

DETERMINANTS OF ADOPTION OF IMPROVED PRACTICES AMONG SORGHUM FARMERS IN MICHIKA LOCAL GOVERNMENT AREA, GONGOLA STATE, NIGERIA

PETER M. BZUGU*
CHRIS O. IGODAN**

ABSTRACT

The study reported in this paper shows the variables of education, loan availability to farmers, motivation and awareness of information on improved farm practices and influence to accept to be significantly related to adoption of recommended farm practices.

A further analysis using stepwise regression procedure reveals that these variables, taken together explain about 8.2% variability in adoption behaviour.

I . Introduction

The need to increase food production has made the Nigerian government to undertake measures and establish programmes to encourage farmers to adopt innovations. This follows the recognition, that use of improved farm practices lead to increased farm output. However, observations revealed that farmers still use traditional methods of sorghum (Guinea corn) production.

In Michika Local Government Area of Gongola State, sorghum is the staple food crop. Presently, sorghum is used as raw material in livestock and in the brewing industry where it serves as a replacement for barley which has been banned from importation. This has consequently resulted in immense economic opportunities for farmers that engage in sorghum production.

Moreover, to enhance farmers' production, the National Cereals

*Department of Agric. Economics & Extension, University of Maiduguri, Maiduguri Nigeria.

**Department of Agricultural Extension, University of Ibadan, Ibadan, Nigeria.

Research Institute, Badegi, recommended some farm practices for sorghum production. These practices which have been promoted by Extension Research and Liaison services (ERLS) and Gongola Agricultural Development Project (GADP) include land preparation, high yielding varieties (SK5912, KSV7, L1499 and L141), seed rate (10kg/ha at 3 - 5 seeds / hole), spacing (45 cm apart along rows/ridges, 90cm apart), Time of planting (June), use of herbicide (e.g. sogopruni) and use of fertilizers.

The efforts of the government has been directed towards farmers in the area as well as involving them in agricultural activities to improve their productivity. These efforts were carried out with the aim that farmers will adopt the innovations introduced. Although, this strategy may have appeared laudable, this intention has not reflected in the adoption behaviour of the farmers. Thus, it becomes necessary to study the determinant factors underlying adoption of improved practices by the farmers with respect to sorghum production in this locality.

II . Theoretical Framework

The concept of information diffusion to explain adoption behaviour among farmers have been well documented by Rogers and Shoemaker (1971). Galjart (1968), Sing and Jha(1965), Emery and Oeser(1960) reported that social status, level of education, contact with extension agents and other personal sources of information, age and farm size were significantly related to adoption. Similar findings were reported by Lionberger and Coughenour (1957), Fliegel (1969) and Sahay(1960). Other investigators found that young and middle aged farmers with medium and large sized farms adopt more improved farm practices than older farmers (Motilalkar, 1967). Singh and Shankariah(1967) also reported that farm size, socio-economic status and education was significantly related to adoption. Barnett (1953) and Roy (1966) stated that cost, profitability, compatibility and efficiency influence the adoption of improved farm practices. Hodgdon and Singh(1966) reported that lack of credit facilities, personal and social characteristics and marketing facilities are associated with adoption.

In the southern part of Nigeria, several studies carried out have shown relationships between farmers' characteristics and adoption behaviour. For instance, Alao (1971) in his study of Ekiti Division, found that fragmentation of farm holdings, and farm size have positive and significant association with farmers' adoption. Basu (1969) found that farm size, tenure system, contact with Extension Agents and full time farming were associated with the adoption of farm practices. Clark and Akinbode (1968) reported that out of the factors considered in their

study, age, level of education, family size and social participation were associated with adoption. In a study by Patel and Anthonio (1971), it was revealed that farm size and family size also affect adoption. Williams and Alao (1972) in their evaluation study in Western Nigeria, found that most farmers investigated were unable to adopt many of the package recommendations because the recommended practices were too expensive.

Studies in the Northern Nigeria have shown significant relationships between levels of literacy and education, contacts with Extension Agents and urban centres, socio-economic status, empathy and leadership roles in agricultural matters and adoption (Yoh, 1982). Igodan *et al.* (1988), in their study of Kainji Lake Basin, found occupation, family size, levels of education, literacy, social participation and contact with Extension Agents to be significantly related to adoption. These studies in Northern Nigeria reveal the paucity of data to generalise the adoption behaviour of the farmers. From these research findings, it has been shown that adoption is being influenced by personal, socio-psychological, situational, stimulus variables and activities of change agents.

III . Methodology

The target population for this study were the sorghum farmers in fifty, predominantly farming villages of Michika Local Government Area, Gongola State. Report on the Agronomic survey of Gongola Agricultural Development Project (GADP) provided the list of villages and farm families used as the sampling frame in the study. Of this number, sixteen experimentally accessible villages were randomly selected from the fifty villages. A total of one hundred and sixty ($n = 160$) farmers were chosen to participate in the study.

