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DIFFERENTIALS IN ADOPTION OF CASSAVA PRODUCTION TECHNOLOGIES AMONG BENEFICIARIES OF THE EXTENSION CENTRE DELIVERY SERVICES OF MICHAEL OKPARA UNIVERSITY OF AGRICULTURE UMUDIKE, ABIA STATE, NIGERIA

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ABSTRACT
The study was carried out in 2016, to evaluate the effect of farmers' adoption of cassava production technologies on cassava yield: a case study of Michael Okpara University of Agriculture Umudike Extension Centre (MEC) delivery services in Abia State, Nigeria. Multi stage sampling techniques was used to elicit information for the study. In the first stage, three Agricultural zones of the State participating in MEC activities were selected. In the second stage, one local government out of three in each zone participating in MEC activities was purposively selected giving a total number of three local governments. In the third stage, three groups of farmers from each local governments participating in MEC activities were purposively selected giving a total number of 9 MEC farmers groups. Twenty participants from each group were randomly selected giving total of 180 participants. Also five MEC staff were selected. Hence, the total sample size for the study included the 180 MEC participants and five MEC staff. Structured questionnaires were used to elicit information for the study. Data were analyzed using descriptive and inferential statistics such as frequency distribution, percentages, mean for descriptive statistics while correlation and regression analysis for inferential statistics. Primary data were used for the study. The result of table 1 revealed that the cassava varieties that had the highest adoption were TME 419 with an adoption mean score of 2.9 ($\bar{X}$=2.9) followed by TMS 0505 with a mean score of 2.8 ($\bar{X}$=2.8) and NR 8082 with mean score of 2.7($\bar{X}$=2.7). Fertilizer application also had a high adoption with a mean score of 2.8 ($\bar{X}$ 2.8). While Pro Vit A cassava variety had a low adoption with a mean score of 1.6 ($\bar{X}$=1.6). The result of table 2 showed that coefficient of determination was 0.07094 which implies that 70.09% of the variation in yield was accounted for by adoption of technologies. The f-ratio was significant at 1% level of significance indicating the goodness-of-fit of the model. The coefficient of adoption of technologies was significant at 1% level of significance and positively related to yield. This implies that yield of crops increases with adoption of technologies. The study therefore concluded that farmers adopted cassava varieties disseminated by the Michael Okpara University of Agriculture Umudike Extension Centre in Abia State. It is recommended that there should be a linkage between the Michael Okpara University of Agriculture and National Root Crops Research Institute Umudike so that both institutions would collaborate in technology development and transfer.

Keywords: Farmers, Adoption and Improved technologies

Introduction

Extension services started as just extension with the aim of disseminating information to people who were not privileged to formal education (Ayenjei, 2009). Extension is concerned with conscious efforts to help people develop sound and rational attitude and behaviours. University based extension in Nigeria is the extension service rendered by the universities in Nigeria. Some of them have embarked on extending the agricultural technologies developed by their universities to rural dwellers. Some of these universities are Obafemi Awolowo University of Ile – Ife, University of Agriculture Makurdi, Michael Okpara University of agriculture Umudike.

(Nwachukwu and Kanu, 2011). Michael Okpara University of Agriculture Extension Centre was established in 2007 by Michael Okpara University of Agriculture Umudike to actualize the goal of the University as a catalyst in rural development. The philosophy of MEC is that the majority of our farmers are absolutely poor. Alleviation of poverty, therefore, cannot be achieved by the dissemination of technologies to them alone. Other aspects of their socio-economic lives like health, education, women and youth empowerment must also be improved upon through external extension services (MOUAU Extension Centre, 2007). Michael Okpara Extension Centre (MEC) broad mandate is to ensure that farmers and their households receive relevant information that would increase their production capacity, improve their well-being, and lift them out of the poverty trap. The Specific Mandate of the Centre are to bring to the knowledge of the communities relevant and timely innovations that would improve their development activities and train farmers and other stakeholders in the method for utilizing technologies made available for them; provide train the - trainer programmes for rural development in the South – East Agro-Ecological Zone as the focal agricultural extension education (MEC, 2007). According to Nwachukwu and Kalu (2011), MEC does the following to achieve its mandate technology dissemination: Dissemination of relevant technologies and the organization of trainings that will help farmers achieve their optimum in the production of their traditional crops, such as cassava, yam, maize, oil palm, and cocoa.

