PROCEEDINGS BOOK

3rd
INTERNATIONAL CONFERENCE ON
FOOD and AGRICULTURAL ECONOMICS
25-26th April 2019
Alanya, TURKEY

ISBN: 978-605-81058-1-2

Harun Uçak (Ed.)
Alanya Alaaddin Keykubat University

3rd

INTERNATIONAL CONFERENCE ON
FOOD AND AGRICULTURAL ECONOMICS

PROCEEDINGS BOOK

(Full Texts-Abstracts-Posters)

25 -26th April 2019

Alanya Alaaddin Keykubat University, Turkey

ISBN
978-605-81058-1-2

EFFECT OF IMPROVED MAIZE PRODUCTION TECHNOLOGY ON THE POVERTY STATUS OF RURAL FARMERS IN KADUNA STATE, NIGERIA.

Usman Shaba Mohammed
Federal University of Technology, Department of Agricultural Economics and Farm Management, Nigeria, Email: usman.shaba@ futminna.edu.ng & hsshabausman@ yahoo.co.uk

Cornelius Owoniyi Adebayo
Federal University of Technology, Department of Agricultural Economics and Farm Management, Nigeria

Akuniyi Matthew Durba
Federal University of Technology, Department of Agricultural Economics and Farm Management, Nigeria

Abstract

Improved maize production technology will increase output per hectare which could translate into increased income. Maize is a major crop produce in Kaduna State, Nigeria. This study examined the effect of improved maize production technology on the poverty status of farmers in Kaduna State, Nigeria. Data for the study were collected through the use of questionnaire and interview schedule. Foster-Greer-Thobecke technique was used to obtain the poverty status of the maize farmers and chow test was conducted to test the effect of the use of improved maize technology on poverty status. Two categories of farmers were selected for the study i.e adopters and non-adopters of improved maize production technology. The result of the study showed that 25.34 and 44.44% of the adopter and non-adopters respectively, are still living in poverty.What is required to bring 24.59%, 33.83% and 37.39% of the adopters, non-adopters and the pooled sample to the poverty line was 72,557.99, 66.763.75 and 94.072.70 Naira respectively. The chow test revealed that, the use of improved maize production technology had a significant positive effect on the poverty status of the maize farmers. The study recommends that, sustained use of improved maize production will get the farmers out of poverty.
Keywords: Foster-Greer-Thobecke, Production Technology, Poverty, Adopter, Chow Test.

1. Introduction

Poverty is a global phenomenon which affects continents, nations and people differently. It affects people in various depths and levels at different times and phases of existence. There is no nation that is absolutely free from poverty. . Nigeria had a poverty level of barely fifteen percent of its population in 1960, and currently struggling to bring it down from about seventy one percent of its about 162 million people (World Bank, 2012). The issue of poverty is central to social and economic development of the developing nations of the world. According to the Multi Dimensional Poverty Index (MPI, 2010), 46% of Nigerians lived below the national poverty line.. Efforts at reducing poverty by were rightly targeted at the rural communities where nearly 70% of the poor population reside, although world bank (2014) argued that is only 33% of the Nigeria population were poor. The phenomenon is more severe in the area where agricultural production is predominantly practice(Awotide et al., 2011). Researchers like Oni and Yusuf (2006) have stress the important of agricultural sector particularly crop production sub-sector in reducing poverty in developing nations of the world. Maize is one of the most important staple food crop in developing countries Nigeria inclusive . Improving the productivity of maize farm by using improved production technologies will enhance farmers welfare.

Improved maize production technology was promoted by a non-Governmental organization, *Sasakawa* Global 2000 (SG-2000). Part of the objectives of the organization is to diffuse improved

agricultural technology to farm households in order to increase output. One of these efforts is the introduction of improved maize production technology in some States in Northern Nigeria. The organization work through the Agricultural Development Projects (ADPs) established in participating States (SG 2000, 2010). Production technology adoption could reduce poverty by increasing farm productivity which will increase farm income.

Therefore, these study analysed the effect of improved maize production technology adoption on poverty status of the rural farmers in Kaduna State, Nigeria

2. Methodology

2.1 Study Area

The study was conducted in Kaduna State. The state is located in the northern part of Nigeria and is located between latitudes 10°21′ N to 10°33′ N and longitudes 7°45′ E to 7°75′ E.. March is the warmest month at 30.4°C, January is the coldest month of the year at 12.7°C, Rainfall is heaviest in the south and decreases northwards with an annual mean rainfall varying between 942mm and 1000mm which last from April-October (NAERLS, 2012).The people of the State are engaged in agricultural production activities. The main crops which are grown in the State include maize, sorghum, soya bean, millet, rice, groundnut, yam and sugarcane. By the 2006 census of the National population commission, Kaduna State population is currently estimated at 6,113,443 (Indexmundi, 2016). There are 23 LGAs in the State, the State has a land mass of about 43,460km^2.

