

Original Research Article

RESOURCE USE EFFICIENCY AMONG COCOYAM FARMERS IN ANAMBRA STATE OF NIGERIA.

Abstract

The study was on economics of cocoyam production in Anambra State. Data used were generated through structured questionnaire and interview schedules administered on 120 cocoyam farmers selected randomly from the study area. Net farm income analysis was used to capture the profitability of cocoyam production in the study area. Furthermore, ordinary least squares regression method was used to analyse the resource use efficiency data, subsequently the allocative indices of the farmers were derived and explained. Result shows that cocoyam production in the study area is profitable with average total revenue of N840,000, total cost of N408,608 and net farm income of N431,392. Result of the resource efficiency showed that farmers did not achieve optimum allocative efficiency in the use of the any of the resources. In general, the elasticity of production show that they were operating at increasing returns to scale. The main problems to cocoyam production were poor access to credit, inadequate extension contact, high cost of inorganic fertilizer and high cost of labour. Among the recommendations made including; need for policy options that would enable farmers to employ more of the resources that were under utilized, while for over utilized resources, farmers should use less of the resource in their productions in order to achieve higher productivity. Furthermore, the need to enhance farmers' access to; improved production inputs, credit through micro finance banks and adequate motivation of extension agent and among others were proffered.

Keywords: Allocative, production, cocoyam, efficiency

Introduction

The term cocoyam refers to the member of aroid family, *araceae* which is widely cultivated in developing countries in Africa, Asia and the Pacific (Okwuowulu, 2000). The two common genera of cocoyam are *Colocasia* and *Xanthosoma* of which the most extensively cultivated species are *Colocasia esculenta* (L) Schott and *Xanthosomasagittifolium* (L) Schott (Okwuowulu, 2000; Adebise and ~~barde~~, 2001). The classification of cocoyam into these two species as noted by NRCRI, (2005) depends on the colour of the tuber, flesh, leaf morphology and floral organization. *Colocasia esculenta* is believed to have originated from South East Asia while *Xanthosomasagittifolium* is indigenous to tropical America and West Indies (NRCRI, 2006). Onwueme and Singhi (1994) reported that cocoyam was introduced into West Africa in the 16 – 17th century by Indian mercenaries.

Nigeria is the largest producer of cocoyam in the world in terms of volume of production with the annual output of 5,068,000 metric tons/annum, (which represents 37% of the world output of cocoyam) as against the potential of 160 million metric tons/annum (FAO, 2007). This

production figure according to Ekweet *al.* (2007) indicated that the potentialities of cocoyam for food security, income generation and nutritional enhancement in the country are grossly underutilized. However, Onwueme and Singhi (1994) and Eze and Okorji (2004) noted that the global average yield of cocoyam is only about 600kg/ha. Cocoyam is ranked third in Nigeria, second and first in Cameroon and Ghana respectively in terms of food supplies and area of land under cultivation (Eze and Okorji, 2004). In Nigeria, cocoyam production ~~are~~ in South-East, South-West, South-South and Middle belt Agro-Ecological Zones by small holder farmers mostly women who rely essentially on simple and crude tools like hoe, cutlasses which are empowered by human efforts (Ikwele, Ezulike and Eke-Okoro, 2003). Cocoyam cultivation is usually solely, especially where other crops may not thrive well or inter-planted with plantation crops, such as oil palm, coconut and intercropped with arable crops, like yam, maize, cassava, and others.

In comparism to the roots and tubers, cocoyam has high food energy yield per unit area (Parkinson, 1984). More so, cocoyam has potentials to thrive in marginal soil, tolerates erratic rainfall and survives many years through small dormant tubers (Okwuowulu 2000; GCS, 2009). The crop according to FAO (2003) is a low maintenance crop that will maintain a good ground cover in the field to reduce weeds and soil erosion, has low production costs and can be stored in the farm, hence making them very useful to rural families. Ndomet *al.* (2003) emphasized that cocoyam has potentials of not having vines to stake as in yam (*discoreasp*), no strong obstructing stem as in cassava (*Manihotspp*) and no entangling vines like in sweet potato (*Ipomeabatata*) which may obstruct its production. Cocoyam has rare attributes which are not peculiar in other roots and tubers such as yielding 30 – 60 metric tons/ha and very low in starch gains (Ekweet *al.*, 2007). Cocoyam production is proned to mechanization using machinery, equipment and selection of clones, to reduce labour costs of production from 49% to 25% (Vehenzuela and Sato, 1991; NRCRI, 2006).

