



The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

ADOPTION OF IMPROVED VARIETIES OF MAIZE AMONG FARMERS IN KOKONA LGA OF NASARAWA STATE

By

S. Mohammed¹; S. Idi¹; A. I. Malumfashi² and G. Katikpo¹

1. Agricultural Economics and Extension Programme
Abubakar Tafawa Balewa University, Bauchi
2. Agricultural Economics and Extension Department
Bayero University, Kano

ABSTRACT

The study was conducted in 2003 to assess the levels of awareness and adoption of improved varieties of maize in Kokona LGA of Nassarawa State. Fifty maize farmers were randomly chosen to provide the data that were analyzed using frequency distribution percentages and t-test analysis. Results indicated that 52.08% of the respondents were between 21-30 years of age while 41.67% acquired tertiary education. Similarly, the result disclosed that while there was no significant difference between awareness and adoption levels of varieties, improved variety *TZESR* ranked first both in terms of popularity and adoption. Furthermore, while most important reasons for farmers' adoption were early maturity and high yield, the major causes for non adoptions were low capital fund and handling difficulties. However, the most salient constraints to adoption of improved varieties were identified as inadequate capital and high costs of inputs among others. Thus, the study recommends that adequate capital, input subsidy and effective extension services be provided in the area.

KEY WORDS: Adoption; Improved; Varieties and Maize.

INTRODUCTION

Nigerian population is rapidly increasing. However, the area of cultivable land as well as number of farm animals per capita is decreasing. Thus, the growth rate of food production in Nigeria is 2.5 percent per annum, while that of food demand is more than 3.5 percent and this necessitated the massive importation rate of 23.1 percent per annum (F.M.A., 1989). Hence, high level of modern technology is essential if Nigerians demand for food and fibre is to be satisfied (Katikpo, 2003). Accordingly, Ofuoku *et al.* (2005) observed that research institutes have played their roles of developing high yielding varieties of crops and breeds of livestock in order to increase yield per unit area of land. Thus, it has been observed that, the use of modern production technologies has played a great role in increasing the per hectare yield of crops. Moreso, Ochi and Malumfashi (2005) observed that, adoption of agricultural technologies moved humans from societies of nomadic hunters/gatherers to geographically-stable and sustainable communities.

From the discussion so far, adoption of modern production technologies is a pre-requisite for the attainment of food security objective of the nation. However, according to Ofuoku *et al.* (2005), adoption of improved varieties of crops was still a problem, though extension services were playing very major roles of

assisting the rural farmers to adopt agricultural innovations. Adoption has been defined as the process involved in accepting ideas or the mental process being passed through, before accepting new ideas. It involves decision making at clearly defined logical steps such as awareness, interest, evaluation, trial and adoption, added Ugbomeh (1991). Agricultural production technology adoption, therefore, refers to the process involved in accepting innovative technologies or methods in agricultural production. This study, in essence, attempts to assess the adoption of improved varieties of maize seeds among farmers in Kokona LGA of Nassarawa State. It provides answers to such questions as what are the most popular varieties of maize in the area and to what extent is each variety adopted? What are the reasons for adoption or otherwise and what are the major constraints hindering adoption? The study pursued the answers to these through the following specific objectives:

- i) To examine the socio-economic characteristics of respondents
- ii) To determine and compare the awareness and adoption levels of improved varieties of maize among farmers in the area.
- iii) To find out whether there is significant difference between levels of awareness and adoption of improved varieties of maize.
- iv) To discover the reasons for farmers' adoption and non-adoption of improved varieties of maize, and
- v) To determine the constraints to adoption of improved varieties of maize in the area.

Methodology

The study was conducted in 2003 in Kokona LGA of Nasarawa State. The local government was chosen for the study because of its high position in terms of maize production and number of newly introduced varieties of maize. Earlier, a list of introduced improved varieties of maize was collected from Nasarawa State Agricultural Development Programme and a survey of awareness and adoption levels of the identified varieties was carried out. Using simple random sampling technique, maize farmers were selected from already purposively chosen four (4) villages. The selection of the villages was based on their higher production capabilities. The data were collected using interview-schedule and were analysed using percentages, frequency distribution and independent student's t-test. The t- test model is described as:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

Where:

- | | | |
|-------------|---|--|
| t | = | value of the t-ratio |
| \bar{x}_1 | = | mean awareness level of varieties |
| \bar{x}_2 | = | mean adoption level of varieties |
| s^2 | = | standard error of the difference between the means |

Thus, a null hypothesis that there is no significant difference between the mean awareness and adoption levels of the varieties was tested using the above model.