2.2 Sampling Technique and Procedure

A multi-stage sampling technique was adopted for this study. At the first stage, a purposive sampling technique was used to select one maize technology transfer adopting and non-adopting zone that is, Lere and Samaru zones respectively. The second stage involved a random sampling of two LGAs from each of the selected zones. This gave a total of four LGAs for the study. The third stage involved a random selection of three communities from each of the selected LGAs. This gave a total of twelve communities for the study. At the last stage, following Nwadike (2016) and Adewumi (2017), 10% of the adopters and non-adopters of the improved maize technology in each of their respective selected communities were sampled. The summary of sampling procedure is presented in Table 1.

Table 1. Sampling Design

Agricultural Zone	Local Government	Community	Sample Frame	Sample Size (10%)
Lere (Adopting Zone)	Lere	Yarkasuwa	312	31
		Saminaka	251	25
		Lere	229	23
	Igabi	Jaji	218	22
		Kwanan Parikwoi	208	21
		Ungwan Kanawa	236	24
Sub-Total			**1,454**	**146**
Samaru (Non-Adopting Zone)	Jama'a	Wadon	187	19
		Fadia	212	21
		Zonkwa	233	23
	Zango Kataf	Samaru Kataf	144	14
		Jankasa	219	22
		Mabushi	176	18
Sub-Total			**1,171**	**117**
Total			**2,625**	**263**

Source: Field survey, 2017

2.3 Method of Data Collection

Primary data were used for this study. The data were collected with the use of structured questionnaire which was complemented with interview schedule. Also, extension agents and trained enumerators were engaged to assist during the period of data collection.

2.4 Analytical Techniques

The farm budgeting model used byYusuf *et al.* (2008) and Adewumi (2017) was adopted and specified in equation (1) as:

$$NFI = \sum_{i=1}^{n} P_i Y_i - \sum_{j=1}^{m} P_j X_j - \sum_{k=1}^{f} F_k \quad (1)$$

Where;
NFI = Net farm income
Y_i = quantity of maize output (kg/ha)
P_i = Unit price of maize
X_j = Quantity of the variable inputs per hectare (where j =, 1, 2, 3, …, m variable inputs)
P_j = Price per unit of variable inputs.
F_k= Cost of fixed inputs per hectare (where k =, 1, 2, 3, …, f fixed inputs)

The Foster-Greer-Thorbecke (1984) model used by Sallawu (2014) and Pelemo (2016) was adopted to determine the poverty status of respondents in the area.

$$P_\alpha = \frac{1}{N} \sum_{i=1}^{Hi} \left(\frac{z - y_i}{z} \right)^\alpha \quad (2)$$

Where, N = total number of respondents;
y_i = Annual household expenditure;
Z = poverty line of respondents in the study areas.
α = Poverty Aversion Parameter Index which take on the values of 0, 1 and 2 representing incidence of poverty, poverty gap and severity of povertyrespectively. The measure relates to different dimensions of the incidence of poverty. The poverty line was placed at two-third mean expenditure of respondents. Based on this, respondents were classified into three groups. a

The first group is the proportion of the population that falls below the poverty line. This is called the head count or incidence of poverty, which was determined with the formula in equation.

$$P_O = \frac{H_0}{N} \quad (3)$$

If $\alpha = 1$, then FGT becomes

$$P_1 = \frac{1}{N} \sum_{i=1}^{Hi} \left(\frac{z - y_i}{z} \right) \quad (4)$$

This is the depth of poverty. It is the percentage of expenditure required to bring each individual below the poverty line to poverty line.

If $\alpha = 2$, then FGT becomes

$$P_2 = \frac{1}{N} \sum_{i=1}^{Hi} \left(\frac{z - y}{z} \right)^2 \quad (5)$$

This is the severity of poverty. It is indicated by giving longer weight to the extremely (core) poor. It is achieved by squaring the gap between their expenditure and the poverty line to increase its weight in the overall poverty measure.

