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# The Effect Of Adoption Of Improved Yam Production Technologies On Input Cost For Yam Production Among Resource-Poor Farmers In Cross River State, Nigeria

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***Abstract:***
*Recommendations of agricultural extension to farmers are designed to assist them in improving production through adoption of such agricultural production technologies/ recommendations. However, adoption of improved production technologies by farmers has been low over the years. This has been partly attributed to the high cost of purchasing and using such improved technologies by farmers. The study was, therefore, conducted to find out how the adoption level has influenced the amount of money spent on purchase of inputs for yam production by the resource-poor farmers in Cross River State. In conducting the study, 180 yam farmers participating in the Agricultural Development programme (ADP) in Cross River State were randomly selected through multi-stage stratified random sampling technique. The data collected were analyzed using linear correlation and regression analysis at 1% level. The study showed that agricultural extension through farmers' adoption of technological recommendations significantly increased farmers' expenditure on purchase of yam productions inputs. The effect of adoption on input cost was found to be highly significant at 1% level. The null hypothesis that adoption does not affect input cost was, therefore, rejected, while the alternative hypothesis was accepted.*

***Key words:*** *Adoption, agricultural extension, recommendations, effect, input cost, yam production, Cross River State*

**1.Introduction**

Adoption of agricultural extension recommendations by farmers is a necessary condition for improved food production, increase in farmers' income and, consequently, improved standard of living of the rural population, who are predominantly farmers. However, studies have shown that adoption of agricultural research-extension recommendations by farmers has remained low (Obinne, 1998; Olayide, 1982; Umeh, et al. 1996; and Agbarevo, 2007). Adoption is the acceptance and putting into use new technology by farmers. One of the reasons why adoption has been low is the cost of adopting the recommendations. Because, the rural farmers are poor, they are not always able to purchase improved technological packages from research and extension workers. In this regard, Titilola (1990), Fliegel (1984), Ifenkwe (2005) and Dreyfus (1996) observed that low adoption should not always be attributed to unwillingness of farmers to adopt but rather high cost of innovations. Moreover, the resource-poor farmers are not unwilling to risk their small capital when the benefits expected from adoption have not been well demonstrated. Although improved crop production technologies significantly affect crop yield (Udealor and Asiegbu, 2006), this would have to be well demonstrated in comparison with local practices before farmers would adopt them.

.Poor adoption rate of extension recommendations has been seen as being responsible for poor agricultural production. It is believed that with higher rates of adoption of recommendations by resource poor-farmers, crop yields would increase and likewise, expenditure on production inputs. In this regard, Omagbemi (1998) observed that adoption of technological innovations by resource-poor farmers would lead to increased farm yields. In the same vein, Swanson et al. (1984) noted that adoption of recommended extension technologies contributed to increase food production (yield). This increase in yield translates into increased farmers' income, which in turn increases the purchasing power of the farmer for production inputs leading to increased expenditure on production inputs ( input cost ).

Nwosu (2005), Bakare et al. (2004), Ehirim et al. (2005), Kaine(2004), and Okeke and Eke-Okoro (2006) posited that a positive correlation existed between adoption of improved crop production technologies and yield. They concluded that poor yield of crops was as a result of poor adoption, and that crop yields could be increased by getting farmers to more readily adopt improved crop production technologies packaged by extension and research. Therefore, improvement in agricultural extension delivery would lead to increased adoption of agricultural extension recommendations, which in turn leads to increased yield of yam. The increase in yam yield would consequently lead to increased income from yam as well as increase in money spent in purchase of production inputs during subsequent planting seasons. This means that Nigeria still has great potentials to increase her current level of yam production. Increasing her current level of production means increasing the quantity of production inputs, which, invariably translates into increase in expenditure on yam production inputs or input cost for yam production.

