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ATTITUDES OF FARMERS TO EXTENSION TRAININGS IN NIGERIA: IMPLICATIONS FOR ADOPTION OF IMPROVED AGRICULTURAL TECHNOLOGIES IN OGUN STATE SOUTHWEST REGION

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Abstract: In Africa, the outcome of development research is enormous and its dissemination has had a huge impact, especially in Nigeria for the last few decades. This impact is observable in the adoption of innovation by farmers with the aim of transforming agricultural production. To enhance adoption, training of the farmers is required. However, the attitude of farmers towards training could influence their decision on the uptake of agricultural innovation. The purpose of this study was to evaluate whether the attitude of cassava farmers to training on selected improved agricultural technologies can substantially influence adoption of the technologies. A multistage sampling technique was used to select the sample size for this study. Data collected were analysed using descriptive and inferential statistical tools. The findings showed that only a few (37.5%) of the farmers had a favourable attitude towards extension training with 64.25% of them having a low level of adoption of the technologies. While farmers' attitude towards training exerted a positive, howbeit minuscule influence on technology adoption, the perception of farmers about constraints to training on technologies had a stronger influence. Factors with a significant negative influence on adoption include, among others, diversification into non-farm occupations and age of farmers. Although the study admits that stimulating favourable attitudes is important for innovation adoption, it maintains that substantial rates of adoption will only be achieved if constraints to trainings on agricultural technology adoption are addressed from the farmers' perspective and if

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agricultural production becomes attractive enough to hold farmers within the sector.

Key words: training, attitudes, adoption, agricultural technologies, extension and non-farm occupation.

Introduction

The role of agriculture in the economy of West African countries is substantial and profound because it is the major livelihood of people in the rural area. Even with the recent growth of industries and trade systems for different commodities, agriculture maintains the lead in the employment in most agrarian communities in Africa. In Nigeria, the situation is peculiar in the rural areas where the peoples' means of living revolve within agricultural activities. Due to challenges facing the agricultural sector in Nigeria, the supply of adequate food and raw materials for the people and industries has been greatly affected. Today, the nation is faced with mounting bills as a result of importation. Adinya, Dixon, Asiedu, and Folayan (2006) have opined that one of the basic needs of human beings is food, and agriculture has gone a long way in providing it. In the recent time, the demand for food has exceeded the supply, and this has facilitated the need for scientific information that could help meet the growing demand for food.

Global agricultural extension systems are in flux due to some bottlenecks – diversified clientele, policy decisions and budget cuts from governments. Approaches to the agricultural extension are changing (Davis, 2008), and governments have failed to provide effective agricultural extension services (Feder, Anderson, Birner & Deininger, 2010). These agricultural extension problems prompt the interest of the government and other stakeholders to create certain interventions and programs that could aid the transformation of agriculture. According to Ajala (2011), the overall development of rural areas can be achieved when improved agricultural technologies are adequately disseminated and massively adopted by the farmers. Meanwhile, in Nigeria, several efforts have been made to bridge the gap between the research institute and the farmers. Omokhaye (2000) and Mgbada (2006) have reported that the main problem is making improved technologies available to farmers and not the lack of technologies and scientific findings needed for economic and social change.

Even with the availability of innovation and dissemination of newly generated findings through extension services, it has not led to tremendous agricultural transformation. In recent decades, there has been an increased focus on sustainable intensification in African agriculture. Forty projects in 20 African countries were analysed and it was found that they provided benefits for 10.39 million farmers on roughly 12.75 million hectares of land out of almost 600 million hectares of land available to improve agricultural production (Pretty,

Toulmin & William, 2011). Despite the great potential of agricultural innovations, their uptake by smallholder farmers in Africa seems to be slow (Ndjeunga & Bantilan, 2005). This calls for exploration of possible factors that are responsible for poor uptake of disseminated innovation meant to improve agriculture. Ricker-Gilbert et al. (2008) and Doss (2006) have pointed out that farmers' decision to adopt a given technology depends not only on the number of farmers that receive information but also on other factors. Apart from the often cited socio-demographic characteristics of farmers, another key factor suspected and examined by this study is the attitude of farmers towards extension training. Rehman et al. (2007) submit that the attitude of farmers plays an important role in their behaviour intent, which usually leads to actual adoption behaviour (adoption of improved agricultural technologies).

A favourable attitude raises the probability of technology adoption while a negative attitude depresses it (Meijer et al., 2015). Although this study admits the farmers' attitude to training as one critical factor affecting innovation adoption, it also reckons that the influence of attitude on adoption may be enhanced or diluted through their control beliefs regarding the relative ease or difficulties on the training received on improved technologies. The study also reveals that mediating factors such as the methods of training employed, whether or not farmers had previously adopted an improved technology and farmers' propensities to diversify livelihoods outside agriculture affect innovation adoption, among others. Hence, a more comprehensive empirical analysis to study the relationship between farmers' attitudes and agricultural innovation adoption needs to be conducted, especially in the light of many constraints limiting farm production and the emerging opportunities in the rural non-form sector that provide strong incentives for agricultural innovation adoption. Findings from this study could help gain a better understanding of drivers of technology and variables that can be skilfully controlled as policy levers to stimulate higher adoption of improved agricultural technologies, thus contributing to agricultural production and food security.