Results and Discussion

3.1 Socio-Economic Characteristics of Respondents

These play an important role in creating awareness and knowledge, subsequently in determining level of technology adoption (Mohammed *et al.*, 2005). The result revealed that 77.00 percent of the respondents were male. However, the representation of female by 23.00 percent was not discouraging. Table 1 depicts that 75.00 percent of the respondents were below 41 years in age. Suffice, therefore, to conclude that the farmers could be motivated to adopt new technologies in anticipation of high returns due to active agedness. However, Doss (2004) opined that age, marital status and religion do not have much policy relevance, other than for policy makers to understand the demographic characteristics of farmers using particular technologies. Bivan (1995) reported that farmer's educational attainment is paramount in his decision-makings. Accordingly, Table 1 shows that 73.00 and 4.00 percents of the sampled farmers acquired formal western and adult educations respectively. On the other hand, 22.92 percent mentioned that they had never attended school. The proportion with western education, particularly tertiary, was encouraging and this may likely have positive impact on adoption. Similarly, more than 83.00 percent of the respondents had maize production experience of over 6 years, while those with 1 – 5 years of experience are represented by 14.58 percent. These values were also encouraging since direct correlation between length of farming experience and level of adoption is not unestablished. In the same manner, scale of production is an important factor determining production. Thus, the result unveiled that 85.42 percent had farm sizes ranging from 1.1 – 7.0 ha; and out of this, 25.00 percent controlled more than 4 hectares. Also, 6.25 percent of the total respondents cultivate more than 7.0ha. Lastly, the result showed that 72.92 percent had 1 – 6 members in their households while others had household sizes of 7 and above persons.

3.2 Adoption of Improved Varieties of Maize

Awareness of the availability of a particular innovation or technology is the first step towards its adoption. Thus, this section assesses the level of farmers' awareness of improved varieties of maize seeds and their respective extents of adoption in the study area. Table 2 shows that variety *TZESR* and variety *TZB* attracted the highest levels of awareness among the respondents with 75.00 and 52.08 percents, respectively. Contrastingly, varieties *TZSR* and *TZNSR* were the least popular among the varieties studied with 29.17 percent of the respondents each. The table, further, discloses that the most popular varieties were also the most adopted in the area. Accordingly, varieties *TZESR*, *TZB* and *Uba super* ranked first, second and third, respectively; while *TZSR* and *TZNSR* were the least adopted varieties of maize with 16.67 percent and 12.50 percent respectively. A farmer may be said to be an adopter if that farmer is using a technology that had been recycled for several generations from hybrid ancestors (Kahba *et al.*, 1998; Nkonya, *et al.*, 1998). To others, an adopter was identified with using only new certified technology (Bisanda, 1998; Ouma, 2002). It was earlier pointed out that awareness is a prerequisite condition for technology adoption. However, awareness is only a necessary but not sufficient condition for adoption.

To this end, an independent t-test analysis was employed to ascertain whether or not the number of adopters is significantly lower than the number of farmers that were aware of the existence of the varieties. From Table 2, the mean score of awareness is 21.0 while that of adoption is 13.8; and table 3 explains whether this difference is significant or just by chance. Since the calculated t-value (1.16) is lower than the tabulated t-value (1.86), then the null hypothesis, which states that there is no significant difference between the number of adopters and of those that were aware of the existence of the varieties, is accepted. Thus, the study concludes that as almost all people become aware of new varieties, they adopt.

