DETERMINANTS OF ACCESS TO NCAM PROVEN TECHNOLOGIES ACROSS THE SIX GEO-POLITICAL ZONES

Abdulquadri, A. F., Mohammed, B. T., Daramola, R. B. Ashaye, W., Omisore, J. K.and Oserei, M. K.
National Centre for Agricultural Mechanization (NCAM), Km. 20 Ilorin-Lokoja Highway, P.M.B. 1525, Ilorin Kwara State
abdullahiabdulquadri@gmail.com

ABSTRACT

The overall objective of this study was to assess the determinants to access National Centre for Agricultural Mechanization (NCAM) Proven Technologies across the six geo-political zones. The study was conducted through the use of a well-structured open and closed ended questionnaire administered through interview schedule to 200 respondents selected using a multistage sampling technique. The data collected were analyzed using both quantitative and qualitative statistics and linear multiple regression analysis. The findings from the study clearly show that the socio-economic characteristics of the 200 respondents are a major determinant in accessing agricultural technologies. More so, cooperative societies, household size, and educational status have positive relationship with access to information on agricultural technology; this has led to adoption of these proven technologies. The study also revealed that there is either limited impact of extension agents or lack of cooperation between NCAM and extension agents in the study area, only few (5%) of the respondents claimed that they source their information from extension agents.

KEYWORDS: NCAM, Agricultural Technologies, Determinants, Processing Centers.

1. INTRODUCTION

The conventional view of agricultural development sees agriculture as the prime engine of growth and poverty reduction in poor countries. The view emphasizes small farm agriculture growing modern variety of cereal staples in relatively high potential and well-connected areas and supports the idea that agricultural development has to be based on increasing productivity of smallholder producers. In this context, limited access to the technologies that assist farmers in improving their production and later in selling their products thus causing low productivity, post-harvest losses and persistently low household income, is considered one of many reasons making farmers vulnerable to poverty.

For years, scientific and technological advancements have benefited farmers in the industrialized world by driving agricultural production. However, smallholder farmers who are responsible for 80 percent of the food in the developing world have yet to see similar gains. These farmers, the majority of whom are women, lack access to many of the tools needed to be successful, such as modern irrigation practices, crop management products, fertilizers, postharvest loss solutions, improved seeds, mobile technology, as well as access to information and extension services (Committee, 2011). Innovation in the Nigerian agricultural sector offers promises of improving farmers' lives, feeding and nourishing more of our population, and consequently, improving the political, ecological, and economic stability of the country. Through these tools and through much greater investment in agriculture, we can move toward more sustainably curbing global hunger and malnutrition around the world by dramatically increasing productivity yields, conserving food by substantially reducing postharvest losses and food wastage, giving farmers

access to real-time information and services in the field, and even improving the nutritional content of foods.

The use of agricultural technologies not only affects the rate of increase in agricultural output, but also determines how the increase in agricultural output impacts on poverty levels and environmental degradation. Therefore, the focus of recent research has been to find better agricultural practices, discovering new strains of crops, improvements of land, soil and water management practices (Agriculture, 2015; Mwangi and Kariuki, 2015). However, the only way for smallholder farmers to benefit from these research station technologies is if they perceive them to be appropriate and proceed to implement them on their farms.

Increased agricultural productivity, technology adoption rates, and household food security and nutrition can be achieved through improved agricultural practices, expansion of rural financial markets, increased capital and equipment ownership by rural households, and development of research and extension linkages (von Braun, 1999). Increased technology development and adoption can raise agricultural output, hence improved household food intake. Improved food intake can also improve the functioning of the human body and the performance of a healthy, normal life which will increase work output (Nwankwo, 2017). Therefore, increase accessed to developed technology may result in high rate of adoption of the technologies and thus reduced labour demands.