Purpose and objectives

The main purpose of this study was to examine, among others, the relationship between adoption and attitudes of cassava farmers with the view to draw implications for adoption of improved agricultural technologies in Ogun State, Southwest Nigeria. The objectives of the study were to: (a) identify improved technologies on which the cassava farmers had received training; (b) examine training techniques used for the cassava farmers; (c) determine the adoption level of the cassava farmers for the improved agricultural technologies; (d) assess the attitudes of cassava farmers towards extension training on improved agricultural

technologies; (e) identify constraints encountered by cassava farmers during the extension training, and (f) describe the socio-economic characteristics of farmers. It was hypothesized, among others, that farmers' attitude as well as perception of constraints to training on agricultural innovation had no significant influence on the level of technology adoption. The hypotheses are grounded in the conceptual/theoretical framework of innovation adoption discussed below.

Conceptual/theoretical framework

This study is grounded in Everett Rogers' innovation adoption theory/model and Ajzen's theory of planned behaviour. Rogers (2003) has stated that adoption is a decision of full use of an innovation as the best course of action available and rejection is a decision not to adopt an innovation. Theoretically, innovation adoption involves five stages which are: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. This is similar to the five stages (awareness, interest, evaluation, trial and adoption) through which an innovation to be adopted must pass (den Ban & Hawkins, 1999). In the work of Rogers, knowledge is the first stage, where an individual learns about the existence of innovation and seeks information about the innovation; it is referred to as awareness-knowledge. This will prompt their interest to evaluate the innovation before the trial and adoption stage as asserted by Van Den Ban and Hawkins. Broadly, Rogers's innovation-decision process covers knowledge, persuasion, and decision to adopt or reject. Rogers's adoption theory also admits the existence of a close nexus between adoption of innovation and attitude (Beal & Rogers, 1960; Rogers, 1973; Singhal, Cody, Rogers, & Sabido, 2004). Rogers (2003) has noted that even though a farmer may have the requisite knowledge, and be unconstrained by other factors, whether the farmer will adopt or reject an innovation depends largely on the attitude of the farmer. Consequently, an attempt is made to establish whether (or not) a significant relationship exists between technology adoption and farmers' attitudes to training on innovation. Adoption of innovation is also linked with the theory of planned behaviour (TPB). According to the theory, human behaviour is guided by three kinds of considerations: beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes (behavioural beliefs), beliefs about the normative expectations of others, and motivation to comply with these expectations (normative beliefs/subjective norms), and beliefs about the presence of factors that may facilitate or impede performance of the behaviour (control beliefs) (Ajzen, 1985, 1987, 1991). The TPB presumes that behavioural beliefs produce a favourable or unfavourable attitude towards performing a behaviour (Campbell, 1963; Sherman & Fazio, 1983; Ajzen, 2005), thus recognising the role of attitude in people's intention to perform a behaviour (in this study behaviour is the adoption of improved technologies). The control belief

relates to people's perception about the relative ease/difficulties with which they could perform an action, captured in this study by farmers' previous experience on agricultural innovation adoption, and their perception on constraints to extension training.

It has been conjectured that subjective norms (normative beliefs) are closely related to the level of education and age of trainees, and that these variables are a good proxy for trainee's ability to evaluate other people's suggestions and their willingness to perform actions so suggested. When a person has a favourable attitude (behavioural belief) towards performing an action, he/she recognises that his/her colleagues, neighbours or the society endorse the action (subjective norms); and that such action can be performed with ease (control belief), so the person is much more likely to execute the action. The above underpins the connection between the three conceptually identified behavioural considerations and adoption of improved technology in this study. To ascertain the robustness of the influence of farmers' behavioural beliefs (attitudes to extension training), control beliefs and normative beliefs on adoption of improved technology, certain confounding factors that can mediate the influence of these factors on technology adoption were controlled. These factors include sex of farmers, whether (or not) they diversify their livelihoods into non-farm sector, and the training method employed to train farmers on innovations, among others. The factors are incorporated in the adoption (probit) model presented in the next section.

