NIGERIAN AGRICULTURAL JOURNAL
ISSN: 0300-368X
Volume 51 Number 3, December 2020 Pg. 72-80
Available online at: http://www.ajol.info/index.php/naj

ANALYSIS OF TECHNOLOGY TRANSFER OF THE ORANGE FLESHED SWEET POTATO VARIETIES TO FARMERS IN ABIA STATE, NIGERIA

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Abstract
This study analyzed the factors influencing technology transfer methods of orange –fleshed varieties to farmers in Abia State, Nigeria. Multi-stage random sampling procedure was used to select eighty (80) farmers. Data for the study was analyzed using descriptive statistics such as: frequency counts, mean scores and percentages and multinomial Logit regression analysis regression analysis. The result revealed the mean ages of 41.9 years, mean household size of 6 persons, 33.75% acquired secondary education with mean farm size 0.42 hectares, mean annual farm income of N124, 187.50, while most of the farmers (88.75%) belonged to different cooperative societies. The result also showed that extension agents occasionally used telephone calls ($\overline{X}$ = 2.4), farm/home visits ($\overline{X}$ = 2.1) and on-farm adaptive research as individual contact methods in transferring orange–fleshed sweet potato varieties to farmers. Likewise, demonstrations, training workshops and tours/field trips were occasionally used as group contacts method for disseminating information on OFSP to farmers. Mass contacts such as radio/television ($\overline{X}$ = 2.4) and leaflet ($\overline{X}$ = 2.0) were methods adopted in technology transfer of OFSP to farmers in the State. The result also indicates that technology transfer methods used by the extension agents were effective ($\overline{X}$ = 3.3). Multinomial Logit regression analysis showed that age, education, household size, farm income and farm size influenced group and mass media methods of transfer of OFSP to farmers in the State. Findings also revealed that unavailability of land to practice the technology, non-accessibility of credit, non-availability of OFSP vines were the major problems affecting the transfer of these varieties to farmers in the study area. The study therefore recommended promotion of mass media methods in the transfer of orange –fleshed varieties to farmers in the study area.

Keywords: Effectiveness, transfer, methods, orange-fleshed sweet potatoes and farmers

Introduction

Nigeria is the third largest producer of sweet potatoes (*Ipomea batata L.*) in the world in terms of quantity after China and Uganda. However, production is 44% below the potential capacity of 7 million tons. In 2018 Nigeria produces 3.9 metric tons of sweet potatoes and is the largest producer in sub-Saharan Africa (Shanhbanden, 2018). In recent times, the West Africa region has witnessed increase in crop output; sweet potato recorded a positive per capita annual rate of increase in production in sub-Saharan Africa (Ndaula *et al*., 2020). The success in transferring technologies to farmers frequently depends on utilizing the most effective methods, either the use of two or more or any single method. Methods used in agricultural extension may be classified into individual contact, group and mass media methods (Gwyn and Gaforth, 2012). Previous studies had shown that the capability of extension agents would affect the efficiency and effectiveness of their deliveries (Musa *et al.,* 2010Ismail and Ismail 2018; Adesiji *et al.* 2010). Technology transfer involves evaluating and adapting research outputs and then widely disseminating or transferring the knowledge and inputs to different target adopters or farmers. In many countries, government agricultural extension does both types of transfer, although the emphasis is often on knowledge transfer (Omotesho *et al*., 2019). Technology transfer helps to increase agricultural productivity, increases acceptability of technology disseminated, cut production costs and lower consumer prices, thus appropriate technologies should be based on simplicity and alignment with the socio-cultural of the adopters (Nwaobiala, 2018). Azumah *et al.*(2018) observed that household extension method is most effective way of transferring information and is easy for activities undertaken by or within the full control of household to be accepted. In this regard, discussion with the whole family highlights more problems, and more

experience is brought to the discussion. However, group household extension method will probably save cost, time and transportation as large number of people will be reached (Anandajayasekeram *et al.,* 2008).

As reported by Maoba (2016), outputs of farmers who had contact with the extension agents was low and their practices were not different than those who did not have contact with extension agents. The findings could be traced to the failure of public agricultural extension system to promptly and effectively disseminate information to farmers. The inadequate contact and lack of communication skills were also identified as the causes of failure and ineffectiveness of extension agents in influencing farmers to adopt technology (Adesiji *et al.,* 2010). In an attempt to develop an improved variety of sweet potato in Nigeria, the National Root Crops Research Institute (NRCRI) Umudike in 2006 conducted a collaborative research on sweet potato variety improvement. The participating research bodies include the International Institute for Tropical Agriculture (IITA), International Potato Centre (IPC) and Faculties of Agriculture of Universities in the country. This research effort led to the development of many improved technologies with regards to sweet potato. One of the technologies developed following the collaborative research was the improved orange fleshed sweet potato variety, notable among which is the orange fleshed varieties. The Institute adopted the technology review meetings with the Agricultural Development Programmes (ADPs) in the South-East zone and the Research-Extension-Farmer-Input Linkage System (REFILS) to create awareness and educate farmers on the benefits of sweet potato production to ensure its widespread adoption (Udemezue, 2018). Although, sweet potato as a crop is consumed in all parts of the county hitherto, no study has been carried out to ascertain the technology transfer method(s) that is effective in disseminating these varieties to farmers in the study area. The objective of the study was to identify factors influencing of technology transfer of orange –fleshed sweet potato technology to farmers in Abia State, Nigeria.

