FOOD SECURITY AND ECONOMICS OF INNOVATION IN MAIZE PRODUCTION: A CASE STUDY OF ADOPTION OF DROUGHT TOLERANT MAIZE VARIETY IN KWARA STATE, NIGERIA

[ab*]O. E.Ayinde, [b]M. Muchie [c]T. Abduolaye [d]G. Olaoye,[e]J. Akangbe, [e] and [a]Folorunsho, O. J

[a]*Deptartment of Agricultural Economics and Farm Management, University of Ilorin, Kwara State Nigeria*

[b]*Institute for Economic Research on Innovation, Tshwane University of Technology, Pretoria, South Africa*

[c]*International Institute of Tropical Agriculture (IITA), Ibadan*

[d]*Department of Agronomy, University of Ilorin, Nigeria*

[e]*Department of Agricultural Extension and Rural Development, University of Ilorin, Kwara State Nigeria*

Selected Poster prepared for presentation at the Agricultural & Applied Economics Association's 2013 AAEA & CAES Joint Annual Meeting, Washington, DC, August 4-6, 2013.

FOOD SECURITY AND ECONOMICS OF INNOVATION IN MAIZE PRODUCTION: A CASE STUDY OF ADOPTION OF DROUGHT TOLERANT MAIZE VARIETY IN KWARA STATE, NIGERIA

[a]*O. E.Ayinde, [b]M. Muchie [c]T. Abduolaye [d]G. Olaoye,[e]J. Akangbe, [e] and [a]Folorunsho, O. J

[a]*Deptartment of Agricultural Economics and Farm Management, University of Ilorin, Kwara State Nigeria*
[b]*Institute for Economic Research on Innovation, Tshwane University of Technology, Pretoria, South Africa*
[c]*International Institute of Tropical Agriculture (IITA), Ibadan*
[d]*Department of Agronomy, University of Ilorin, Nigeria*
[e]*Department of Agricultural Extension and Rural Development, University of Ilorin, Kwara State Nigeria*

[1]E- mail: opeayinde@yahoo.com; opeyemi@unilorin.edu.ng; AyindeOE@tut.ac.za

Selected Poster prepared for presentation at the AAEA & CAES Joint Annual Meeting Washington DC, USA, *4-6 August, 2013.*

INTRODUCTION

Food insecurity remains one of the most visible dimensions of poverty and is generally the first sign of extreme destitution. Fighting poverty; ensuring food and nutrition security while protecting the environment still remains as a major challenge facing the global development practitioners (Ayinde et al 2012). Food access is closely linked to food supply, so food security is dependent on a healthy and sustainable food system. The food system includes the production, processing, distribution, marketing, acquisition and consumption of food. In the past, producer cooperatives and state farms were the main users of improved agricultural technology However in recent years individual farmers have started to adopt and use improved technologies including machenireis and planting of improved seed varieties. International agricultural research institutes and collaborating national partners have developed a number of improved technologies in Nigeria. However, many farmers show different attitudes towards the adoption of these agricultural technologies and this has greatly affected the availability of food in the economy. There is a need for proper diffusion of innovation to farmers because agricultural production still remains the main source of livelihood for most rural communities in developing countries and Sub-Saharan Africa in particular. Maize (Zea mays) is an important staple cereal crop in many countries of Sub-Saharan Africa. Considering the great demand for maize, research institutions such as the International Institute of Tropical Agriculture(IITA) in Nigeria, have developed technologies for increased maize production in order to meet the growing demand for maize at all seasons. Given the recent rise in international maize and fertilizer prices, there is mounting pressure to increase yield and yield stability in environments where there are real risks to production from drought (Greg 2008).Variability in rainfall(and hence in drought) seems likely to increase as the effects of climate change are more fully felt. As temperature rise and fall patterns change, additional losses of maize grain may approach 10million tons/year, currently worth almost 5bn. Drought and heat tolerant crops will play an increasingly important part in adapting to this variation and the long term underlying trend towards a hotter and probably drier production environment (Greg 2008). Drought has become a serious threat to maize production in Nigeria causing losses in yield. Drought remains one of the most limiting factors to maize production in Nigeria, therefore to ensure and improve maize production profitable to resource poor farmers,' research on drought tolerant maize (DTM) is critical. Developing maize varieties with tolerance of drought will boost maize production in Africa, a continent where the crop is among the major staples (Abdoulaye et al 2009). The release of more than 8 improved drought tolerant maize varieties in Nigeria since 2009 has sparked optimism for increased maize production, especially as the varieties are meant to overcome major constraints facing its cultivation in the sub-regions such as drought. Hence a need to study the adoption of the drought tolerant maize variety.

The study objectives are to:

- ❑Analyze the socio-economic characteristics of maize producers,
- ❑Assess the rate of adoption of drought tolerant maize variety,
- ❑Evaluate factors influencing the adoption rate of drought tolerant maize variety

METHODOLOGY

The study area is Kwara State of Nigeria which is situated in the West African region. Primary data were collected with the used of comprehensive questionnaires. Multi-stage random sampling technique was employed in the data collection The analytical techniques that were used include: Descriptive statistics, and logistic Regression analysis.

