growth rates

Compound growth rates were estimated with the following exponential model using least square techniques which are given below:

$$Y = ab^t \dots\dots\dots(2)$$

Where,

- Y= Trend value of dependent variable (area/ total production/yield)
a = constant
b =Trend coefficient (slope of line)

t = time variable (Years)

The function takes the form of a linear equation in logarithmic and become log- linear as under:

$$\text{Log } Y = \text{log } a + \text{log } b \dots\dots\dots (3)$$

$$\text{Compound growth rate (CGR)} = (\text{Antilog } b - 1) \times 100 \dots\dots\dots (4)$$

Test of significance

The results of empirical research must be put to test for their degree of acceptability. In statistics, these come under “test of significance”. For testing the hypothesis, suitable statistical test are applied. These are applied to assess their significance at 1% and 5% level of significance for the periods which are spelled P_1, P_2 and P_3 out in the following section:

Standard error (SE)

$$\text{Standard error (SE)} = \sqrt{\frac{1 - r^2}{n - 2}} \dots\dots\dots (5)$$

Where,

r = coefficient of multiple determination

n= Number of observation

‘t ‘test

To test the significance of b value of the trend equation, ‘t ‘ test was used.

$$t = \frac{\text{antilog } b}{\text{SE}} \sim (n-2) \text{ d.f}$$

Where,

b=independent variable

SE= Standard error.

d.f = degree of freedom

Source: (Seaford et. al. 2000)

RESULTS AND DISCUSSIONS

Performance of Crops Production

The production changes were pertained to the time series of 1980-81 to 1994 95, 1995-96 to 2009-10 and 1980-81 to 2009-2010 which are designated as before Government interventions period (P_1) and after Government Interventions period (P_3) and overall period (P_2). In Ibadan metropolis of Oyo State, Nigeria. The three major crops viz. Cassava, Maize, Yam are grown in an area of 69.97 thousand ha. during the current year (2009-2010) which accounts for 35.23 percent of the gross cropped area. The data on relative change in acreage, production and productivity of the three (3) major crops and other competition crops were presented in the table 1.

The data showed that during P₁ period and P₃ period, the relative changes in area, production and productivity was higher which decreased during P₂ period. In all the three periods, Sorghum indicated negativity in area and production except productivity which increased during P₁ and P₃ decreased in P₂ period, but productivity decreased during all the periods. The area, production and productivity of Cassava and Wheat increased during P₁ and overall period but decreased in P₂ period. Area of Cassava, Wheat and Sorghum decline during P₂ period but due to increase in productivity, production increases.

Table 1. Distribution of Relative change (RC %) of output of major and other competition crops during the period P₁, P₂ and P₃ in Ibadan Metropolis, Oyo State, Nigeria

Crops	Period	P ₁				P ₂				P ₃			
		BY	CY	AC	RC	BY	CY	AC	RC	BY	CY	AC	RC
Cassava	Area	1552	1584	32	2.1	1657	1603	-54	-3.3	1552	1603	51	3.3
	Prod	1084	1330	246	22.7	1262	1390	128	10.1	1084	1390	306	28.2
	Yield	698	839	141	20.2	762	867	105	13.7	698	867	169	24.2
Wheat	Area	3319	3913	594	17.89	4221	4129	-92	-2.2	3319	4129	810	24.4
	Prod	3370	6375	3005	89.1	7142	7476	334	4.7	3370	7476	4106	121.8
	Yield	1005	1622	617	61.4	1694	1808	114	6.7	1005	1808	803	87.8
Maize	Area	692	792	100	14.4	762	841	79	1.4	692	841	149	21.5
	Prod	663	1079	416	62.7	953	1101	148	15.5	663	1101	438	66.1
	Yield	958	1356	398	41.5	1250	1309	59	4.7	958	1309	351	36.6
Sorghum	Area	2195	1242	-953	-43.4	905	495	-410	-45.3	2195	495	-1700	-77.4
	Prod	1679	1167	-512	-30.5	771	586	-185	-24	1679	586	-1093	-65.1
	Yield	762	916	154	20.2	852	1195	343	40.2	762	1195	443	56.8
Yam	Area	473	375	-98	-20.7	331	325	-6	-1.8	473	325	-148	-31.3
	Prod	333	327	-6	-1.8	256	217	-39	-15.2	333	217	-116	-34.8
	Yield	703	870	167	23.8	773	673	-100	-12.9	703	673	-30	-4.3
Potato	Area	588	413	-175	-29.8	397	529	132	33.2	588	529	-59	-10.1
	Prod	152	129	-23	-15.1	144	194	50	34.7	152	194	42	27.6
	Yield	259	311	-175	20.1	362	367	5	1.4	259	367	108	41.7
Cocoyam	Area	1939	2290	351	18.1	2402	2874	472	19.6	1939	2874	935	48.2
	Prod	1279	1984	705	55.1	2143	2682	539	25.1	1279	2682	1403	109.7
	Yield	655	843	188	28.7	894	925	31	3.5	655	925	270	41.2
Millet	Area	283	381	98	35.00	480	531	51	10.6	283	531	248	88.00
	Prod	111	187	76	68.5	222	256	34	15.3	111	256	145	130.6
	Yield	391	484	93	23.8	463	482	19	4.1	391	482	91	23.3