The study, further, attempted to examine out the farmers' reasons for adoption and/or non-adoption of improved varieties (Table 4). The results depicted that; early maturity (85.42%) and high yield (79.17%) were identified as most important reasons for adoption while disease resistance (58.32%) and high market value (32.92%) as least important. Similarly, the table explains that low capital volume (50.00%) and difficulties in handling (37.50%) were the major important reasons for farmers non adoption; while low market values (95.83%) and low yield (61.58%) were termed as less important reasons for non adoption. Finally, the study investigated into the general constraints hindering adoption of improved varieties of maize in the area. Accordingly, inadequate capital fund, high cost of inputs and farmers non-access to innovations were considered as serious constraints to adoption by 83.33, 43.75 and 41.67 percents of the total respondents, respectively. This finding concords with that of Ofuoku *et al.* (2005) who discovered inadequate capital as one of the major constraints to adoption of improved Soya beans varieties in Ndokwa West and Ukwuani LGAs of Delta State. It also agrees with Mohammed *et al.* (2005) who opined that capital finance is necessary for the adoption of modern and improved production technologies. Conversely, 16.67, 56.25 and 58.33 percents did not term these respective constraints as serious limitations to adoption. More so, illiteracy (77.18%) and inefficient extension services (79.27%) were not seen as serious problems hindering adoption.

Conclusion and Recommendations

The study, which was conducted in 2003, assessed the level of awareness and adoption of improved varieties of maize in Kokona LGA of Nasarawa State. The collected data, from randomly chosen respondents, were subjected to descriptive and t-test analyses. Result revealed that majority of the respondents were male, below 41 years in age, acquired formal western education, had over 6 years of farming experience, had farm sizes of 1.1 – 7.0 ha and control 1 – 6 members in their households. In addition, while varieties *TZESR* and *TZB* attracted the highest levels of awareness and adoptions, the study discovered no significant difference between awareness and adoption levels of improved maize varieties in the area. Also, while early maturity and high yield were the major reasons for adoption, low capital and handling difficulties limit adoption levels. Finally, constraints to adoption included low capital, high input costs and farmers' non-access to innovations. Thus, the study recommends that credit facilities, input subsidy and effective extension services should be improved.

Table 1: Socio-Economic Characteristics of Farmers (n=48)

Characteristics		Frequency	Percentage	Cumulative Percentage
Age (Years)	21 – 30	25	52.08	52.08
	31 – 40	11	22.92	75.00
	41 – 50	7	14.58	89.58
	51 and above	5	10.42	100.00
Educational Attainment	Never been to school	11	22.92	22.92
	Primary education	7	14.58	39.50
	Secondary education	8	16.67	54.17
	Tertiary education	20	41.67	95.84
	Adult education	2	4.17	100.01
Farming Experience (years)	< 1	1	2.08	2.08
	1 – 5	7	14.58	16.66
	6 – 10	19	39.58	56.24
	> 10	21	43.75	99.99
Farm size (ha)	< 1.1	4	8.33	8.33
	1.1 – 4.0	29	60.42	68.75
	4.1 – 7.0	12	25.00	93.75
	Above 7.0	3	6.25	100.00
Total		48	100.00	
Household size (No.)	1 – 3	17	35.42	35.42
	4 – 6	18	27.50	72.92
	7 – 9	6	12.50	85.42
	Above 9	7	14.8	100.00

Source: Field survey Data, (2003)

Table 2: Farmers awareness and adoption levels of improved varieties of maize (n=48)

Variety	Awareness			Adoption		
	Freq.	Percent	Rank	Freq.	Percent	Rank
TZB	25	52.08	2 nd	14	56.00	2 nd
TZESR	36	75.00	1 st	31	86.11	1 st
TZSR	14	29.17	4 th	8	57.11	4 th
TZNSR	14	29.17	4 th	6	42.86	5 th
UBA SUPER I&II	16	33.33	3 rd	10	62.50	3 rd

Source: Field Survey Data, (2003)

Table 3: Difference between awareness and adoption levels of farmers (n=48)

t-calculated	d.f.	Prob.	t-tabulated
1.16	8	P<0.05	1.86

Source: Field survey Data, (2003)

Table 4: Reasons for farmers adoption and non-adoption of improved varieties of maize (n=48)

Variables			More Important		Less Important	
			Freq.	Percent	Freq.	Percent
Reasons for Adoption	High yield		38	79.17	10	20.83
	Early maturity		41	85.42	7	14.58
	Disease resistance		20	41.68	28	58.32
	Market value		13	27.08	35	72.92
Reasons for Non-adoption	Lower yield		17	35.42	31	64.58
	Handling difficulties		18	37.50	30	62.50
	Low capital		24	50.00	24	50.00
	Low market value		2	4.17	46	95.83