Adoption of improved technology involves purchase of the new package of technology, which is a production input. The input cost is the cost of purchasing such inputs. The amount of money spent on purchasing improved technology is a reflection of the level of adoption because he more the farmer adopts, the more he spends on the technology. However, some technologies may only involve a change of method of production that may not always involve more spending on inputs. The problem is that the level at which adoption influences input cost is apparently unknown. Before the benefits of adoption of new technology is well demonstrated, most resource-poor farmers would be unwilling to risk their meager capital as the money spent on first time adoption does not come from the benefit of such a technology that is being adopted.

On the basis of the foregone, the paper hypothesizes that adoption of improved yam production technologies does not significantly increase input cost.

**2.Materials And Methods**

Farmers were studied relative to adoption of agricultural extension recommendations and their expenditure on purchase of production inputs for yam production. Cross River State, which is the area of study, is in the South- South geo-political zone of Nigeria. It is bounded to the south by the Atlantic ocean, to the east by the Republic of Cameroon, to the south-west by Akwa-Ibom State, to the west by Abia and Ebonyi States, and to the north by Benue State. It lies between the co-ordinates of latitudes $6^{o}$N and $8^{o}$E of the Equator. There are three main cities in the state: Calabar (the state capital) in the south, Ikom in the central zone and Ogoja in the northern zone.

The inhabitants of the state are mainly farmers. Most of the local governments have several rivers, which encourage fishing activities. The farmers are mainly resource-poor. Farmers in the south and central zones are predominantly arable crop farmers. Crops produced include maize, yam, cassava, plantain, banana, cocoa yam, etc. However, Ikom in the central zone is noted for production of cocoa in addition to the other crops. Boki Local Government, which is also in the central zone is noted for the production of cocoa and palm oil in commercial quantities. Farmers in the north produce cassava, yam and maize but to a less extent. They, however, produce rice and groundnuts in greater quantities than the other zones. Generally, cassava, yam and maize are the major crops grown in the state.

The state has a population of about 3million and a land mass of 22156 square kilometers with wide expanse of arable lands, which encourage arable and plantation farming. As typical of areas in Nigeria with many rivers, the state has a multiplicity of languages with more than one language spoken in some local governments. Cross River State is adapted to the production of a wide range of crops because of variation in the soil and climatic conditions. The south of Cross River and its environs are essentially mangrove forest, swamp and tropical rainforest. Cross River central is essentially a rainforest belt, while Cross River North is essentially guinea savanna belt.

In conducting the study, 180 Agricultural Development Project (ADP) yam farmers were randomly selected through stratified sampling technique. The state was divided into the three Agricultural Development Project (ADP) zones. Three blocks were selected from each zone, and two cells from each of the nine blocks selected, giving a total of eighteen cells. Ten farmers were randomly selected from each cell, giving a sample size of 180 farmers. The data used for the study were collected with the use of a structured questionnaire. The researcher was assisted in the distribution and collection of the questionnaire by the Agricultural Development Project staff and enumerators.

The data on adoption of recommendations and cost of inputs collected were analyzed using linear correlation and regression analysis. To obtain an adoption index, farmers' responses were categorized into: (a) never adopted, (b) adopted and stopped, and (c) adopted and still using innovation, to which numerical values 1, 2 and 3 were assigned respectively. The mean response was computed and used as the adoption index.

The null hypothesis that adoption does not affect input cost significantly was tested at 1% level using linear correlation and regression analysis. Theregression equation is given by the formula: 'y = a+bx'. Where:

y = input cost (dependent variable) a = intercept

b = slope

x = independent variable (adoption)

**3.Results And Discussion**

Table 1 shows the result of estimated linear repression: the effect of adoption on input cost for yam production. It can be observed that the value of "R " (0.22599) shows that a positive relationship exists between adoption and input cost However, adoption of improved production technologies accounted for 5.1% of the input cost. The co-efficient of determination ($r^2$) of 0.05107 and F-value

of 9. 57992 is highly significant at 1% level Therefore, the null hypothesis that adoption of agricultural extension recommendations has no significant effect on input cost is rejected at 1% level.