The data for the study were collected from primary and secondary sources. Primary data were obtained from the questionnaires administered to the farmers by the Extension Agents in Michika Local Government Area. Secondary data were gathered from the records of the Gongola State Ministry of Agriculture (MOA), Gongola Agricultural Development Project (GADP) and Federal Agricultural Coordinating Unit (FACU), Ibadan. Out of one hundred and sixty (160) questionnaires administered to the respondents, one hundred and fifty (150) were completed with useable data for analysis.

Operationally, the adoption rate of the farmers was defined as the number of farm practices adopted without reference to sequence of adoption and time. A farmer was classified as having adopted, if he indicates the practice adopted. Using item analysis, the farmers who were high adopters were separated from low adopters. Each practice

TABLE 1 Intercorrelation between Selected Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Age	1.0000											
Education	-0.26768	1.0000										
Occupation	0.24013	0.06977	1.0000									
Land tenure	-0.20096	0.10850	0.05109	1.0000								
Farm size	0.34153	-0.22261	0.15720	-0.18442	1.0000							
Awareness	0.11562	-0.09534	0.00246	-0.01494	-0.07361	1.0000						
Loan	0.03490	0.02230	-0.02333	-0.17076	-0.10294	0.00067	1.0000					
Farm organization	-0.00061	0.03984	0.00137	-0.03160	0.03865	0.0116	-0.04958	1.0000				
Purpose of Production	0.03755	0.11357	0.2232	0.15498	-0.03063	0.08011	0.22797	0.03994	1.0000			
Influence to accept	0.11484	0.03145	0.17093	-0.01539	0.02011	-0.02681	0.02271	0.11598	0.41761	1.0000		
Benefit from farming	-0.06779	0.12342	-0.02582	0.11339	-0.0892	0.18642	0.03889	0.05998	0.33830	0.44687	1.0000	
Adopifon	0.01619	0.16400*	-0.03911	-0.00313	-0.01271	0.11083*	-0.11433*	-0.02836	-0.00492	-0.1486*	-0.0447	1.0000

* Variables significantly related to adoption at 0.05 significance level.

adopted was assigned one point, and the scores on this variable (adoption index) ranged from 1 to 7. The constructed index was used as the dependent variable.

To organise and summarise the data, frequency distribution and chi-square test was used to indicate the extent of relationship between selected variables and adoption of improved farm practices at the *a priori* 0.05 level of significance. For testing the relationship between selected variables and adoption, simple correlation analysis was used and the stepwise multiple regression procedure was used to determine the predictive power of the independent variables found to be associated with the adoption behaviour of farmers.

IV . Findings : Intercorrelation between Selected Variables and Adoption

Table 1 shows the intercorrelation between selected variables and adoption. Most of the variables in the matrix are low and negatively related to adoption. Of all the variables studied, only four were found to be significantly related to adoption of innovations. These variables were education ($r = 0.16$), awareness ($r = 0.11$), loan ($r = -0.11$) and influence to accept ($r = -0.14$). The relationship between these four variables and adoption were found to be either negative or positive with considerably low coefficients. When the significant variables were entered in a stepwise regression analysis to determine that which best predict adoption behaviour of farmers, education was found to explain 2.69% of the variability in adoption. This was closely followed by influence to accept (2.40%), awareness (1.64%) and finally loan (1.48%). The total variability explained was only 8.21% which indicates the contribution of these four variables to adoption behaviour (Table 2).

The low variability explained by the variables in this study may show that other high polynomial variables not studied may be just as important in explaining adoption behaviour. In view of this, there is need to improve upon the measures and include more variables in the regression model.

TABLE 2 Summary of Stepwise Multiple Regression Analysis of Adoption on Some Selected Variables

Variable	B	MR	R ²	R ² Change	%	F-Value*
Education	0.2787	0.1640	0.0269	0.0269	2.69	3.59
Influence to accept	-0.1710	0.2256	0.0509	0.0240	2.40	3.78
Awareness	-0.5128	0.2596	0.0673	0.0164	1.64	3.39
Loan	-0.6051	0.2865	0.0821	0.0148	1.48	3.13

*P < 0.05

V . Conclusion and Implications

The study concludes that farmers adopt new farm practices only when it will satisfy their needs, irrespective of their educational levels. The low educational levels affects the farmers in the use of print media. Land tenure system, which determines the performance and improvement of any farming system, does not appear to be conducive to individual producers to make long term investments in land. The farm productivity of the farmers makes difficulty for them to save or to make any productivity increasing investment from personal sources. There is no agro-allied industry and adequate market information for the farmers about the demand of the crop else where.

There are some recommendations for sorghum production which appear impracticable from the point of view of the farmers. Such recommendations include land preparation and use of herbicides. One would appreciate this with regards to the conditions under which they operate. In view of farmers' meagre resources, high cost of tractor hiring services, high cost of herbicides and lack of credit facilities, it would be difficult for sorghum farmers to adopt these recommendations.