Materials and Methods

Study area

The study was conducted in Ogun state, the southwestern region of Nigeria. It is a tropical rainforest zone with a land mass area of 16,406,226 km2 which lies on latitudes 70 01′ and 70 18′, longitudes 20 45′ and 30 55′. It shares a border with the Republic of Benin and Lagos state in the South, Osun and Oyo states in the North. The annual rainfall is between 1000mm and 2599mm. The population of Ogun state was estimated by the 2006 Census to be 3,728,098 (National Population Commission [NPC], 2006). Farming is the main livelihood of the people in the study area. They cultivate arable crops such as cassava, maize, and rice as their major agricultural produce. Ogun state is the leading cassava producing region in Nigeria and has benefitted from some cassava production interventions, such as the IFAD-assisted Cassava Multiplication Program (ICMP), Cassava: Adding Value for Africa (C: AVA) and Presidential Initiative on Cassava by Federal Government of Nigeria. These interventions provided training for cassava farmers on improved agricultural technologies that enhance cassava production across the four agricultural zones. These factors, therefore, make Ogun state suitable for the study.

Sampling technique

A multi-stage sampling technique was used to select a total sample of 120 cassava farmers. At the first stage, two agricultural zones were randomly selected from the four existing agricultural zones classified by Ogun State Agricultural Development Program (OGADEP). A simple random sampling technique was thereafter used to select one block from each of the selected zones, and three cells from each of the selected blocks. This made a total of six cells. Two villages were also selected randomly from each cell to give a total of 12 villages while 10 farmers were selected randomly from those who had been trained on the improved agricultural technologies to make a total of 120 farmers. An interview schedule was used to elicit information from the farmers.

Validity and reliability tests

The interview schedule was subjected to face validity involving experts in agricultural extension education, psychology, and innovation studies. Their comments were used to improve the instrument so as to address the in-built errors on it. The reliability test was also determined using a test-retest method. The interview schedule developed was tested on a sample of 20 trained cassava farmers who were not included in the study sample to obtain their responses at an interval of two weeks. The Cronbach alpha value for the attitude of farmers to training was 0.762, for constraints to extension training was 0.782, while that of adoption of improved agricultural technologies was 0.753.

Measurement of key variables

(a) The attitudes of the farmers were measured using a five-point Likert scale: strongly agree, agree, undecided, disagree and strongly disagree; (b) Constraints encountered during extension training were also determined using a scale consisting of serious, less serious and not serious constraints which were assigned 3, 2 and 1 respectively; (c) The stage of adoption was measured using a six-point scale: unaware, aware, interest, evaluation, trial and adoption which were assigned a score of 1 to 6 respectively. Implicitly, for an innovation to be adopted, a farmer must have passed through all the six stages of adoption. Given this background, a farmer with scores of six (6) was considered to have completed all the adoption stages and adjudged to have adopted the technology. For this study, farmers were trained on 10 improved agricultural technologies. Farmers that adopted at least 5 of the technologies (representing 50% or more) were considered to have a relatively high level of adoption, otherwise a relatively low level of adoption. Thereafter a farmer with a high level of adoption was assigned a qualitative value of 1 and 0 for

a relatively low level of adoption. To capture farmers' attitudes to training and perception about constraints to the training on the technology received, the attitudes and the constraint scores were converted to the composite index for each respondent to capture the attitude of farmers and the perception about constraints to the training respectively as follows:

$$V_{ji} = \frac{1}{n_j} \sum_{k=1}^{n_j} D_{kji} \quad (1)$$

where V_{ji} = A composite index for the respondent i regarding the training concern/issue j; j = 1, 2: with j = 1 relating to the attitude and j = 2 relating to farmer's perception on constraints to training;

n_j = Total number of the questions asked about attitudes and perception of constraints respectively;

i = 1, 2, 3…, 120. For ease of interpretation, a composite index of the attitude was further transformed into a qualitative (binary outcome) variable with the value of 1 assigned to respondents whose composite (attitude) index was above the mean composite index for the sampled farmers and the value of 0 ascribed to farmers whose composite index was below the mean index. For this study, farmers with the qualitative value of 1 were considered to have favourable attitudes to training while those with the 0 value, unfavourable attitudes.

Data analysis

The data obtained were subjected to descriptive statistics (mean, frequency, tables and percentages) and Probit regression analysis. The Probit regression model is as follows:

$$\text{Prob}(Yi=1) = \beta_o + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \beta_8 X_{8i} + \beta_9 X_{9i} + \beta_{10} X_{10i} + \beta_{11} X_{11i} + \beta_{12} X_{12i} + \beta_{13} X_{13i} + \beta_{14} X_{14i} + \beta_{15} X_{15i} + \beta_{16} X_{16i} + u_i \quad (2)$$

where: Yi = Level of technology adoption defined as 1, if a farmer adopted at least 50% of the total number of technologies and 0 otherwise, X_1 = Attitude to training (1 if a farmer had a favourable attitude, 0 if an attitude was unfavourable), X_2 = Age range of 45 to 60 years (1 if a farmer fell within the age group, 0 – otherwise), X_3 = Age above 60 years (1 if a farmer fell within the age group, 0 otherwise), X_4 = Sex (1 if a farmer was male, 0 – otherwise), X_5 = Farm size (in hectares), X_6 = Perceived constraints during trainings (total constraint scores), X_7 = Adult education (1 if a respondent had an adult education, 0 – otherwise), X_8 = Primary education (1 if a respondent had a primary education, 0 – otherwise), X_9 = Secondary education (1 if a respondent had a secondary education, 0 – otherwise), X_{10} = Previous experience on technology adoption (1 if a farmer had

adopted any of the technologies, 0 – otherwise), X_{11} = Total number of training methods used, X_{12} = Practical demonstration (1 if a farmer was exposed to a practical demonstration, 0 – otherwise), X_{13} = Diversified occupation (1 if a farmer had some other occupation apart from farming, 0 – otherwise), u_i = Error term.