The Nigerian agricultural sector is predominantly dominated by resource-poor farmers who still practice the traditional or subsistence agriculture in which simplest traditional tools are being used. The output and productivity are low, capital investment is minimal, while land and labor constitute principal factors, thus culminating in the "law of diminishing return" – high labor and input applications but low returns. According to Galadima (2014) an enormous gap exists between available knowledge of improved technology and actual practice which has had considerable negative effects on food production.

Farmers in Nigeria are faced with some difficulties in using the required mechanical tools to implement mechanization on their farms and processing of their produce. Some of these difficulties are policy and monetary in nature (namely, government support policies and access to bank loans), and some other difficulties are structural and infrastructural in character (such as subsistence farming, nature of the land: topographical and geometrical shapes and small land holdings). In addressing some of these challenges, NCAM has developed various types of adoptable and adaptable agro-processing technologies such as cassava processing technologies, rice processing technologies, integrated farm projects, etc., and rendering services such as land clearing services, tractor hiring services, etc. to ease the suffering of farmers and increase their productivity. Agricultural innovations are basically aimed at growing the various native crops to each diverse local area within the world's ecosystem. This diversity requires different agricultural technologies suitable for each local area. In this view, much effort have been made by NCAM to develop machines for specific agricultural production in each local area, and those attempts have been to a large extent successful in meeting demands of each rural farmer. However, it is essential to form an interrelated system in which researchers, developers, manufacturers, and distributors are engaged in collaborative efforts to solve farmers' problems locally (Rasouli, et al. (2009).

The National Centre for Agricultural Mechanization (NCAM) in her stride to improve the livelihood of farmers and ensure food security in the country has made tremendous efforts in Research and Development of simple agricultural technologies (Faleye et al., 2012). Also, from the study by Mohammed et al. (2014) carried out in Ifelodun Local Government Area of Kwara State, Nigeria with the objective promoting the adoption of NCAM agricultural processing technologies among farmers in the neighboring communities. These technologies have the potential to enable stakeholders to improve their yields and income, food security, and participation in the economy. Since the majority of the world's poor live in rural areas, lack of connection to information technology have limited access to many goods and services (Mgbenka et al., 2015). In this perspective, there is need to assess the determinants poised against rural farmers in accessing NCAM proven technologies.

2. METHODOLOGY

The study was conducted across the six geo-political zones where NCAM Processing Centers were established. A multi stage sampling technique was adopted for this study. Six states were purposively selected across the six geo-political zones; Kwara (North-Central), Akwa-Ibom (South-South), Kebbi (North-West), Borno (North-East), Ogun (South-South) and Imo (South-East). In the second stage six (6) communities each were randomly selected due to their proximity to the established processing centers making a total of 36 communities selected for the study. A total of 200 questionnaires were administered within the 36 communities using convenience sampling technique.

Data collected was analyzed using descriptive statistics presented in frequency table while multiple regression analysis was used to assess the determinants in accessing NCAM proven technologies across the six geo-political zones.

3. RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

Table 1. Socio-Economic Characteristics of the Respondents

VARIABLES	FREQUENCY (N=200)	PERCENTAGE
Gender		
Male	148	74.0
Female	52	26.0
Age		
<20	6	3.0
21-30	24	12.0
31-40	72	36.0
41-50	84	42.0
>50	14	7.0
Marital Status		
Married	154	77.0
Single	28	14.0
Widowed	18	9.0

Household Size		
≤3	62	31.0
4-6	108	54.0
7-10	30	15.2
Educational Status		
No formal Education	21	10.5
Arabic/Islamic Education	59	29.5
Adult Education	42	21.0
Primary Education	41	20.5
Secondary Education	21	10.5
Tertiary Education	16	8.0
Occupation		
Farming	73	36.5
Artisans	24	12.0
Trading	60	30.0
Civil servant	31	15.5
Student	12	6.0
Experience		
≤2years	15	7.5
3-5years	42	21.0
6-8years	41	20.5
9-11years	49	24.5
≥12years	53	26.5
Membership of Cooperative Society		
Yes	168	84
No	32	16
Source of Information		
Undecided	23	11.5
Media	29	14.5
Friends & family	52	26.0
NCAM staff	86	43.0
Extension agent	10	5.0
Patronage on NCAM Established Processing Centers		
Yes	171	85.5
No	29	14.5

