The influence of extension contact and education on maize production in Niger State, Nigeria

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Abstract

paper examines the effect of extension contact and education on the output of maize farmers in Niger State, Nigeria. Primary data collected from 160 farmers selected using multi-stage random sampling technique during the 2006 cropping season and analysed g Ordinary Least Squares (OLS) multiple regression analysis. The OLS results reveal that land, labour, education and extension ct are the significant factors that accounted for observed variation in output. The study recommends that farmers should increase sizes so as to maximize output. Effective extension services and adult education programmes should also be strengthened in the

oduction

e (*Zea mays*) is a cereal plant of the of the tribe *Maydeas,* of grass family *Graminae.* It is one of the most important staple food s in Nigeria.

ultural extension service delivery world over has been concerned with communicating research findings and improved ultural practices to farmers. The efficiency with which these information and practices are conveyed to farmers has to a large being argued to be one of the catalysts that would increase agricultural productivity. Education is also believed to raise the ical competence of the farmers and enable them cope with the complexities associated with the adoption of improved ology.

ffects of extension contact and education on farmers' productivity are widely acknowledged (Duraisamy, 1992 and Seyoum, *et* 98). Many studies have revealed that the level of education helps farmers use production information more efficiently, as a more ed farmer acquires more information and to that extent is a better producer (Philips, 1994; Wang *et al,* 1996 and Yang, 1997). evel of farmers' education is believed to influence the use of improved technology in agricultural production and hence farm tivity. Durojaiye and Olanloye (1992) and Awolola, 1995 in particular, reported that education contributed positively and icantly to agricultural production in Ogun and Kaduna States of Nigeria.

ye (2005) maintained that a strong linkage complemented by flawless information flow, will significantly boost agricultural tion and improve rural livelihoods in developing countries. Similarly, Munyua (2000) indicated that the success of the green ion in Asia and the near East for instance, indicates that giving rural communities access to information, knowledge, ogy and services will contribute to sustainable agriculture. To succeed however, will require an effective tripartite partnership n the government, the private sector and the civil society so as to help nurture a receptive culture and framework among the segments of the society. Rural communities require information among others on supply of inputs, new technologies, early g systems (drought, pests and diseases), credit, market prices and their competitors (Ozor, 2005).
he empirical evidence of the influence of extension contact and education on farmers' production activities, the objective of per is to examine the effects of these farmer-related factors, namely, extension contact and education on the output of maize in State, Nigeria.

sis: The following hypothesis was statistically tested:
b_i =0, which means that the estimated coefficients of extension contact and education equal to zero, i.e the two variables have efficients.

h methodology

ea: This study was carried out in Niger State, Nigeria. Niger State lies between latitude 9°36' north and longitude 6°20'. ng to the 2005 population census, Niger State has a population of 3,421,581 people. The state covers a land area of 92,800 h represents about 10% of the total land area of Nigeria. About 85% of this total land area is arable. There are two distinct The rainy and the dry seasons respectively. The temperatures range between 21°C-37°C. Annual rainfall varies from n the northern part of the state to 1,600mm in the south. The state is presently administered under the constitutional 25 local nt area structure. There are two distinct seasons: the rainy and the dry seasons respectively. Farming is the primary on. The major crops grown include; maize, cassava, yam, millet, melon, cocoyams, potatoes, groundnut, guinea corn and

Sampling design and data collection: The sampling method used is the multi-stage random sampling technique so as to get a representative sample. The Agricultural Development Project (ADP) zones formed the first stratum for sampling. There are three agricultural development project zones in the state namely: Bida (Zone I), Kontagora (Zone II) and Kuta (Zone III). Out of these one ADP zone, namely, Bida Agricultural Zone was selected using the simple random sampling procedure. The second stage involved choosing three local government areas (LGAs) namely, Katcha, Lavun and Badeggi. The third stratum was the villages from where two villages each were randomly selected from each of the three LGAs. The sampled villages include: Egbati Nagi, Emi Tsowa (Katcha LGA), Chanchaga and Doko (Lavun LGA) as well as Kataeregi and Kansanagi (Badeggi LGA). The last stage is the household level, from where twenty households each randomly selected, giving a total sample size of 120.