We used STATA 13 for analysis with the standard error robust option selected during analysis to ensure much more efficient results.

Results and Discussion

Socio-economic characteristics of cassava farmers

Table 1 shows that most (67.5%) of the cassava farmers in the study area were male, which indicates that males dominate the cassava production sector in Ogun state. This is also the case in the farming of other crops in the study area as earlier studies (Fabusoro, 2006, Mohammed & Ndanitsa, 2012) have also reported that there are more men in farming than women. This implies that men could be ready and willing to undergo training that could improve cassava production. The average age of the cassava farmers was 49 years which is in line with the findings of Adeokun, Adereke, and Opele (2006), Tologbonse, Mesini, Tsado (2006) and Aromolaran (2013), who have pointed out that most farmers in the study area are middle aged and young adults who are still very agile to seek innovation.

Table 1. Socio-economic characteristics of cassava farmers.

Variables	Mean	Mode frequency (percentage)
Age (years)	49 years	
Sex		81(67.5%) Male
Marital status		73(60.9%) Married
Farm size	1.2 acres (0.49ha)	
Level of education		40 (33.3%) Adult education

Many (60.9%) of them were married and only 5.8% of them had a tertiary education while 33.3 percent had an adult education. This shows that many of the farmers had a low level of education which invariably affected adoption of improved agricultural technologies. The education level of the respondents could influence their attitude to training thereby affecting their readiness to adopt a new idea. The higher the level of education of a farmer, the better his/her ability to comprehend the new idea during training will be.

Training on improved agricultural technologies and techniques in the study area

Table 2 shows that more than 90% of the respondents were trained on various improved agricultural technologies which can help them improve cassava production. Extension through training could contribute to agricultural productivity by increasing the speed of technology transfer that can improve farming practices (Feder, Murgai, & Quizon, 2004). These techniques included the use of a knapsack sprayer (97.5%), planting date and angles of cassava (95.8%). It is only a few (39.2%) of them that had training in integrated pest management (IPM). Gutierez, Kogan, and Stinner (2003), Rajotte, Norton, Luther, Barrera, and Heong (2005) have opined that knowledge of IPM among farmers in Sub-Saharan Africa is generally deficient in extension systems. The limited and/or ineffective transfer of IPM strategies to farmers is connected to lack of understanding of IPM by extension agents (Erbaugh et al., 2007). Training in new sets of skills which can be applied to farming is a vital source of support for livelihood improvement.

Table 2. Distribution of farmers by their training in improved agricultural technologies.

Improved agricultural technologies/techniques	Frequency*	Percentage
Use of improved varieties	119	99.2
Use of a knapsack sprayer	117	97.5
Fertiliser application techniques	116	96.7
Ploughing and ridging before planting	115	95.8
Appropriate planting dates and angles	115	95.8
Use of agrochemicals such as herbicides, pesticides	112	93.3
Appropriate and adequate weeding approach	101	84.2
Supply/replacement of seedlings	98	81.7
Integrated pest management	47	39.2

Multiple responses.

Distribution of trainees by the training techniques in agricultural technologies

Figure 1 shows that most (89.2%) of the farmers came for trainings on improved technologies conducted using a practical demonstration while barely over 50% of them participated in the trainings performed using on-farm trial, postal and picture, as well as result demonstration training techniques. Only 40% of them received the training via the agricultural show. The large turnout for the practical demonstration may be attributed to the fact that it gives people an opportunity to participate and learn through direct practical experience (Practical Action, 2003).

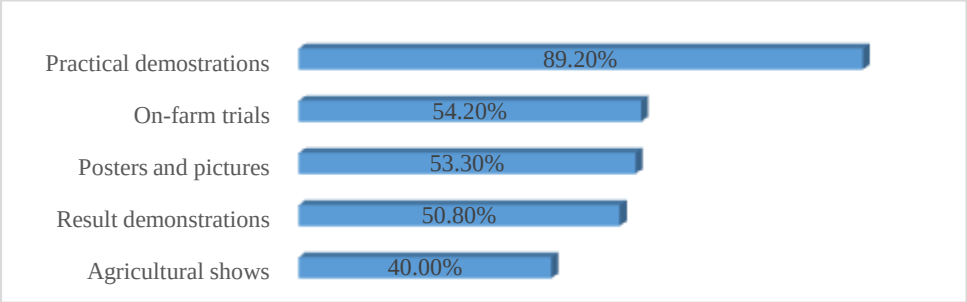

Figure 1. Techniques employed in the training of the cassava farmers.