The result of data analysis shows a low positive correlation between input cost and adoption. But It should be noted that input cost is also affected by other variables outside adoption. But the positive correlation between adoption of improved yam production technologies and input cost implies that farmers' cost of production increases with adoption of the research-extension recommendations. The low co-efficient of determination ($r^2$) of 5.1% shows that adoption did not account for much of the expenditure on inputs, which further implies that low adoption would lead to low input cost.

Another reason for relatively high adoption and low input cost is that adoption itself in the first instance requires money from other sources as the improved technological recommendations are purchased with money. This is so because money spent on procuring inputs (improved technologies) to be adopted could not have been gotten from the benefits of first time adoption but rather from non-farm income sources.

This finding is supported by Kernga (2003) who observed that capital needed be raised to be able to purchase improved technological inputs, such as improved seeds, fertilizers, chemicals, among others for adoption or use by farmers. And unless the farmer was able to raise such capital, adoption would not take place. Kernga (2003) concluded that input cost was influenced by adoption, and that adoption cost is that part of input cost accounted for by cost of inputs/technologies adopted in the first instance largely met by non-farm income sources. These non-farm income sources provided the money for adoption in the first instance as input for first time adoption could not have been met from increased income arising from adoption But because the farmers are poor, they are often unable to provide this needed capital for first time adoption. Hence, adoption is low not because farmers do not want to adopt but because they lack the capital to bear the cost of adoption (Fliegel, 1984). However, with the concomitant increase in yield and income, subsequent input cost would be met from farm income. This is because of the farmer's conviction of the benefits of adoption of recommended technologies. Hence, he would be willing to spend more money on purchase of inputs since the benefits of adopting such recommended technologies have been well demonstrated or proven ( Agbarevo, 2011).Furthermore, Kernga (2003) equally found high correlation between adoption and non-farm income, which farmers used in purchasing farm inputs (innovations) for adoption; whereas correlation between adoption and input cost was low for farmers without strong economic base from non-farm incomes. In the same vein, Nwaru (2005) found that non-farm income of farmers provided resource endowments for investment in agriculture. Adoption in itself is investment with expected returns but which is seen as risk for first time adopters, who have not proven the benefits of adoption. Only farmers who have this risk capital can afford to purchase extension technological recommendations for first time adopters, and such risk capital largely comes from non-farm income sources.

| Variables | Coefficients | Standard Error | T-Value |
|---|---|---|---|
| Constant | -4760.897 | 8853.265 | 0.538 |
| Adoption | 13150.307 | 4248.689 | 3.095* |
| R | 0.22599 | | |
| $R^2$ | 0.05107 | | |
| F-Value | 9.57992* | | |
| Sample size | 180 | | |

*Table 1: Correlation And Regression Analysis: The Effect Of Adoption On Input Cost For Yam Production*
** Significant At 1%*

**4.Conclusion**

The study has shown that a positive relationship exists between adoption and input cost, and that the farmers' predisposition to adopt is largely influenced by available capital for investment. Since adoption also correlates positively with yield, it, therefore, follows that the greater the capital at the disposal of the farmers, the greater the adoption, and yield would increase. This underscores the importance of making credits available to farmers (not businessmen who pose as farmers to acquire agricultural credit from banks) for improved yam production if the goal to produce enough yam would be met, vis-à-vis the Millennium Developmental Goal on food security.

The removal of agricultural subsidy by the government is inimical to agricultural and rural development in a developing economy like Nigeria. Government should rather cut down spending on frivolous issues and increase its budget on agriculture to provide funds for agricultural subsidy. Since the fear of the unknown and high cost of technologies for adoption is largely responsible for poor adoption (as resource-poor farmers are unwilling to risk their meager capital), subsidizing cost of innovations would remove the fear and increase adoption with the attendant benefits.

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