Table one shows that majority of the respondents were male (74%), Singh et al. (2014) reported that gender affects technology adoption since the head of the household is the primary decision maker and men have more access to and control over vital production resources than women due to socio-cultural values and norms. Also, about 90% of the respondents were between age 21 and 50 years old, this shows that majority of the respondents belong to the active segment of the population, while the remaining 10% belong to the aged group. This age group has tendency of

having positive impact in accessing NCAM proven technologies by farmers in the study area. This age category is in line with those Solomon et al. (2012) referred to as economically active groups. About 77% 0f the respondents are married; this imply that farmers would likely place premium attention to NCAM processing technologies because of the awareness on their part that they have more responsibilities to attend to.

The distribution of household size among the respondents showed that majority of them (54.0%) had between 4 and 6 people per household. The respondents with household size ≤ 3 is 31.0% while that of between 7 and 10 had the lowest (15.2%). This is implied that respondents have a relative large family. A substantial proportion of the respondents (10.5%) had no formal education. Those with primary, Arabic, adult and secondary education constituted the highest percentage (81.5%) of the respondents. Only a small fraction of the respondents (8%) had post-secondary education. This supports the findings of Simpson and Owens (2003) who stated that the literacy level of farmers enhances the rate of adoption of improved technology. Majority (36.5%) of the respondents were full time farmers, 30.0% indicated trading to be their major occupation, while the remaining 33.5 % of the respondents were civil servants, artisans and students. This is in line with the findings of Obidike (2011), that majority of rural dwellers are farmers.

About 26.5% of the respondents had aboved 12 years of experience, 24.5% had between 9-11 years of experience, 20.5% had between 6-8 years of experience, 21.0% had between 3-5 years of experience, while 7.5% had below 2 years of experience. Long farming experience is an advantage for increased farm output and it may encourage rapid adoption of improved technology (Eze, 2014). The result in table 1 also shows that 84% (168) respondents in the study area belong to cooperative society while the remaining 16% (32) did not belong to any cooperative society. Majority of the respondents had experience as members of cooperative group which can facilitate understanding of agricultural information due to the interaction among themselves (Bello and Obinne, 2012). Information sources available to farmers on NCAM proven technologies in the study area indicated that most of the respondents (43.0%) received information from NCAM Staff. Other information sources available to respondents includes; electronic media (14.5%), family and friends (26.0%), extension agents (5%), while 11% of the respondents cannot decide the source of their information. This is line with the findings of Ipadelola, 2015 which says accessed information will assist farmers in the decision making process either to adopt or not adopt the available technologies. Therefore, a more targeted approach should be used in disseminating agricultural information to ensure that it reaches as many farmers as possible taking into account sources of information available to them. Respondents in the study area actively (85.5%) engaged in the usage of NCAM Processing Centers. This showed that NCAM has actively participated in improving the productivity of farmers in the study area. This result is in lines with the findings of Mohammed et al. (2014) and Faleye et al. (2012).

Multiple Regression Analysis

Table 2. Determinants of Access to NCAM Proven Technologies

Regression Analysis						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-3.694	2.600		-1.421	.157
	Gender	-.145	.134	-.066	-1.083	.280
	Age of Respondent	-.044	.057	-.049	-.772	.441
	Marital status	-.037	.119	-.034	-.309	.758
	Membership of cooperative	2.716	1.219	1.300	2.229	.027*
	Household size	.034	.270	.024	.126	.900
	Educational status	.301	.048	.403	6.252	.000*
	Occupation	-.022	.078	-.037	-.281	.779
	Experience	-.095	.070	-.141	-1.354	.177
	Source of income	-.068	.214	-.031	-.319	.750

Source: Field survey
Significant at 1% and at 5% probability level respectively
*Significant
R^2=0.691
Adjusted R^2 = 0.608

Data in Table 2 show the determinants of access to NCAM proven technologies by respondents in the study area. The R square (0.691) value indicates the access to NCAM proven technologies by the determinants (socioeconomic and institutional characteristics of the respondents).