Primary data were generated for this study through a farm management survey. Most of the data were collected on weekly three monthly basis during the 2006 production season. The data collected from the rural households through the use of well structured questionnaire with the help of trained ADP enumerators under the supervision of the researchers. The livelihood, economic, demographic and input-output data constituted the bulk of the data collected.

The empirical model: It was hypothesized that maize production is influenced by a number of production and farmer-specific factors. Thus, the estimated function is not strictly speaking, a production function.

In implicit form, the model is specified as follows:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e) \quad (1)$$

where Y= Total output of maize (tons)

X_1 = Farm size (hectares)

X_2 = Labour input (mandays)

X_3 = Fertilizer input (kg)

X_4 = Capital input (naira)

X_5 = Other inputs such as improved seeds, agrochemicals etc (naira)

X_6 = Age of farmer (years)

X_7 = Level of education (number of years spent in school)

X_8 = Extension contact (number of meetings with extension agent during the production season)

X_9 = Years of farming experience (number)

Explicitly, the model is specified as:

Linear:

$$Y = \delta_0 + \delta_1 X_1 + \delta_2 X_2 + \delta_3 X_3 + \delta_4 X_4 + \delta_5 X_5 + \delta_6 X_6 + \delta_7 X_7 + \delta_8 X_8 + \delta_9 X_9 + e \quad (2)$$

Double-log:

$$\ln Y = \delta_0 + \delta_1 \ln X_1 + \delta_2 \ln X_2 + \delta_3 \ln X_3 + \delta_4 \ln X_4 + \delta_5 \ln X_5 + \delta_6 \ln X_6 + \delta_7 \ln X_7 + \delta_8 \ln X_8 + \delta_9 \ln X_9 + e \quad (3)$$

Exponential:

$$\ln Y = \delta_0 + \delta_1 X_1 + \delta_2 X_2 + \delta_3 X_3 + \delta_4 X_4 + \delta_5 X_5 + \delta_6 X_6 + \delta_7 X_7 + \delta_8 X_8 + \delta_9 X_9 + e \quad (4)$$

Semilog:

$$Y = \delta_0 + \delta_1 \ln X_1 + \delta_2 \ln X_2 + \delta_3 \ln X_3 + \delta_4 \ln X_4 + \delta_5 \ln X_5 + \delta_6 \ln X_6 + \delta_7 \ln X_7 + \delta_8 \ln X_8 + \delta_9 \ln X_9 + e \quad (5)$$

Variables X_1-X_9 are as previously defined, δ_0 is the constant term, δ_0-δ_9 are regression parameters estimated econometrically, ln is the natural logarithm and e is the error term. Four functional forms namely the linear, double-logarithmic, semilog and exponential were estimated econometrically and the lead equation chosen on the basis of the relative magnitude of the coefficient of multiple determination (R^2), parsimony of the variables as well as the signs, magnitudes and significance of the regression parameters, based on normal econometric, economic and statistical criteria.

Results and discussion

The average sampled respondent is 43.7 years old, had at least quranic education and had eight family members. Furthermore, he cultivates 0.8 hectares, usually operated an average number of three farms and had an average of two contacts with either an extension agent or a contact farmer. About 76 of the maize farmers used fertilizer. The mean quantity of fertilizer used was 55.40kg per hectare.