Source: Field survey Data, (2003)

Table 5: Constraints to adoption of improved varieties of maize (n=48)

Variables	Serious		Non-serious	
	Frequency	Percentage	Frequency	Percentage
Inefficient extension services	10	20.83	38	79.27
Farmers Illiteracy	11	22.92	37	77.18
Inadequate capital fund	40	83.33	8	16.67
High costs of inputs	21	43.75	27	56.25
Inaccessibility of innovations	20	41.67	28	58.33

Source: Field survey Data, (2003)

REFERENCES

- Bisanda, S. Mwangi, W. Verkuijl, H. Moshi, A. J. and Amadajayasekaram, P. (1998). Adoption of Maize Production Technologies in Southern Highlands of Tanzania, Mexico, D. F. International Maize and Wheat Improvement Centre (CIMMYT), and the Southern African Centre for Cooperation in Agricultural Research (SACCAR).
- Bivan, G. M. (1995). Economics of Resource-Use in Small Scale Agricultural Production: A Case of Cotton Farms in Akko LGA of Bauchi State. An unpublished M.Sc. Thesis. Agricultural Economics and Extension Programme, Abubakar Tafawa Balewa University, Bauchi, 68pp.
- Doss, C. R. (2004). Analyzing Technology Adoption: Challenges and Limitations of Micro-Studies, Tale Centre for International and Aca Studies, Yale University.
- F.M.A (1989). **Agricultural Policy for Nigeria**. MAMSER, Abuja, Nigeria, 6 – 15.
- Kahba, A. R. M.; Verkuijl, H; Mwangi, W; Byamungu, D. A; Anadajayasekeram, P. and Moshi, A. J. (1998). Adoption of Maize Production Technology in Central Tanzania, Mexico, D. F. International Maize and Wheat Improvement Centre (CIMMYT). The United Republic of Tanzania and the Southern African Centre for Cooperation in Agricultural Research (SACCAR). P 29
- Katikpo, G. (2003). The Assessment of Adoption Rate of Improved Production Technologies Among Farmers in Kokona LGA of Nasarawa State. An unpublished B. Tech. Project, Agricultural Economics and Extension Programme, Abubakar Tafawa Balewa University, Bauchi.
- Mohammed, S; Idi, S; Malumfashi, A. I, and Musa, S. A. (2005). "Commercial Banks and Agricultural Funding in Gombe State, Nigeria". *Management Network Journal*. 4(7): 59 – 67.

- Nkonya, E. Xarvery, P. Akonaay, H. Mwangi, W. Anadajayasekeram P. Verkuijl, H. Martella, D. and Moshi, A. J. (1998). Adoption of Maize Production Technologies in Northern Tanzania, Mexico, D. F. International Maize and Wheat Improvement Centre (CIMMYT). The United Republic of Tanzania and the Southern African Centre for Cooperation in Agricultural Research (SACCAR)
- Ochi, J. E. and Malumfashi, A. I. (2005). Adoption of Selected Technologies in Fadama Farming in Bauchi State. **In: Economic Reforms and Management of Nigerian Agriculture**, Ogisi, O. D.; Okuneye, P. B. and Oyaide, W. J. Eds. Proceedings of the 19 Annual Conference of Farm Management Association of Nigeria (FAMAN) , pp 190-197.
- Ofuoku, A. U; Emuh, F. N. and Osuagwu, C. N. (2005). Adoption of Improved Varieties of Soya Beans Among Rural Female Farmers in Ndowa West and Ukwuani LGAs of Delta State Nigeria. **In: O'Raye.**
- Ouma, J., Murithi, F; Mwangi, W; Verkuijl, H; Fethi, M. and Groote, H. (2002). Adoption of Seed and Fertilizer Technologies in Embu District, Kenya. Mexico, D. F: Kenya Agricultural Research Institute (KARI), and International Maize and Wheat Improvement Centre (CIMMYT).
- Ugbomeh, G. M. M. (1991). An Appraisal of Fertilizer Adoption: A case study of Selected Farms in Ndokwa Local Government Area of Bendel State, Nigeria. *Abraka Journal of Agriculture*. 1(1) Pp 92 – 102.