The determinant coefficient (adjusted R^2) amounted 0.608 meant that the variation of access to NCAM proven technology could be explained by the independent variables of gender, age, marital status, membership of cooperative societies, household size, educational status, occupation, experience and income amounted 60.80%, while 39.20% were explained by other factors that are not included in the model.

The result in Table 2 further shown that out of ten variables investigated, only two variables were found to be statistically significant in influencing the access of NCAM proven technologies. These include membership of farmers' group/cooperatives (P< 0.027) and educational status (P < 0.000). Membership of cooperative societies has positive influence (t = 2.229, P = 0.027) on the access to NCAM proven technologies by the respondents in the study area. Ayodele et al. (2016) showed that cooperative membership increases the adoption of improved agricultural technologies. Also, Abdulquadri and Mohammed (2012) affirmed that cooperative organizations created an appropriate avenue for demonstration of agricultural modern technologies to meet farmer's needs in agricultural production and processing. This also justifies the view of Abdullah and Samah (2013) that cooperative societies can serve as a vehicle in dissemination of agricultural technology. The result also implies that the respondents agreed to

the fact that cooperative contribute to agricultural production. Therefore, frequent contact of NCAM researchers with members of farmer cooperative gave them the opportunity to learn more on the availability and use of new improved technologies developed by the Centre (Mohammed et al., 2014). In the light of this Kughur and Ortindi (2015) showed that frequency of extension contact with members of farmers cooperative to be the significant factors influencing adoption of agricultural technologies. Therefore, the positive impact of farmer's cooperatives is that an increase in their number will leads to more access to agricultural technology. Thus create an easy access for extension agents to contact a large pool of farmers at a particular place within the same period of time. Hence, farmers who have contacts with extension organizations are likely to hear about improved varieties and thus have more incentive to adopt these new agricultural technologies.

The Result also indicated that educational status of the respondents ($t = 6.252$, $P = 0.000$) had positive influence on the access to NCAM proven technologies in the study area. Hence, higher education allows farmers to make efficient adoption decision. This corroborate findings of Rahji (2014) who emphasized strong positive influence of education on adoption. This reveals that the more the number of years in school, the better the level of adoption of the technologies by the respondents, this is because the more the level of enlightenment, the better the willingness of the farmers to accept farming innovations. The farmers could easily understand the new technologies and are more willing to adopt than their illiterate counterparts.

4. CONCLUSIONS AND RECOMMENDATION

The willingness and ability of farmers to access the proven technologies developed by the Centre at the respective processing centers depends to a large extents on availability of information on the technologies. The findings in this study clearly shows that the socio-economic characteristics of the respondents is a major determinants in accessing agricultural technologies, whereby cooperative societies, household size, and educational status have positive relationship with access to information on agricultural technology hence leads to probably adoption of the technology. Therefore, there is need for more publicity of NCAM technology by further strengthen of NCAM extension services as proofed in the study that the respondents access more information on NCAM proven technologies through NCAM staff which is leading to improvement in farmers livelihood.

Therefore, based on this motive of increasing dissemination of information on NCAM proven developed technologies to the farmers, the following recommendations are suggested:

1. There is need for continuous publicity of NCAM proven developed technologies to create awareness among farmers and the general public;
2. There is need to strengthened the services of NCAM extension, as it has been proved in the study that majority of information about the Centre were sourced through NCAM staff;
3. There is need for farmers' adult education / enlightenment workshops (i.e agric show) to provide information on the technologies as it has been proved that education contribute immensely in accessing NCAM proven technologies. The workshops should be designed to increase their knowledge about the proven technologies developed by the Centre; and
4. Farmers should be more encouraged to form and actively participate in cooperative societies or social group to enable ease dissemination of information by extension agents to them at a particular time in a particular place.

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