Cocoyam ~~providers~~ employment for about 12% of the Nigeria working population. (CBN,2001) and supply more than 18% of the carbohydrate needs of the Nigeria(Okwuowulu 2000). It ~~providers~~ income for jobbers youths and returns who could otherwisebe viewed as unproductive by the society (Ume *etal* 2009)

Nevertheless, cocoyam production in the country failed substantially in attaining the potential output level because of the following constraints which include; cocoyam production is labour intensive with most of the operations carried out manually at the production level (Okoye

and Onyenweaku, 2007). ~~lack~~ of improved varieties and cultural practices, long period of maturation, tuber irritants among certain cultivars and possession of dangerous calcium oxalate which is suspected to affect the liver (Onwueme and Singhi, 1994; NRCRI, 2007). Furthermore, ~~SeremiPalapala~~, Talwana and Nandi (2008) identified socioeconomic constraints to sustainable cocoyam production in Lake Victoria Crescent, Tanzania to include: storage problems, increasing input costs, labour scarcity, land scarcity, inadequate technical know-how among cocoyam growing farmers, lack of extension services, poor road network, perishability of planting material, unavailability and ignorance in the use of agrochemicals (fertilizer, pesticides etc).

Adepogu and Awodumlgila (2008) attributed the problems of migrant cattle rearers who graze over farm land and stealing of farm produce affect considerably cocoyam production in Ekiti local government area of Ondo State. The dwindling attention given to cocoyam production according to Onyenweaku, (2000) could be because of its unacceptability by the high income countries for consumption and other purposes. Other problems are poor marketability system, relatively poor producer prices, lowly yield (Eze and Okorji, 2004) poor cultural practices, late planting and pest and diseases control (Okwuowulu, 2000). For instance, the *Pythiummyriotylum* viral disease has caused considerable damage to corms and cormel up to 90% in Cameroon (PacumbabWuto and Sama, 1999). ~~Reyes-Castro (2004)~~

The reasons for under-exploitation of the values of cocoyams in Nigeria as enumerated by Ekweet *al.* (2007) include: unattractive mucilage which could discourage consumption, technical difficulties involved in managing cocoyam especially the post-harvest losses have made cocoyam to be less attractive, the introduction and popularization of cassava, maize, rice and other new crops into the farming and food system of Nigerians led to a rapid decline in relevance of cocoyam as food for even the peasant farmers.

However, the prospects of cocoyam in Nigeria remain bright, despite myriads of problems; cocoyam production and marketing enhanced many rural and urban households, particularly women with low income to better their livelihoods; its starch can be converted or used in the manufacturing of perfumes, fire extinguisher, soap and deodorant. The starch can be used as composite in the manufacturing of infant and invalid meals (Ekweet *al.*, 2010). Reyes-Castro (2004) reported that cocoyam is a source of foreign exchange for Cameroon and

100 Nicaragua farmers. The broad leaves of cocoyam are used for wrapping purposes of kola and
101 bitter kola during storage (ICSGN, 2009).

102 ~~Eze and Okorji, 2004~~). Cocoyam can be prepared, processed and consumed in various
103 forms, especially where it is cultivated. For instance the corms and cormels can be peeled, boiled
104 and eaten with palm oil or ~~vegetable~~ source. The cormels can be boiled or roasted. The boiled
105 cormel pounded to prepare paste, the cormels are dried and pounded to ~~fofoo~~, a popular dish in
106 West Africa (NRCRI, 2007 and GRP, 2009). Cocoyam can be processed into cornflakes,
107 confectionaries and flour for soup thickening (Mbanaso and Obiora, 2005). It can also be
108 processed into “Achicha” used as food to fill up the hunger period gap especially during peak
109 farming season when hunger is on increase. The leaves of cocoyam especially
110 *colocasiaesculenta* is an excellent source of folic acid, riboflavin, thiamine particularly value to
111 anemic. Thiamine is necessary in our modern day diet where lot of refined carbohydrate is eaten
112 (GCS, 2009).