Cassava is a starchy root crop that develops underground. It serves as a primary food security crop in Africa due to its tolerance to drought and diseases. Cassava is an important staple food crop which ranks fourth in the tropical world (after rice, wheat and maize). Nigeria is the world's largest producer of cassava with about 31.4 million metric tons and ranks second after yam in extent of production among the root and tuber crops of economic value in Nigeria (Ganiya *et al., 2014*). Farmers preferred improved varieties because of their higher yields, earlier maturity, high suppression of weeds and greater resistance to diverse diseases and pests (FAO, 2004). Cassava (*Manihot esculenta Crantz*) is a perennial root crop that grows in non-ideal conditions and represents a major staple crop in Africa, South America and Asia. According to Onyemauwa, (2010) cassava has the potential to increase farmer's income, reduce rural and urban poverty and help close the food gap. All parts of the cassava plant can be consumed, including the starchy roots and foliage. It provides very efficient carbohydrate substantial amount of protein, minerals (iron and calcium) and vitamins (A and C) through leaf consumption, although to a much smaller population in the present time (Dixon, *et al.*, 2003). Cassava is the most popular tuber crop in Nigeria. One of the reasons is because it's the source of one of the nation's major staple food. Garri. Beyond garri: foods like abacha and fufu, starch flour are popular all-round the nation, and are all produced from the cassava. It supplies about 70% of the total calorie intake of more than half the population (Eru Kobe, 2012). It is an important source of food in the tropics. Cassava leaves are a good source of protein (rich in lysine). It is a crop for hunger alleviation and it has a great potential for sustainable food security and export promotion. The advantage of cassava as a candidate crop for hunger alleviation, poverty eradication and food security include tolerance to drought, low demand on soil nutrients capacity for providing good root yields in areas where other crops fail to grow etc. Dried cassava chips and pellets are also used as livestock feed, cassava can be used in producing alcohol. The low cyanide cassava varieties (e.g. TMS 4(2) 1425) and other varieties are being used in confectionary industries for making composite bread and biscuit (Eke Okoro, 2011).

Therefore, the adoption of improved technology by rural farmers is influenced by the extent the farmers feel their felt needs would be met by adopting such recommendations. (Agbaraevo, 2012). Objective of the study is to determine the level of adoption of technologies disseminated to farmers. The MOUAU Extension centre (MEC) was established to key into the extension delivery service to increase adoption of innovations and food production, among other objectives. It has the mandate to ensure that farmer's and other rural dwellers and their households receive relevant information that would increase their production capacity, improve their well–being and lift them out of the poverty trap. It is in this regard, that the study was conceived. The objective of this study is to ascertain the effectiveness of MEC in extension delivery services.

Methodology

The study was conducted in Abia State. The state has three Agricultural Zones with 38 extension blocks and 27 circles (ADP, 2004). It has a population of 2,833,999 made up of 1,234,193 males, 1,599,806 females, and a population density of about 578 persons per square kilometre (NPC, 2006). In the first stage, three Agricultural zones of the State participating in MEC activities were selected. In the second stage, one local government out of three in each zone participating in MEC activities was purposively selected giving a total number of three local governments. In the third stage, three groups of farmers from each local governments participating in MEC activities were purposively selected giving a

total number of 9 MEC farmers groups. Twenty participants from each group were randomly selected giving total of 180 participants. Also five MEC staff were selected. Hence, the total sample size for the study included the 180 MEC participants and five MEC staff. Structured questionnaires were used to elicit information for the study. Data were analyzed using descriptive and inferential statistics such as frequency distribution, percentages, mean for descriptive statistics while correlation and regression analysis for inferential statistics was computed and used to reject or accept the null hypothesis. The regression equation is expressed thus:

$$y = a + bx + e$$

Where:
y = Output in tonnes (dependent variable)
a = intercept
b = slope
x = mean adoption scores of technologies (independent variable)
e = error term

Results and Discussion

Level of adoption of technologies disseminated to farmers

Level of adoption of technologies disseminated to farmers by MEC is presented in Table 1. The result showed that the cassava varieties that had the highest adoption were TME 419 with an adoption mean score of 2.9 ($\bar{X}$=2.9) followed by TMS 0505 with a mean score of 2.8 ($\bar{X}$=2.8) and NR 8082 with mean score of 2.7($\bar{X}$=2.7). Fertilizer application also had a high adoption with a mean score of 2.8 ($\bar{X}$ 2.8). While Pro Vit A cassava variety had a low adoption with a mean score of 1.6 ($\bar{X}$=1.6). The grand mean was 2.6.The implication of the result is that the adopted technologies met the farmers felt needs. Adoption of sustainable practices by farmers is the key to transforming agriculture into a long term sustainable system as reported by Ogunwale (1997). Also, Agbaraevo (2015) indicated that recommendations which rural farmers regarded as very relevant to their felt needs recorded high adoption, while those that did not address their felt needs recorded low adoption rates. He also opined that, the adoption of improved technology by rural farmers is influenced by the extent the farmers feel their felt needs would be met by adopting such recommendations. Adoption of innovation had positive and significant impact on farm productivity. Efforts at increasing farm productivity and reducing poverty among farm households should involve policies that would encourage the households to embrace adoption of agricultural innovations (Iheke and Nwaru, 2014). Adoption of technology means acceptance or utilization of technology.