The logistic regression function was used to identify factors influencing the rate of adoption of drought tolerant maize variety. According to Gujarat (1988), the model is specified as;

$$1n[p(x)] /(1-[p(x)]) = \beta_{\circ}+\beta 11+\beta 2X2+.B5X5+E1$$

Where X1- Farm size, X2- Education, X3- Extension contact, X4- Farmer's asset, X5- Family size (number of adults), E1- Error term.

Figure 1: Adoption Rate of Maize Varieties

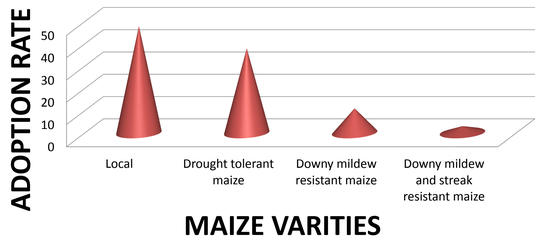

Table 1: Result of Logit Model

Variables	B	S.E	Sig.
Constant	.878	0.743	0.237
Farm Size	-1.850**	0.576	0.001
Education	0.031**	0.031	0.043
Extension Service	1.452**	0.631	0.021
Farmer Asset	01.696**	0.715	0.018
Family Size	-1.929**	0.579	0.001

** (*) denotes rejection of the hypothesis at 5% (1%) significance level.

RESULTS AND DISCUSSION

Seventy one percent (74%) of respondents were male and twenty nine percent (29%) female. More than 52 % of respondents are more than 40years of age. Furthermore, ninety one percent (91%) of the farmers were married while five percent (5%) were single. This shows that the farmers are responsible since marriage entails special obligations. In regards to the educational background, farmers that have no education were eight percent, farmers with primary education were forty eight percent while fifteen percent of the farmers had secondary education, nine percent had tertiary education and twenty percent has other type of education. The response to innovation (DTM) may not be a function of farmer's exposure to formal education only. The study shows that about 68% of respondents has more than 6 members in their households. Forty six percent of the farmers were engaged in farming as their primary occupation, twenty percent for trading, sixteen percent for contractor and eighteen percent for carpentry. Although further examination reveals that other respondents having other occupation in addition to than farming as their primary occupation, they still have farming as their secondary occupation. The results show that forty percent of the farmers have contact with extension agent, while sixty percent has no contact with extension agent. Contact with extensions services is expected to increase adoption of drought tolerant maize varieties as previous findings of Obeta and Nwagbo (1991), indicate that frequent contact with extension agent is likely to minimize doubts among farmers and ensure timely purchase of inputs.

In accessing the rate of adoption of Drought tolerant maize variety and other high yielding maize varieties, the study shows that apart from local maize, drought tolerant maize variety has the highest rate of adoption (Figure 1).

The result of the logit analysis in Table 1 revealed that five variables were found to be significant in relation to the adoption of drought tolerant maize variety. These Variables are farm size, education, extension service, farmer asset and family size. Hence these variables determines choice and rate of the maize farmers in adopting of drought tolerant maize variety. This implies that the more the contact with the extension agents the more the adoption rate. Also the higher the education and assets the higher the adoption rate. Unlike the family size and farm size that are negatively related with rate of adoption.

CONCLUSION AND RECOMMENDATIONS

It was revealed from the study that rate of adoption of drought tolerant maize variety is higher than that of other high yielding maize varieties. The regression analysis showed that the rate of adoption of drought tolerant maize variety is affected by the farm size, education, access extension service, farmer other assets and family size. Probability to adopt DTM can be increase by improved access to extension services and education to farmers. The study also suggest that those with higher amount of assets are more likely to adopt. On the other hand, larger family size and farm size were being shown as negatively correlated to adoption to drought tolerant maize in this case. Hence the study recommends:

- ➢ Increase in the number of extension agents who would help introduce drought tolerant maize variety to farmers
- ➢There should be increased awareness on the need to embrace modern technologies and innovations for the transformation of the maize production in the country and consequently raise farmers' standard of living.
- ➢ More investment in adult education to increase farmers' level of education
- ➢ Continue promotion of intensification of agrricultyural production since study shows that those with smaller and are also adopters of improved drought tolerant maize varieties.

ACKNOWLEDGEMENTS

The authors acknowledge and appreciate South African Chair in Tshwane University of Technology, Institute for Economic Research for Innovation for partly fund of 10,000 Rand for collection of data in this project. They also appreciate the DTMA committee at University Ilorin working on the DTMA Project coordinated by International Institute for Tropical Agriculture (IITA), Ibadan under Prime Agreement from CIMMYT for their support during this project.

NOTE THAT THE STUDY IS ON GOING research