113 Taro and Tanniacormels and corms composed of 77-86% edible material and 14-23%
114 scaly peels. They (corms and cormels) contain calcium phosphate and vitamin A, B and C, and
115 contain small sized starch which is easily digestible and used by diabetics (Ekweet *al.*, 2007).
116 Cocoyam does not only provide carbohydrate but as well dietary-fibre (non-starchy
117 polysaccharides e.g. cellulose and petins) which medically reduces the incidences of coronary
118 heart disease, colon cancer and digestible disorder (FAO, 2003). Cocoyam according to
119 Parkinsons (1984) supersedes cassava and yam in terms of its high protein, mineral and vitamins.

120 Several studies have shown that the production and productivity of cocoyam in Nigeria is
121 dwindling in recent year as yield less than 18 metrictones per hectare, thus limiting the ability of
122 the crop to perform its’ traditional role in economic develoment (Okoye and Onyenweaku,
123 2007). The productivity of Cocoyam can be increased through application or adoption of new
124 technologies or efficient utilization of existing resource. Nevertheless, reports on adoption of
125 technology by farmers in developing countries are not impressive, hence improving their
126 productivities entail efficiency in resource use (Onyenweaku and Okoye,2007). Allocative
127 efficiency is the manipulation of available scarce resources and technical know how to achieve
128 the highest possible economic benefits within given resources where its marginal value product
129 is equated to its unit price(Nwaru, 2006). It is allocative efficiency of cocoyam farmers and the

profitability of cocoyam production in the study area that this study ~~incline~~ to explore as such information is deficient in the study area.

Methodology

Anambra State of Nigeriawas the study area. The state is located between latitude $5^{\circ}38'N$ and $6^{\circ}47'E$ of the equator and longitude $6^{\circ}36'N$ and $7^{\circ}21'E$ of the Greenwich Meridian. The state is bounded in the east by Enugu State, in the West by Delta State, in the South by Imo State and in the North by Kogi State. Anambra State has Awka as capital with population figure of 4.184 million people (NPC, 2006). It has four agricultural zones; Anambra, Awka, Onitsha and Aguata. The state has mean temperature of $28 - 38^{\circ}C$ and rainfall of 1500 – 2500mm.

Multistage random sampling technique was used for the study. Three zones were selected out of four agricultural zones for stage1. In stage 2, four blocks were selected from each of the zones. Stage 3 involved selection of five circles from each of the sampled block. This brought to a total of sixty circles. In the final stage, sixty farmers were selected from each circle and making a total of one hundred and twenty farmers for detail study. Structured questionnaire was administered to each of the respondents to collect information on input and output quantities used and their unit prices, farmers' socioeconomic characteristics and other essential information as related to the study. Secondary data were obtained from journals, internets, seminar and other periodicals. Ordinary least square regression method was used to determine the bi coefficient of cocoyam farmers and stated as;

$$Y = f(X_1 X_2 X_3 X_4 X_5 X_6 + e) \quad (1)$$

Where Y = output of cocoyam (kg) 

X_1 = farm size (ha); X_2 =planting material (kg); X_3 = fertilizer (kg) X_4 = labour (manday); X_5 = capital input (₦); $b_1 - b_5$ = coefficient of the parameter; b_0 = intercepts, e = error term. 

Four functional forms were fitted. These include: linear, semi-log, double log and exponential functions. The model were stated as follow:

Linear function

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + e \dots \quad (2)$$

Semi log

$$Y = \ln b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + e \dots \quad (3)$$

Double log function:-

$$\ln Y = \ln b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + e \dots \quad (4)$$

161 Exponential function

$$162 \quad \ln Y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + e \quad \dots \quad (5)$$

163 The choice of the best functional form was based on the magnitude of the R^2 , the
164 significance, size and the signs of regression coefficient. The allocative efficiency was
165 determined by computing the marginal analysis of the inputs used by farmers in the study area.
166 Moreso, the required adjustment in marginal value product (in percentages) for optimal
167 allocation of the variable inputs used was also computed. The models were specified as follows:

$$168 \quad r = MVP/MFC \quad \dots \quad (6)$$

$$169 \quad MVP = mpp_{x_1} p_y \quad \dots \quad (7)$$

170 (double log as lead equation)

$$171 \quad Mpp_{y_1} = \frac{dy}{dx} = \frac{b_1 y}{x_1} \quad \dots \quad (8)$$