Area: 000'ha, Production: 000'tonnes, Yield: kg/ha

P₁: Before Government interventions period of 1980-81 to 1994-95

P₂: After Government interventions period of 1995-96 to 2009-10

P₃: Period of study starting from 1980-81 to 2009-10

BY: Base Year (Triennium)

CY: Current Year (Triennium)

RC%: Relative Change in Percentage

Compound Growth Rate

The selected crops were re-classified, (eight selected crops) based on the kingdom and they were divided into cereals crops and tuber crops. The table 2 shows the Compound Growth Rate (%) of Cereals crops in Ibadan Metropolis area of Oyo State, Nigeria. Millet was negatively significant and rest of the crops showed positively significant growth except negative significant for sorghum and wheat acreage for P₂ period. During P₂ period, the growth in acreage, production and productivity decreased significantly, while it increased in P₁ and P₃ Periods.

Millet witnessed decreased growth both in acreage and production for P₁ and P₃ period. The high growth in production of Wheat and Maize was due to increased in productivity despite of marginal decreased in acreage. The result also showed that cereal crops witnessed very high, positive and significant growths with regards to area, production and productivity except for millet. Very high and highly significant growth was registered for Wheat in Ibadan metropolis area of Oyo State among the major cereal crops during the study period.

Table 2. Compound Growth Rate (%) of Cereals crops in Ibadan Metropolis area of Oyo State, Nigeria

Crops	P ₁			P ₂			P ₃		
	A	P	Y	A	P	Y	A	P	Y
Cereals									
Sorghum	0.04**	1.5**	1.5**	- 0.3**	0.7**	1.0**	0.3**	1.2**	0.9**
Wheat	1.0**	5.1**	4.0**	- 0.2**	0.3**	0.5**	0.8**	2.8**	2.1**
Maize	1.0**	3.2**	2.2**	0.9**	0.6**	-0.4**	0.4*	1.9**	1.2**
millet	- 4.6**	-3.8**	0.8**	- 4.4**	- 1.7**	2.9**	- 5.8*	-4.8**	1.1**

Note: ** Significant at 1 per cent level, * Significant at 5 per cent level

Table 3. Compound Growth Rate of Tuber Crops in Ibadan Metropolis area of Oyo State, Nigeria

	A	P	Y	A	P	Y	A	P	Y
Tubers									
Cassava	1.8**	-0.3**	1.5**	- 0.07**	-1.5**	-1.5**	-1.6**	2.3**	-0.6**
Yam	-3.2**	-1.9**	1.3**	2.5**	3.0**	0.5**	-0.7**	0.7**	1.4**
Potato	1.6**	3.9**	2.3**	1.4**	1.9**	0.4**	1.4**	2.9**	1.5**
Cocoyam	2.5**	4.6**	2.0**	0.9**	1.3**	0.4**	2.9**	3.5**	0.6**

Note: ** Significant at 1 per cent level, * Significant at 5 per cent level

The data on growth rate of major tuber crops growth in Ibadan Metropolis of Oyo State is presented in the table 3. The data shows that the growth in production of potato and cocoyam were positive and significant during P₁ period and was mainly due to higher growth in area of cocoyam while in case of potato, it was mainly accounted for higher and significant growth rate in productivity of these crops. The production of cassava and yam shows negative growth in production and this was mainly attributed to higher decline in acreage of these crops despite of positive and significant growth in productivity.