Adoption of improved agricultural technologies among cassava farmers

Table 3 shows the distribution of cassava farmers who adopted each of the improved agricultural technologies. Most (63.3%) of them adopted ploughing and ridging of the farmlands before planting. Adjei-Nsiah and Sakyi-Dawson (2012) have opined that the construction of mounds and ridges loosens the compacted soil after continuous cropping. Approximately 35.0% of the trainees adopted the appropriate and adequate weeding method.

Table 3. Adoption of improved agricultural technologies by cassava farmers.

Improved agricultural technologies	Frequency*	Percentage
Ploughing and ridging before planting	76	63.3
Planting on the flat after ploughing without ridging	52	43.2
Appropriate and adequate weeding approach	42	35.0
Supply/replacement of seedlings	32	26.7
Use of improved varieties	25	20.8
Fertiliser application techniques	23	19.2
Appropriate planting dates and angles	21	17.5
Use of a knapsack sprayer	11	9.2
Use of agrochemicals such as herbicides, pesticides	10	8.3
Integrated pest management	1	0.8

*Multiple responses.

Proper weeding can help cassava performance because weeds harbor pests in the cassava farm, thereby multiplying pests and diseases (Melifonwu et al., 2000). It is important to note that less than 20% of the respondents adopted fertiliser application techniques (19.2%), appropriate planting date and angles (17.5%), and use of agrochemicals (8.3%). The low percentage of adoption of these technologies is a result of the technical expertise needed for their application. For instance,

addition of fertiliser to the plant can nourish it, but can also be detrimental to the plant if not properly applied. To prevent the wrong usage, adequate training is required. David (2005) opined that chemical fertilisers could have a negative effect on soil fertility and soil structure if improperly used over a long period of time.

Figure 2 shows the overall adoption level of cassava farmers in the study area. The findings reveal that 35.8% of the respondents attained a high level of adoption of the agricultural technologies. A greater number of the respondents reached a low level of adoption of the technologies. This low level of adoption may have a great impact on the possible level of cassava output that could have been produced in the study area. According to Jain, Arora, and Raju (2009), agricultural technologies include all kinds of improved techniques which have an effect on the growth of agricultural output. Adoption of improved technologies is considered a major factor in the success of the green revolution (Kasirye, 2013; Chen & Ravallion, 2004).

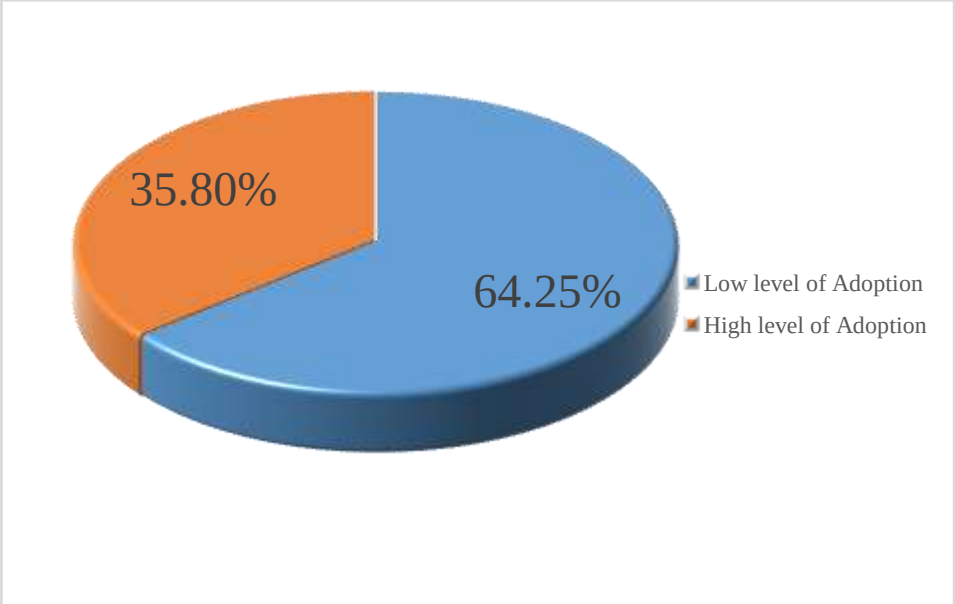

Figure 2. Overall level of adoption of improved agricultural technologies by farmers.

Despite the training of cassava farmers on improved technologies and hence adoption of the techniques, most (52%) cassava farmers still attained a low level adoption of the technologies. The attitude of farmers towards training is one of the salient factors that could be responsible for a low level of adoption despite adequate training (Ogunsumi, 2007).