The regression estimates of the effect of adoption of technology on cassava yield

Table 2: The linear functional form was chosen as the lead equation based on statistical econometric reasons. These are the high magnitude of the coefficient of simple determination (R^2), the level of significance of the variable and its conformity with *a priori* expectation, and the significance of the f– ratio. The coefficient of determination was 0.07094 which implies that 70.09% of the variation in yield was accounted for by adoption of technologies. The f-ratio was significant at 1% level of significance indicating the goodness-of-fit of the model. The coefficient of adoption of technologies was significant at 1% level of significance and positively related to yield. This implies that yield of crops increases with adoption of technologies. This conforms to *a priori* expectation and is in line with the findings of Agbaraevo (2013), which indicated that crop yields could be increased by getting farmers to more readily adopt improved crop production technologies packaged by extension and research. Iheke and Nwaru (2014) also reported that adoption of innovation had positive and significant impact on farm productivity. They therefore, recommended that efforts at increasing farm productivity and reducing poverty among farm households should involve policies that would encourage the households to embrace or step up adoption of agricultural innovations. The result of this work is in line with the result of the study conducted by Agbarevo and Obinne (2008) which showed that each unit increase in adoption of cassava technologies would increase yield by 373kg/ha. One of the strategies for poverty reduction through increased agricultural productivity is to promote the production of high yielding crop varieties. To improve productivity in the agricultural sector will, among other things, require a concerted effort in providing the farming community with high yielding varieties that are drought and pest resistant (Nkonya *et al.*, 2004). This implies that there is a significant positive relationship between adoption of MEC's technologies and cassava yield, increase in the level of adoption of technologies would lead to increase in yield. Key factors that increase adoption and yield were farmers' participation in extension activities, also the arrangement of follow up visits to farmers after adoption for further education on the technologies as reported by Swanson and Samy (2002). This also agrees with the findings of Osinowo (2005) which reported that crop yield significantly influenced the participation of farmers in agricultural projects/ interventions.

Conclusion

Michael Okpara University of Agriculture Umudike Extension Centre disseminated different improved

cassava varieties to the farmers in the study area and also, that the adoption of cassava production technologies led to increased yield. This implies that yield of crops increases with adoption of technologies. The study therefore concluded that farmers adopted cassava varieties disseminated by the Michael Okpara University of Agriculture Umudike Extension Centre in Abia State. It is recommended that there should be a linkage between the Michael Okpara University of Agriculture and National Root Crops Research Institute Umudike so that both institutions would collaborate in technology development and transfer.

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Table 1: Level of Adoption of technologies

Technologies	**Always adopted**	**Adopted and stopped**	**Never adopted**	**Mean score**
Pro vit A	25(75)	63 (126)	92(92)	1.6*
NR8082	140 (420)	26 (52)	14 (14)	2.7**
TME 419	162 (486)	12 (24)	6 (6)	2.9**
TMS 0505	149 (447)	21 (42)	10 (10)	2.8**
Fertilizer	148 (444)	21 (42)	11 (11)	2.8**
Grand mean				**2.6**

Source: Field Survey, 2016
Key: **= High adoption
*= Low Adoption

Table 2: Result of Correlation and Regression Analysis: The effect of adoption on cassava yield

Variable	**Linear +**	**Exponential**	**Double log**	**Semi log**
Intercept	174.955	0.977	0.981	182.638
	(7.67)***	(6.38)***	(7.36)***	(9.20)***
Adoption	14.911	0.150	0.638	29.345
	(4.87)***	(2.47)**	(4.38)***	(2.51)**
R	0.7550	0.5966	0.6205	0.6039
r^{-2}	0.07094	0.5210	0.5715	0.5573
F – ratio	9.74***	4.84***	5.89***	2.01***

Source: Computed from survey data, 2016.
*** = significant at 1%, ** = significant at 5% Linear + = lead equation
Ho_2 is rejected at 5% level