During P₂ period, the growth in production of all tube crops except cassava and yam were positive and significant and cocoyam shows promising tuber crops since its productivity growth was positive and significant during this period. Also, based on overall growth of production of potato and cocoyam were positive and significant in Ibadan Metropolis area of Oyo State and this was mainly accounted for higher and significant growth in acreage of these tuber crop

Table 4. Growth Rates of selected groups crops in Ibadan Metropolis area of Oyo State, Nigeria

Crops	P1			P2			P3		
	A	P	Y	A	P	Y	A	P	Y
Total tuber crops	0.03	2.5**	2.4**	1.2**	1.6**	0.4	0.7	2.1**	1.3**
Total cereals	-0.7**	2.6**	3.3**	-0.7**	0.3	1.0	-0.7	1.4**	2.1**

Note: ** Significant at 1 per cent level, * Significant at 5 per cent level

The data depicted in the table 4 shows that growth in production of total cereals was positive and significant during P₁ and P₃ period despite of negative and insignificant growth in acreage of total cereals and this could be achieved due to very high and significant growth in productivity during P₁ and P₂ period. In case of total tuber crops, the growth in production was positive and highly significant during the entire three periods under study but it is very interesting to note that this was due to high and significant growth in productivity during P₁ period.

Decomposition Analysis

It is known fact that crop production is a function of area and yield. Therefore total production is divided into (1) area effect (2) yield effect (3) interaction effect towards change in total production of principal crops in the study area and some have been presented in the table 5.

Table 5. Decomposition of production of principal crops in Ibadan Metropolis area of Oyo State, Nigeria

S. No.	Crops	Changes in Production ('000tons)	Area Effect (%)	Yield Effect (%)	Interaction Effect (%)
1	Cassava	306	12	86	2
2	Wheat	4106	20	66	14
3	Maize	438	33	55	12
4	Cocoyam	1403	44	37	19
5	Millet	145	67	18	15
6	Yam	-116	-90	-8	-2

Wheat crop has the highest value based on changes that happen between the current and base years. The changes have 66 percent effect on yield, 20% on area and 14 percent on joint effect during production. Despite high changes in production of cocoyam, area effect is 44percent, 37 percent in yield and 19 percent in joint interaction effect. Cassava crop has the highest relative contribution of (86 per cent) yield effect and yam crop has negative value in terms of changes in production but have 90 percent negative value in terms of area effect and

both cassava and yam have the least value of 2 percent in terms of joint effect during production. From the discussion it is concluded that farmers in the study area adopted intensive farming in the production of cassava, wheat and maize revealing in the high value of yield effects in the total production of these crops.

CONCLUSIONS

The area, production and productivity of cassava and wheat increased during period P_1 and overall period P_3 but decreased in their second period P_2 . Area of cassava, wheat and sorghum decline during second period but due to increase in productivity, production increases. The production of cassava and yam shows negative growth in production and this was mainly attributed to higher decline in acreage of the crops despite of positive and significant growth in productivity. The component analysis revealed that yield contribution (55 to 86 per cent) was higher in change of cassava, wheat and maize production while area contribution was significantly higher in other selected crops.

RECOMMENDATIONS

Some suggestions for higher and equitable production of cassava are given below:

- The potential to expand output is simple if government and other related institutions pay more attentions to agriculture sector.
- Improved cassava may be cultivated intensively by adoption full package of practices, provision of cheap credit followed by marketing and processing facilities is an urgent need of the study area.
- Also, adequate farm inputs like agro- chemicals must be made available at cheap price to the farmers and government must follow a clear cut linkage supply system of inputs.

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