Attitudes of cassava farmers toward extension training on agricultural technologies

Table 4 and Figure 3 show the mean attitudinal response of farmers to questions relating to their attitude to training, and an estimate of their overall attitude to trainings on improved technologies. Figure 3 shows that 62.5% of the cassava farmers had an unfavourable attitude towards the extension training. Farmers' unfavourable attitudes could impede their understanding of the innovation, thereby affecting their adoption decisions. Rehman et al. (2007) noted that attitudes of English dairy farmers toward production technologies played an important role in their behaviour intent, which was reflected in their actual adoption behaviour.

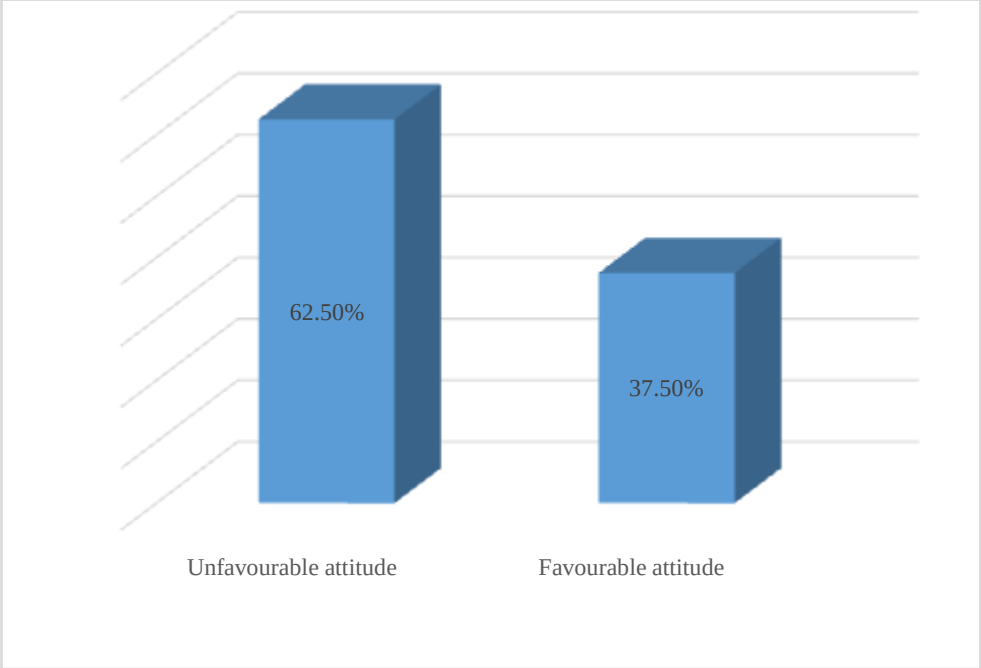

Figure 3. Attitudes of cassava farmers to training: unfavourable attitude versus favourable attitude.

Table 4 shows that the mean attitude response score on whether the training was time consuming was M = 3.58, implying a disincentive attitude. United Nations Educational Scientific and Cultural Organization (UNESCO) (2004) opined that during a long session of training, boredom may set in, and hence, an unfavourable attitude.

Table 4. Attitudes of farmers to extension training on improved agricultural technologies.

Items	M	SD
Training is of no use to me	3.99	1.41
I will be willing to invite others to attend a similar training	3.73	1.81
Training is usually time-consuming	3.58	1.53
Venue of the training is not conducive	3.38	1.58
The relationship among the trainees during the training is cordial	3.05	1.37
Training should be done in one location	2.98	1.81
Training is clear and understandable	2.97	1.66
Training should be conducted in more than one location	2.97	1.66
I am satisfied with the distance of the training center	2.88	1.64
Materials used for the training are adequate	2.77	1.41
Equipment and facilities for the training are not in good condition	2.72	1.39
I will be willing to attend similar trainings in the future	2.67	1.31
I am content with the training	2.63	1.59
A trainer does not listen to me when I express my views during the training	2.58	1.64
Training is timely and I am satisfied with the time allotted for each session	2.57	1.50
The training helps develop much interest in improved agricultural technologies	2.32	1.29
Training enhances my knowledge and it will improve my farming activities	2.29	1.21
Training helps me to identify different improved agricultural technologies that could be of use in my farming activities	2.22	1.12
Training increases my knowledge on the improved agricultural technologies	1.98	1.06
Training helps me to acquire skills which will improve my farming activities	1.65	0.94

M = Mean, SD = Standard deviation.

A similar negative conclusion (an unfavourable attitude) was drawn by the farmers (trainees) based on how conducive was the venue of the training and its environment, as well as the farmers' willingness to attend similar trainings in the future. Nevertheless, trainees expressed favourable attitudes regarding their preparedness to invite others to attend a similar training in the future (mean attitude response score = 3.73).