172 Semi log form the lead equation

$$173 \quad Mpp_i = \frac{dy}{dx} = b_i \quad \dots \quad (9)$$

174 (linear form is the lead equation)

$$175 \quad D_i = (1 - 1/r_i) 100 \quad \dots \quad (10)$$

176 (Simonyan and Balogun, 2010)

177
178 r = efficiency ratio notation, MVP = marginal value product, MFC = marginal factor cost (cost of
179 unit price of a particular input), MPP = marginal physical product and are arithmetic means of
180 the yield, P_y = unit price of output, x_1 = various input 1 to n = absolute value of % change in
181 MVP of 1th resource, r_1 = ratio of MVP to MFC for i^{th} resource, 100 = factor (percentage)

182 If $r = 1$, it implies that resources are efficiently used i.e. $MVP = MFC = 1$

183 $r > 1$, implies that resources are under-utilized

184 $r < 1$, implies that resources are over-utilized.

185
186 The net farm income can be calculated by gross margin less fixed input. The net farm
187 income can be expressed as thus:

$$188 \quad \text{Gross Margin (GM)} = \sum_{i=1}^n P_i Q_i - \sum_{i=1}^m r_i x_i \quad - \quad - \quad - \quad - \quad - \quad (1)$$

$$189 \quad \text{Net farm income (NFI)} = \sum_{i=1}^n P_i Q_i \left[\sum_{i=1}^n r_i x_i + K \right] \quad - \quad - \quad - \quad - \quad (2)$$

190 Where GM = Gross margin; NFI = Net farm income; P_1 = Market (unit) price of output Y (₦);
 191 Q = quantity of output Y (kg); r_1 = unit price of the variable input (₦); x_1 = quantity of variable
 192 input (kg); x_1 = quantity of variable input (kg); Kn = Annual fixed cost (depreciation) (₦); $i = 1\ 2$
 193 $3\ \dots\dots\dots n$; $j = 1\ 2\ 3\ \dots\dots\dots M$

194 The objective ~~iii~~ was determined using percent response and frequency distribution.

195

196 Results and Discussion

197 The result of the estimated Cobb Douglas production function, as shown in Table 1 as lead
 198 equation because of high econometric and statistical ~~criteria~~ was selected and used to compute
 199 the allocative efficiency indices b_1 coefficient which is the ratio of the marginal value product
 200 (MVP) of each input to their respective acquisition cost were computed to obtain the relative
 201 efficiency of cocoyam farmers in south east Nigeria.

202 From Table 1, the double log analysis revealed that the coefficients of farm size, planting
 203 material, labour and fertilizer were significant at various risk levels. As expressed the coefficient
 204 of fertilizer (0.076) was positive and statistically significant at 1.0% alpha level. This conformed
 205 to the findings of Ume *et al.* (2009), who asserted that fertilizer is an important input factor that
 206 greatly influences farmers' output. The coefficient of planting material (0.968) was positive and
 207 statistically at 5.0% risk level. This was in agreement to *apriori* expectation that increase in
 208 planting material would result in increase in the cocoyam output of the farmer. The coefficient of
 209 labour (0.677) and farm size (0.165) were positive in line with *apriori* expectation and
 210 significant at 10% risk levels respectively. These implied that any increase in individual or
 211 collectively would increase the farmers' output. Farm size, according to Onyenweaku *et al.*,
 212 (2010) affects adoption costs, human capital, and risk perception.

213 **Table 1 Estimated Multiple Regression Production Function for Cocoyam**

214

Variable	Linear	Exponential	Double Log (Cobb Douglas)	Semi Log
Constant	9.664 (4.766)***	6.6464 (3.229)***	6.074 (3.741)***	3.181 (3.177)***
Farm size	1.404 (2.007)**	0.061 (0.022)	0.165 (1.201)*	0.732 (0.007)

Planting	0.61	0.667	0.958	1.061
material	(0.787)	(0.571)	(2.021)**	(-0.441)
Fertilizer	0.413	0.087	0.076	-2.104
	(-1.266)	(2.177)**	(3.661)***	(2.314)**
Labour	0.922	0.488	0.677	-0.475
	(3.024)***	(4.056)***	(1.272)*	(0.303)
Capital	-0.511	-0.599	-0.433	0.014
	(-2.763)	(-1.046)	(0.016)	(0.029)
R ²	0.688	0.551	0.874	0.647
F Value	4.486***	6.641***	92.64***	4.771***