The estimated parameters and the relevant statistical test results obtained from the analysis are presented in Table 1. The semi-log was the lead equation and was therefore used for further discussion. It had an R^2 value of 0.791. This implies that about 79.1% of the variation in maize output (Y) is accounted for by the variables (X_1-X_9) included in the model, while the remaining 20.9% is as a result of non-inclusion of other explanatory variables in the model. The F-ratio is positive and statistically significant at the 0.01 level indicating that the variables included in the model adequately explained the output of maize in the survey area. Out of the 9 variables modeled, only 4 were found to be statistically significant at explaining maize output, namely, land, labour, education and extension contact.

ble 1: OLS multiple regression estimates of the factors affecting maize production in Niger State, 2006

riables	Semi-log	Linear	Double log	Exponential
nstant term	713.832	32.509	6.106**	5.384***
	(0.742)	(0.268)	(2.467)	(18.380)
rm size	429.618***	278.562***	0.666***	0.330**
	(4.967)	(4.227)	(2.999)	(2.920)
bour	241.932***	1.281***	0.685***	0.003**
	(3.002)	(4.418)	(3.304)	(4.652)
lizer	-85.313	0.235	0.257	-0.000
	(-1.397)	(0.641)	(1.106)	(-1.330)
al inputs	-7.897	-0.419	-0.685	-0.004
	(-0.378)	(-0.419)	(-1.600)	(-0.421)
ng materials	-8.135	0.003	-0.373	0.000
	(-0.241)	(0.132)	(-0.430)	(0.511)
	-49.784	-0.162	-0.044	0.001
	(-0.953)	(-0.272)	(-0.324)	(0.315)
ation	449.254***	-3.864	-0.052	-0.019
	(2.702)	(-0.633)	(-0.967)	(-1.311)
sion contact	277.815***	-3.481	-0.232	-0.011
	(3.081)	(-0.629)	(-1.474)	(-0.781)
ng experience	4.419	-0.579	-0.069	-0.005
	(0.098)	(-0.289)	(-0.603)	(-0.940)
	0.791	0.769	0.620	0.605
usted	0.766	0.745	0.574	0.566
stics	31.210***	33.203***	13.430***	15.326***

omputed from survey data, 2006.

***, ** and * implies significance at the 0.001, 0.005 and 0.10 levels respectively;
in parentheses are the respective t-ratios.

ficient for farm size (X_1) is 429.618 and was found to be statistically significant at 1% level. This implies that there is a relationship between farm size and yield of maize. *Larger farm size coupled with good managerial practices will translate into puts. Small holder farmers are known to cultivate small pieces of fractionalized farm lands of between 0.1- 1.0 hectare and e more than one plot in scattered locations. Labour is the human effort employed in production* and is vital in agriculture. r referred to in this study is both the family and hired labour. The amount of labour in man days was found to be statistically nt at 1% in explaining the output of maize .The coefficient for labour variable is 241.932. This implies that there is a positive ip between output of maize and labour input in man days. Most farmers in Nigeria are known to be characterized by over n human labour to accomplish their various farm operations and the labour is usually provided by the members of a farm

ficient of the education variable is estimated to be positive as expected and statistically significant at the 0.01 level . The n is that, maize farmers with more years of formal schooling tend to be more efficient than their counterparts who had little ucation, presumably due to their enhanced ability to acquire technical knowledge which enables them allocate scarce more efficiently to maximize output. Amaza and Olayemi (2000) found that education positively influenced the technical, e and economic efficiency of food crop producers in Gombe State, Nigeria .

y, the coefficient of extension variable is estimated to be positive and statistically significant at the 0.01 level. This indicates sed extension services to farmers tend to increase the level of output realized by the farmers. Extension visits are vital in ning because it affords the farmer the opportunity to learn improved technologies and discover how to acquire needed inputs and services. Consequently, extension services variable was therefore found to have exerted a positive influence on of maize in the survey area.

pothesis: The estimated coefficients are presented in Table 1. The hypothesis which specifies that extension contact and variables have zero coefficients is hereby rejected. This implies that the estimated coefficients for the two variables do not ero and that extension contact and education contributed significantly in maize production in Niger State.

n and policy recommendations

and education were found to have positively influenced maize production in Niger State. The adoption of new technology sion has the potential of revolutionalizing and bringing about the much advocated agricultural transformation. It is ded that government should encourage formal education as a means of boosting food crop production. However, as a short

term measure, informal education could be effective for farmers who have had little or no access to formal education. Also, effe[...]
and or farm advisory services should be strengthened in the state.

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