Constraints associated with extension training in the study area

The farmers perceived selected constraints as bottlenecks or obstacles to extension training received. Entries in Table 5 show that the level of education of the farmer was ranked first with a mean of 2.58, and this affected the understanding of the farmer on the complexity of the technology and their ability to apply it appropriately. The more educated the trainees (farmers), the better their understanding of the training was. According to Adisa, Adeokun, and Oladoja (2006), training is a process by which the skills and abilities of people are improved and it requires some level of literacy of the trainees to cope. Inadequate

agricultural training/extension officers (M = 2.40) were another major constraint to the training. An inadequate number of agricultural training/extension officers, therefore, may hinder the number of training packages they could take per time as well as the quality of time spent with the farmers during the training sessions. Okwu and Ejembi (2005) refer to farmers' trainings as an intensive learning activity for farmers to understand the skills required for the adoption of agricultural technologies. A misunderstanding of the message (M = 2.38) got the 3rd position in the ranking. Occupational Safety and Health Administration (OSHA, 2010) opined that training programmes must be clear and understandable to the participant.

Table 5. Constraints to extension training on improved agricultural technologies.

Constraints	M	SD	Ranking
Education level of the trainee	2.58	0.63	1st
Inadequate agricultural training/extension officers	2.40	0.79	2nd
Misunderstanding of the message of the training	2.38	0.75	3rd
Improper planning and poor coordination of the training	2.36	0.72	4th
Incompetence in delivery skills of the trainer	2.30	0.73	5th
Inability to carry the farmers along during the training	2.28	0.77	6th
Time allotted for the training	2.26	0.85	7th
Inadequate training facilities	2.25	0.82	8th
Distance of the training center	2.08	0.86	9th
Distraction and digression during the training	2.06	0.82	10th

Factors influencing adoption of improved agricultural technologies

Results in Table 6 show that the coefficient associated with farmers' attitudes was positive, indicating a direct relationship between an attitude and adoption of improved technology. The implication is that those farmers with a favourable attitude to the extension training were more likely to adopt an innovation compared with those with an unfavourable attitude. This corroborates the findings of Ogunsumi (2011), who found that farmers with a favourable attitude had a higher level of adoption of improved technologies. The statistical insignificance of the coefficient of an attitude suggests that having a favourable attitude is unlikely to substantially raise the level of technology adoption. Table 6 also shows that the coefficient of the perception of farmers on the constraints to training was negative and statistically significant ($p<0.05$). The coefficient of the farmers' perception on the constraints was statistically significant, and with the largest absolute value compared to the coefficients of other predictors/factors in the model suggests the dominance impact it had on a farmer's chance of technology adoption. The imports of these findings are that though strategies could be devised to enhance a favourable attitude of farmers towards adopting an innovation, stimulating a

favourable attitude will only have a miniscule impact on innovation uptake unless the constraints to the trainings are addressed from the farmers' perspective. The statistically positive and significant coefficient of farmers' age classification between 45 and 55 years ($p<0.05$) implies that barring all other constraining factors, relatively younger farmers were more likely to adopt a new innovation than older farmers. This holds main implications for agricultural extension works and agricultural policy in developing countries, especially in Nigeria where the majority of the farming population is ageing with many young people unwilling to embrace farming.

Table 6. Factors influencing an attitude towards training and adoption of improved agricultural technologies.

Explanatory variables	Coefficient	Z-value	p/>z/
Attitude to training (dummy)	0.076	0.19	0.848
Age of the respondent 45 to 55 years (dummy)	0.800	2.04	0.041
Age of the respondent above 55 years (dummy)	-0.934	-1.32	0.187
Sex of the respondent (dummy)	-0.125	-0.29	0.773
Farm size	0.234	1.64	0.102
Perceived constraints	-2.520	-2.03	0.042
Adult education (dummy)	0.616	1.57	0.117
Primary education (dummy)	0.436	0.71	0.477
Secondary education (dummy)	0.149	0.26	0.795
Previous adoption of improved technology (dummy)	0.682	1.68	0.093
Practical demonstration (dummy)	0.913	1.83	0.068
Number of training methods exposed to besides practical demonstration	-0.114	-0.66	0.511
Diversified likelihoods (dummy)	-0.979	-1.92	0.055
Constant	-0.770	-0.62	0.537
Wald Chi-square = 26.15			
Log pseudo likelihood = -25.73			
Prob > chi2 = 0.0162			

The coefficients of educational dummies used to capture both formal and informal (adult) education were positive, indicating the role access to both formal and informal education could play in stimulating a higher rate of adoption of innovations. This is in line with findings of Akinbile (2003) and Crook, Tood, Combs, Woehr, and Ketchen (2011) that farmers with higher levels of education adopt new technologies more rapidly than farmers with a lower level of education. However, the statistical insignificance of the coefficients of all the educational dummies suggests the farmers' levels of education did not substantially enhance greater uptake of the improved technologies. The results of this study also establish that those who had previously adopted one or more of the innovations on which

they received trainings had a greater chance of adopting more improved technologies than those who had not adopted any of the technologies. The import of these findings is that farmers do learn from their previous experience on innovation and could bring it to bear on new technologies being introduced to them. The coefficient of a practical demonstration training method was positive and statistically significant ($p<0.1$), indicating that the training method could have a higher chance of stimulating higher uptakes of the innovations they were exposed to. This finding projects the uniqueness of the training method in enhancing adoption and should be cautiously prepared to stimulate technology adoption.