Source: Field Survey, 2012

***, **, * significant at 1.0%, 5.0% and 10.0% levels of probability respectively

The figure in parenthesis is the t-ratio

The result in Table 2 indicated that none of the variables considered had efficiency ratio that was equal to 1 (one), which implied efficient utilization of resources. The ratio of marginal value product to marginal factor cost of farm size (0.020) and planting material (0.766) were greater than 1, signified under utilization of resources. These indicated that more than profit maximization levels of the resources were used. Simoyan and Balogun (2010) and Nwaruet *al.* (2010) findings concurred to these assertions. The low resource endowment of most of most farmers in the developing countries could be because of poor financial base, hence, resulting to under-utilization of resources. The effects of under-utilization of resources as observed by Ezedinma, (2006) are that farming remains in rudimentary and traditional levels

The over-utilization of resource implied that less of the profit maximization of the resource was used. The possible reasons for the over utilization of the resources of fertilizer, labour cost and capital as shown in Table 2, were variously discussed. The limitless use of animal manure, particularly from sheep and goat in crop production as fertilizer by farmers from their farms which has no significant cost implication could be the reason for over-utilization of the resources. Iheke (2010) reported that the employment of large number of family labour that is often neglected in costing total cost of production among peasant farmers in most developing countries in small sized farm could result to over-utilization. The finding of Nwosu and Okoli

(2010) agreed to this work. Therefore, for profit to be optimized in cocoyam production in Anambra state of Nigeria, farm size and planting materials should be reduced from their current level by 99.9% and 20.4%, while fertilizer, labour and capital should be increased from their current levels by 16.6%, 79% and 99.9% respectively.

Table 2: Distribution of Allocative Efficiency Indices of Cocoyam Farmers

Variable	$\bar{Y}$	$\bar{X}$	Bi	MPP	MVP	MFC	R	(D)%
Farm size	3,420.28	0.877	0.165	643,490	772.188	1000	77218.8	99.9
Planting material	3,420.28	540	0.958	6.067	728.04	150	4.85	-20.4
Fertilizer	3,420.28	420	0.076	0.619	74.28	120	0.619	-61.6
Labour	3,420.28	500	0.677	4.631	555.72	1000	0.556	-79
Capital	3,420.28	-217	0.345	5437.33	-65247	1000	-6.524	99.9

Source: Field Survey, 2014

The value of the return to scale of the cocoyam farmers in south east Nigeria as shown in Table 3 was 1.441, which indicated that the farmers were operating at irrational stage of production which is the region of maximum technical efficiency. This finding concurred with the assertion of Simonyan and Balogun (2010), Mbanasor and Obioha (2005), who posited that the actual cases of increasing returns occurred in relatively low levels of output that characterized small scale farming. Nwaruet *al.* (2010) remarked that our local farmers can improve on their productivity by employing more of improved inputs.

Table 3: Elasticity of Production and Return to Scale of Cocoyam

Variable	Elasticity of Production
Farm size	0.165
Planting materials	0.958
Fertilizer	0.076
Labour	0.677
Capital	-0.433
Return to Scale	1.441

Source: Field Survey, 2013

Costs and return on cocoyam production per hectare is revealed in Table 5

In the study area, mixed cropping was the predominant cropping pattern although sole cropping could be cultivated especially where other crops can not survive. This is particularly under fairly high shade. The food crops usually planted in mixture with yam, cassava, maize and stands of okra. In Nigeria, the practice of mixed cropping is adopted as a risk aversion strategy designed to insure against possibilities of crop failure and heavy losses of capital and labour inputs (Awoke, 2001). Furthermore, mixed cropping is known to be more profitable than sole cropping and consistent with farmers' food security objectives (Okorji, 2003). In this study, the emphasis was on cocoyam as major crop.

The average quantity of cocoyam sett planted per hectare was 400kg. as shown in Table 5. Given a cost of ₦300 per kilogram (kg), expenditure on cocoyam setts for planting was ₦120,000, constituted about 39.5% of the total physical input. The high cost of planting material (corms and cormels) (₦120,000) could be attributed to the fact that the same edible part also served as planting material, in effect resulting in high cost of the input (Okwuowulu, 2000). Iwueke (1999) finding on yam minisett technique by farmers in Southeast Nigeria concurred to this assertion. About 350kg of inorganic fertilizer costing ₦42000, 500kg of organic manure costing ₦12,000 was applied per hectare of cocoyam enterprise. The total cost of physical input came to ₦249, 000.