Drawing largely on the results of the analysis of the study, the recommendations made include: Effective research and Extension linkages should be strengthened, so that research scientists become aware of the agro-socioeconomic environments in which their research findings will be utilized. Credit facilities should be made available to farmers and disbursed in kind, while crop insurance should be encouraged. The latter may encourage farmers to embark more readily on substantial expenditures for new farm technologies. It may also reduce the risk of loan defaulting by farmers. Other recommendations are; formation of institutions for servicing new agricultural inputs and for marketing farm products, and since knowledge has been established as a crucial factor in adoption by farmers, adult and extension education activities should be more vigorously pursued to ensure better adoption.

REFERENCES

- Alao, J. A., *Community Structure and Modernization of Agriculture: An Analysis of Factors Influencing the Adoption of Farm Practices among Nigerian Farmers*, Unpublished Ph. D dissertation, Cornell University, Ithaca, New York, 1971.
- Basu, A. C., "The Relationship of Farmer's Characteristics to Adoption of Recommended Farm Practices in Four Villages of Western State of Nigeria." *Bulletin of Rural Economics and Sociology*, Vol. 4, No. I, 1969.
- Barnett, D.M., *Innovations*, McGraw-Hill Book Company, New york, 1953.

- Clark, R.C. and Akinbode, T.A., Factors Associated with Adoption of Farm Practices in Western Nigeria. *Research Bulletin*, No. 1, Faculty of Agriculture, University of Ife, Ile - Ife, 1968.
- Emery, F.C. and Oeser, O.A., "Information, Decision and Adoption," *American Journal of Sociology*, No. 65, 1960.
- Galjart, B.F., *Old Habbits and New Practices in Brazilian Land Settlement*, Wageningen. The Netherlands Centre for Agricultural Publishing Documentation, 1968.
- Fliegel, F.C., "Community Organisation and Acceptance of Change in Rural India." *Rural Sociology*, Vol. 34, No. 2, 1969, pp. 167-198.
- Hodgdon, L. L. and Singh, Harpal, *Adoption of Agricultural Practices in Madhya Pradesh*. NICD, Rajeev - dranager, Government of India, Hyderabad 30 (A.P), 1966.
- Igodan, C.O., Ohaji, P.E. and Ekpere, J.A., "Factors Associated with the Adoption of Recommended Practices for Maize Production in Kainji Lake Basin of Nigeria." *Agricultural Administration and Extension*, No. 29, pp.149 - 157, 1988.
- Lionberger. A. F. and Coughenour, C.M., "Social Structure and Diffusion of Farm Information in Columbia. *Missouri Agricultural Experimental Station Research Bulletin*, 631, 1957.
- Motilalkar, C., *The Adoption Process and the Adopter Categories of Some Improved Practices in Paddy Cultivation in Western Bengal Village*. College of Agriculture, Rdjeudranagar, Hyberabad, 1967.
- Patel, A.U. and Anthonio, O.B.O., "An Analysis of Selected Factors That Influence the Adoption of Improved Practices among Tobacco Farmers in Western State of Nigeria," *Nigerian Agricultural Journal*, Vol. 8, No. 2, 1971.
- Roy, R.N., *A Study of Characteristics of Improved Farm Practices as Related to Adoption*. I.A.R.I., New Delhi, India, 1966.
- Rogers, E.M. and Shoemaker, F.F., *Communication of Innovations; A Cross Cultural Approach*. The Free Press, New York, 1971.
- Sahay, R.R., Role of Size of Farm, Farm Income and Farming Efficiency in Adoption of Improved Agricultural Techniques. Unpublished M.Sc Thesis, Sabour, Bihar Agricultural College, Bihar University, 1960.
- Singh, B.N. and Jha, R.N., "Utilization of Sources of Farm Information in Relation to Adoption of Improved Agricultural Practices," *Indian Journal of Extension Education*, Vol. 1, No. 1, 1965.
- Snigh, K.N. and Shankariah, C.H., "Factors Related to the Adoption of Improved Practices of Vegetable Production" *Interdiscipline*, Vol. 4, No. 3, 1967, pp. 207 - 218
- Voh, J.P., A Study of Factors Associated with the Adoption of Recommended Farm Practices in a Nigerian Village." *Agricultural Administration*, Vol. 9, 1982. pp.17 - 27.

- Williams, S.K.T., "Sources of Information on Improved Farm Practices in Some Selected Areas of Western Nigeria." *Bulletin of Rural Economics and Sociology*, Vol. 4, No. 1, 1969, p.30.
- Williams, S.K.T. and Alao, J.O., "Increasing Food Crop Production in the Seventies: Evaluation of the Maize/Rice Project USAID/MANR Western State of Nigeria - The Case of Farmers." *Proceedings of Agricultural Society of Nigeria*, Vol. 9. 1972.