The coefficient of diversified occupation was negative and statistically significant ($p<0.1$), meaning that farmers who diversified their occupation outside the farm sector had more depressed level of technology adoption than those who concentrated on agriculture. Diversification of occupation implies a broadening of income sources and less time allocation to/investment in agriculture with the attendant implications on adoption of some important technology.

These findings calls for deeper evaluation of the root causes of low rates of innovation uptake in the country and how agricultural production can be made to command economic return sufficient enough to keep farmers with the agricultural industry. This is imperative especially in the face of the numerous challenges facing agriculture and the propensity for non-farm livelihoods. The log-likelihood function of the model (-25.73) and the chi-square value (26.15) associated with the log-likelihood ratio, that is statistically significant ($p<0.05$), indicate that all the explanatory variables in the model jointly exert a significant influence on adoption of the improved technologies.

Conclusion

The study sought to examine the potential role farmers' attitudes could play in technology adoption as well as the influence of some other factors on innovation adoption. Most of the farmers had the adult education training with the majority of them having an unfavourable attitude towards the training they received. Although farmers' attitudes to the training on improved technology had a positive and weak influence on innovation adoption, the perception of farmers about constraints to training and technology adoption appeared to exert a greater influence. The use of a practical demonstration method in training farmers on new technology would result in a higher level of innovation adoption among the farmers. Participation in non-farm business engagement would lead to lower rates of technology adoption. The implications of these findings are that stimulating favourable attitudes among farmers may yield a piecemeal effect on technology if constraints restricting technology adoption are not removed. A higher level of innovation adoption can be achieved if younger people are encouraged to go into agriculture, and if

agricultural production is attractive enough to keep farmers in the sector. The findings hold main implications for the agricultural extension service delivery, and the need to rethink agricultural and development strategies in the country such that rural land spaces would promote adoption of agricultural technology and boost food security.

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STAVOVI POLJOPRIVREDNIKA PREMA OBUKAMA SAVETODAVNIH SLUŽBI U NIGERIJI: IMPLIKACIJE ZA USVAJANJE POBOLJŠANIH POLJOPRIVREDNIH TEHNOLOGIJA U JUGOZAPADNOM REGIONU DRŽAVE OGUN

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R e z i m e

U Africi, rezultat razvojnog istraživanja je ogroman i njegova diseminacija ima ogroman uticaj, posebno u Nigeriji poslednjih nekoliko decenija. Ovaj uticaj je uočljiv u usvajanju inovacija od strane poljoprivrednika s ciljem da se transformiše poljoprivredna proizvodnja. Kako bi se povećalo usvajanje novih znanja, potrebna je obuka poljoprivrednika. Međutim, stav poljoprivrednika prema obuci može uticati na njihovu odluku o prihvatanju poljoprivredne inovacije. Cilj ovog istraživanja bio je da se proceni da li stav proizvođača manioke prema obuci o odabranim poboljšanim poljoprivrednim tehnologijama može značajno da utiče na usvajanje tehnologija. Višestepena tehnika uzorkovanja korišćena je za odabir veličine uzorka za ovo istraživanje. Podaci koji su sakupljeni analizirani su uz pomoć deskriptivne statistike i inferencijalnih statističkih alatki. Rezultati su pokazali da samo nekoliko (37,5%) poljoprivrednika ima povoljan stav prema obuci savetodavne službe, a 64,25% poljoprivrednika pokazuju nizak nivo usvajanja tehnologija. Dok je stav poljoprivrednika prema obuci imao pozitivan, mada mali uticaj na usvajanje tehnologija, percepcija poljoprivrednika o ograničenjima obuke o novim tehnologijama imala je snažniji uticaj. Faktori sa značajnim negativnim uticajem na usvajanje uključuju, između ostalih, diversifikaciju nepoljoprivrednih aktivnosti i starost poljoprivrednika. Iako se u ovom istraživanju priznaje da je podsticanje povoljnih stavova važno za usvajanje inovacija, tvrdi se da će značajne stope usvajanja biti postignute samo ako se ograničenja obuke o usvajanju poljoprivredne tehnologije budu otklanjala iz

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perspektive poljoprivednika i ako poljoprivredna prozvodnja postane dovoljno zanimljiva da poljoprvrednike zadrži unutar sektora.

Ključne reči: obuka, stavovi, usvajanje, poljoprivredne tehnologije, savetodavstvo i nepoljoprivredne aktivnosti.

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