Labour input (family and hired) for various farm operations was shown in Table 4 and included; land preparation (bush clearing, stumping and mounding/ridging), planting, fertilizer application, weeding and harvesting. However, while bush clearing and land preparation were predominantly male activities, planting, fertilizer application, weeding and harvesting were mostly undertaken by women and children. Labour input was measured in man-days. The hours worked by men, women and children were converted to regular man-days using the follow conversion factors: 1 man-day for all activities carried out by male adult, 0.50 man-days for all operations carried out by children (7-14 years) and 0.75 man-day for planting, land preparation and fertilizer application by women. A conversion factor of 1.00 was used for weeding and harvesting operation by women (Akorhe, 1981).

On the average, the total amount of labour employed per hectare was 440 man-days. A total of 60 percent came from family labour, while 40 percent from hired labour. Hired labour was used for most tedious operations such as land preparation and bush clearing. Nevertheless,

family labour constituted a significant proportion of total labour input. This could be because most farmers used family labour since they were financially constrained to hire labour in their farm works (Ezedinma, 2006). The high cost and scarcity of hired labour could be related to recent unprecedented urban drift of youths witnessed in the study areas (Ezedinma, 2004).

About 10.9 percent of man-days were employed in planting, fertilizer and harvesting respectively, while 36.4% and 27.3% of man-days were engaged in land preparation and hand weeding respectively. Ajoku, (2009) finding agreed with this assertion. Nevertheless, only very insignificant number of cocoyam farmers used herbicides. Weeding was therefore, mostly done manually thus raising the labour input for weeding. Njoku (2000) invoked scarcity, high cost, ignorant of existence and method of use of relevant herbicide to explain the possible reasons for limited use of herbicides among small holder farmers in most developing counties. Limited number of the farmers used insecticides. The same reasons for limited use of herbicides apply to the limited use of insecticides as well as the fact that limited diseases and insect attacked cocoyam farms in the survey year. These may have reduced the need for insecticide.

Wage rate varied with the nature of the farm operations. Land preparation (mounding and ridge making) attracted ₦2, 500 per day, planting: ₦800, weeding; ₦1000, fertilizer application; ₦800 and harvesting; ₦1000. The total cost of labour was ₦80600, which was about 19.7 percent of total cost of production.

The depreciated value of farm implements (machete, hoe, digger, shovel and basket) amounted to ₦3, 200 per hectare. The total cost of production was ₦408, 608.

A total of 2800kg of cocoyam were harvested per hectare. At ₦300/kg of cocoyam; this yielded a market value of ₦840, 000. Taking away the total variable cost of ₦405,408. The gross margin for cocoyam was ₦435, 592. The NFI =total revenue/total cost =431392his indicated that cocoyam production was profitable in the study area. This collaborates with the finding of Ajoku (2009), who obtained a similar finding in Owerri West Local Government Area of Imo State. The benefit cost ratio = 1:2.06This indicated that for every one naira spent on cocoyam production, about ₦2.06 will be realized.

Cocoyam farmers in the study area were confronted by challenges in their quest to increase their productions and were summarized and presented in Table 4.

Poor access to credit was the most prominent problem that confronted cocoyam farmers and was represented by 81.7 percent of the total respondent. The finding of Simonyan and Balogun (2010) attested to the finding. Credit is a very important production resource which helps in transforming agriculture from subsistence to commercial type (Voh, 1984). Unfortunately, this resource eluded most farmers because of lack of collateral, lack of knowledge and experience on how to complete loan application forms, rigorous process involved in obtaining loan and high interest rate. Other problems included delay in loan approval and release of fund to farmers during planting season and short repayment period (Omoruyiet *al.*, 1999; Ume *et al.*, 2008). Moreso, a high proportion of sample farmers (81.7%) encountered the problem of high labour cost. Labour cost constituted about 35-40% of the total cost of production. This could be because most of traditional farm level operations are nearly zero mechanized (Ezedinma, 2000). Awoke and Okorji (2003) and Dimeluet *al.* (2009) remarked that with increase in population, rural-urban migration, the ageing of the rural farming population and feminization of agriculture, labour would likely to be inelastic and expensive. The effect is high cost of production and consequently low returns.