A z-test model was used to determine the effect of *Sasakawa* improved maizeproduction technology on the poverty status of the farmers. The model is specified in equation (6) as:

$$Z = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} \quad (6)$$

Where;

$\bar{X}_1$ = Mean outcome of the Sasakawa maize technology adopters
$\bar{X}_2$ = Mean outcome of the Sasakawa maize technology non − adopters
σ_1^2 = Outcome variance of the Sasakawa maize technology adopters
σ_2^2 = Outcome variance of the Sasakawa maize technology non − adopters
n_1 = Number of observation of the Sasakawa maize technology adopters
n_2 = Number of observation of the Sasakawa maize technology non − adopters

3. Results and Discussions

3.1 Poverty Status of Maize Farming Household

The poverty status of the maize farming households' heads was analysed using FGT index and the results are presented in Tables 2. Farm households were categorized into poor and non-poor. The result showed that only 25.34%, 44.44% and 31.56% of the adopters, non-adopters and pooled data were poor using the $1.98 per day. This implies that there is still the incidence of poverty in the study area. The poverty head count or incidence (P_0), poverty gap or depth (P_1), and squared poverty gap or severity (P_2) was also calculated and the results are presented in Table3. The mean incomes of all adopters, non-adopters and pooled data were estimated to be ₦442,606.69, ₦296,026.1 and ₦377,397.85 per annum respectively as presented in Table4.. The relative poverty line was thus defined based on the average income of the farmers. The poverty line is an income-based threshold line that divides the poor and the non-poor farm households in the study area. The value of the poverty line for the adopters, non-adopters and pooled data was estimated as ₦295,071.13, ₦197,350.75, 606.70 and ₦251,598.56. Consequently, farmers that earned less than two-third of the mean income, that is, the poverty line were considered to be poor. This approach was used in similar studies in Nigeria by Nmadu, *et al.* (2014) and Omobaba (2016).

Table 2. Poverty Status of Household

Poverty Status	Adopters		Non-Adopters		Pooled Data	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Poor	37	25.34	52	44.44	83	31.56
Non-Poor	109	74.66	65	55.56	180	68.44
Total	146	100.00	117	100	263	100

Source: Computed from field survey, 2017.

Table 3. Estimated FGT Indices of the Respondents

FGT Indices	Adopters	Non-Adopters	Pooled Data
Head Count (P_0)	0.2587	0.4444	0.3156
Poverty Depth (P_1)	0.2459	0.3383	0.3739
Poverty Severity (P_2)	0.0846	0.1511	0.1819
Mean Income (₦)	442606.69	296026.12	377397.85
Poverty Line (₦)	295071.13	197350.75	251598.56

Source: Computed from field survey, 2017

The P_0 for the entire adopters, non-adopters and pooled data were 0.2587, 0.4444 and 0.3156 respectively. The poverty gap index (P_1) usually referred to as the depth of an average poor person from the poverty line for the adopters, non-adopters and pooled data were estimated to be 0.2459, 0.3383 and 0.3739. This implies that 24.59% of the adopters, that is, ₦72,557.99; 33.83% of the non-adopters, that is, ₦66,763.75 and 37.39% of the pooled data, that is ₦94,072.70 were required to bring an average poor person within the group to the poverty line respectively. This is the minimum cost of eliminating poverty (relative to the poverty line) and this shows the amount that could be transferred to the poor to bring their income up to the poverty line. Thus, this measure is an indicator of the potential savings to the poverty alleviation budget. The poverty gap (P_2) which measures the distance of each poor person to another was found to be 0.0846, 0.1511 and 0.1819 for the adopters, non-adopters and pooled data respectively. This means that among the poor household heads, 8.46%, 15.11% and 18.19% respectively were severely poor. This indicates that the poor household heads were not equally poor but they vary in their degree of poverty being more pronounced for the non-adopters compared to the adopters. These estimates are similar to the 37% reported by Sallawu (2014) for farming households surveyed in Niger State but lower than the 46.75% reported by Omobaba (2016) based on the income-poverty line measure.

Table 4. Estimated Income for Adopter and Non-Adopter of Improved Maize Production Technologies

Annual Income (₦)	Adopter	Non- Adopter	Pooled Data
1 – 100,000	1 (0.68)	11 (9.40)	12 (4.56))
100,001 – 200,000	10 (6.85)	41 (35.04)	51 (19.39)
200,001 – 300,000	28 (19.18)	6 (5.13)	34 (12.93)
300,001 – 400,000	20 (13.70)	11 (9.40)	22 (8.37)
400,001 – 500,000	56 (38.36)	35 (29.91)	70 (26.62)
Above 500,000	31 (21.23)	13 (11.11)	74 (28.14)
Mean	442,606.69	296,026.12	377,397.85