Table 4: Costs and Return on Cocoyam Production Per Hectare

Item	Unit	Quantity	Price/ Cost/Unit (₦)	Cost/Value (₦)
Gross revenue				
Yield	Kg	2800	300	840,000
Physical input cost				
Cocoyam sett	Kg	400	400	160,000
Fertilizer (NPK)	Kg	350	6,000	42,000
Organic manure	Kg	800	1,500	12,000
Transportation and other				35,000
miscellaneous				
Total				249,000
Labour				
		Hired	Family	
Land preparation (clearing and ridging)	Man-day	20	-	2,500
				50,000

Planting	Man-day	2	4	800	4,800
Fertilizer application	Man-day	-	6	800	4,800
Hand weeding	Man-day	-	15	1,000	15,000
Harvesting	Man-day	-	6	1000	6000
Total labour cost					80,600
Opportunity cost of capital at bank lending rate of 23%					75,808
Total variable cost					405,408
Gross margin (GM) (TR-TVC)					435,592
Depreciation of fixed assets excluding land					3,200
Total cost (TVC+TFC)					408,608
Farm income (TR-TC)					431,392
Benefit cost ratio					1:2.06

Source: Field Survey, 2014

Table 5 revealed that 80.8 percent of the respondents complained of high cost of chemical fertilizer as hindrance in achieving their production objective of self-sufficiency in cocoyam production. Fertilizer was among major factors limiting productivity growth of agriculture in Sub-Saharan Africa. Its' effect on crop yield is positive and immediate; hence, the most readily adopted technology. Nevertheless, this important resource-input is prohibitive and scarce at the most farm levels of the developing countries as reported by Onyenweaku *et al.* (2010). Fifty one dot seven percent (51.7%) of the sampled farmers complained of high cost of planting material. Studies on cocoyam (Okwuowulu, 2000; Ajoku, 2009; Okoye and Onyenweaku, 2009) opined that cocoyam corms and cormels (planting materials) constitute more than 33% of the total cost of cocoyam production and this could be attributed to the fact that the same planting material is the edible portion.. In addition, inadequate extension contact (78.3%) was reported by the respondents. Several authors (Rogers, 2003; Unammah, 2003; Asiabaka, 2002) reported a wide gap of extension services and the farmers in the developing countries. This limits the interpersonal contacts which plays decisive role to eventual adoption of technology. In effect,

technologies that are found to be technically and financially feasible and socially acceptable and compatible with the farmers' resources base could not be adopted. This scenario does not augur well for agricultural development.

Table 5: Distribution of Respondents According to Constraints to Cocoyam Production.

Problems	Frequency	Percentage
Poor access to credit	99	82.5
High labour cost	98	81.7
High cost of fertilizer	97	80.8
Inadequate extension contact	94	78.3
High cost of planting	58	51.7
Material	14	11.7
Long distance from farm	10	8.3
Inadequate storage facilities		

* Multiple responses



Source: Field Survey, 2012

Conclusion and Recommendations

The major conclusions drawn from this study are that ;Cocoyamfarmers were not allocatively efficient in the use of their farm resources. Most of the farmers' resources considered were under utilized with exception of fertilizer and labour that were over utilized, which implies that the farmers operates in region 1 of production process.

Okro farming was profitable in the study area with average revenue of N840,000,total cost of production of N408,608 per hectare and Net farm income of N431,392.

The main problems to cocoyam production as reported by the respondents were; poor access to credit, inadequate extension contact, high cost of inorganic fertilizer and high cost of labour. Based on the results, the following recommendations are made;

(i) There is need for policy options to increase farmers' access to improved production inputs such as fertilizer, seed, credit and pesticides at lower cost and at right time for the farmers to achieve high production.

(ii) Farmers' access to land should be enhanced through enforcing land use decrees act of 1978.

(iii) To achieve optimum allocative efficiency and hence maximum profit in cocoyam production in the study area, farmers should be encouraged to maximise the use of underutilized resource and minimize the use of over utilized resource in order to improve the farmers' productivity and income of the farmers in the study area. This can be achieved through appropriate policy options that would encourage the reallocation and redistribution of these inputs.

(iv) The need to improve extension agents frequency of contact with farmers through either reducing the extension-farmer's ratio or providing the extension agents with mobility and other incentives to enhance farmers productivity.



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