Source: Computed from field survey, 2017

3.2 Effect of SG-2000 Improved Maize Technology on the Poverty Status of the Adopters

The result of the z-test analysis of the effect of SG-2000 improved maize technology on the poverty status of the adopters is presented in Table5. The result shows an estimated mean poverty depth index of 0.2459 and 0.3383 for the adopters and non-adopters respectively. It also indicated an estimated mean poverty depth difference of -0.0924 between the adopters and non-adopters with a z-value of -2.3938 which was significant at the $p<0.05$ probability level. This implies that the poverty depth of the adopters is 9.24% lower than that of the non-adopters. This could be attributed to effect of *Sasakawa* maize technology on the adopters. This implies that SG-2000 improved maize technology had a positive and significant effect on the poverty status of adopters in Kaduna State in that there poverty has been significantly reduced compared to the non-adopters.

Table 5. Analysis of Effect of SG-2000 Improved Maize Technology on the Poverty Status of the Adopters

Variables	Mean	Standard Deviation	Z-Value
Adopters Poverty Depth	0.2459	0.1575	-2.3938**
Non-Adopters Poverty Depth	0.3383	0.1933	
Poverty Depth Difference	-0.0924	0.0734	

Source: Field survey, 2017.

4. Conclusion and Recommendation

Based on the findings of the study, it was concluded that the use of improved maize technology had significant and positive effect on the poverty status of the maize farmers in Kaduna State

This suggests that adoption of improved maize production technologies significantly generate an improvement in farming household poverty status. Hence, efforts should be intensified to ensure farmers have access to improved maize production technologies at the right time. All programs, strategies and policies that could lead to increase in improved maize production technology adoption should be encouraged in order to achieve the much desired poverty reduction in the rural farming communities in Nigeria.

References

Adewumi, A. (2017). Optimum production plans for cassava-based crop farmers in Kwara State, Nigeria. Unpublished MTech Thesis, Department of Agricultural Economics and Extension Technology, Federal University of Technology, Minna Nigeria.

Awotide , B.A., T.T. Awoyemi , A. Diagne, and V.T. Ojehomon (2011). Impact of Access to Subsidised Certified Improved Rice Seed on Income: Evidence from Rice Farming Households in Nigeria. OIDA International Journal of Sustainable Development 02:12 (2011).

The Global Multidimensional Poverty Index by the U.N (2010). http://www.dataforall.org/dashboard/ophi/index.php/

Nmadu, J. N., Yisa, E. S., Simpa, J. O., & Sallawu, H. (2014). Poverty Reduction in Nigeria: Lessons from Small Scale Farmers of Niger and Kogi States. *British Journal of Economics, Management and Trade*, 5(1), 124-134.

National Agricultural Extension Research and Liaison Services (NAERLS), (2012). Agricultural Performance Survey of 2012 Wet season in Nigeria. Pp 110

Nwadike, C. C. (2016). Comparative economic analysis of yam and sweet potato marketing in Federal Capital Territory, Abuja, Nigeria. Unpublished MTech Thesis, Department of Agricultural Economics and Extension Technology, Federal University of Technology, Minna Nigeria.

Omobaba, R. Y. (2016). Income diversification and poverty status of arable crop farmers in Shiroro Local Government area of Niger State, Nigeria. Unpublished B. Agric. Tech thesis, Department of Agricultural Economics and Extension Technology Federal University of Technology, Minna, Nigeria

Oni, A.O and S.A. Yusuf(2006). Dterminants of Expected Poverty among Rural House holds in Nigeria. Final report presented at AERC, Biannual workshop in Nairobi, Kenya

Sallawu, H. (2014). Livelihood and income diversification strategies among farm households in Niger State, Nigeria. Unpublished *MTech thesis,* Department of Agricultural Economics and Extension Technology Federal University of Technology, Minna, Nigeria

Sasakawa Global 2000 (2010), *Preliminary report on Adoption situation in Northern Nigeria*, SG 2000.

Pelemo, J. J. (2016). Effect of cashew production on rural poverty alleviation in Kogi State Nigeria. Unpublished MTech thesis, Department of Agricultural Economics and Extension Technology Federal University of Technology, Minna, Nigeria

World Bank, (2012). Nigeria: poverty in the midst of plenty. The challenge of growth with inclusion. World Bank Poverty Assessment. Population and Human Resources Division, West Africa Department, Africa Region. Report No. 14733 UNI. World Bank, Washington DC, USA.

World Bank. (2014). *Nigeria economic report (English)*. Nigeria economic report; no. 2. Washington, DC World Bank Group.http://documents.worldbank.org/curated/en/337181468100145688/Nigeria-economic-report.