Methodology

Study Area and Description

The study was conducted in Abia state, Nigeria. The state lies between Longitudes 7023' and 802' east of the Equator, Latitudes 4047' and 6012' north of the Greenwich Meridian. The State is located East of Imo state and shares common boundaries with Anambra, Enugu and Ebonyi States on the North West, North and North East respectively. It is bounded by Cross River and Akwa Ibom States on the East and Southeast and Rivers State to the South. The 2017 estimate population of the state is 3,727,300 people (National Population Commission, 2017). Most of the people in Abia State, especially the rural dwellers are engaged mainly in subsistence farming. The major farm crops grown include yam, cassava, cocoyam, rice, maize, plantain, okra, sweet potatoes and melon, oil palm, cocoa and rubber production.

Sample size and Data Analysis

A multistage sampling technique was used in selecting the respondents. First two (2) agricultural zones namely; Umuahia and Aba were randomly selected out of the three agricultural zones that make up the State. Two blocks each were randomly selected from the two agricultural zones. The blocks are; Ikwuano block and Umuahia North in Umuahia zone, while Osiisoma and Isiala Ngwa South blocks were selected from the Aba zone. A total of 4 blocks were used in data collection. From the selected blocks two (2) circles or cells were randomly selected to give a total of eight (8) circles. Finally, ten (10) orange –fleshed sweet potato farmers were randomly chosen from the selected circles to give a sample size of 80 orange fleshed sweet potato farmers. The objectives were realized using descriptive statistics such as frequency counts mean scores and percentages, while the hypothesis was tested using the t-test generated from the multinomial Logit regression model.

Analytical Techniques

The methods of technology transfer adopted by delivery agencies to farmers were measured by providing the farmers with three categorized technology delivery methods with the response options of always, occasionally and never with scores 3, 2 and 1 assigned, respectively The bench mark was obtained thus; 3+2+1 = 6 divided by 3 to give 2.0. The following decision rule was obtained thus:

1.00 - 1.50 (never)
1.51 - 1.99 (occasionally)
2.0 and above (always)

The effectiveness of technology transfer methods in disseminating Orange - fleshed sweet potato technology were measured by providing them with ten effective statements with response options of strongly agree, agree, disagree and strongly disagree assigned, respectively The bench mark was obtained thus; 5+4+3+2+1 = 15 divided by 3 to give 3.0. The mean decision rule implied any mean score of 3.0 and above is effective (i.e. agree and strongly agree) and below is not effective.

Model Specification

Multinomial Logit regression model was used to analyze factors influencing transfer methods of orange fleshed sweet potato (OFSP) among sweet potato farmers in the Study Area. The dependent variable (transfer method) was a qualitative term that denotes the means by which OFSP technology was communicated to the farmers. The sources of OFSP information was grouped into two categories namely: group and mass media. Being a qualitative term, number one was assigned to group and two to mass media. This method was adopted because the dependent variable has more than two alternatives among which the farmer has to choose. The study employed the multinomial logit model because of its documented superiority and ease of computation over other binary regression models (Greene, 2003). The independent variables included; age (years), education (years), farm size (hectare),

household size (number), farm income (Naira), vine availability (dummy, Yes=1, No =0), type of variety (dummy, Yes=1, No =0) and membership of cooperative (dummy, Yes=1, No =0). Probability of a farmer i's choice of method j was estimated using multinomial logit model as in equation (1) (Greene, 2003).

$$P_{ij} = \frac{eXB_j}{\sum_j^j eX_iB_j} \quad \text{for } j = 1....3 \qquad .....(1)$$

$$\text{Probability } (Y_i = J/X_i) = P_{ij} = \frac{eX_iB_i}{\sum_j^j=3\ eX_iB_j}, \quad \text{for } j > 1 \ .....(2)$$

$$\text{Probability } Y_i = 1/X_i = P_{ij} = \frac{1}{1+\sum_j^j=3\ eX_iB_j} \quad \text{for } j > 1 \ .....(3)$$

Where P_{ij} is the probability representing the ith farmer's chance of accepting transfer method j, X_i represents a set of explanatory variables, e is the natural base of logarithms, and β_j are parameters to be estimated by maximum likelihood estimator (MLE). The estimated equations provide a set of probabilities for the j + 1 choice for a farmer with X_i characteristics. For identification of the model, there is need to normalize by assuming $\beta_0 = 0$. Thus the probabilities are given by equations (2), (3)):

The marginal effects of explanatory variables on probabilities are specified as:

$$\Delta_{ij} = dP_{ij}/X_i = P_{ij}\ [B_{IJ} - \sum_j^j = 0P_{ij}B_j] = P_{ij}\ [B_j - B-] \qquad .....(4)$$

Where,

Y = Technology transfer methods of orange-fleshed sweet potato varieties (measured by transfer methods used (group = 1 and mass = 2).

X_1 = age (years)

X_2 = household size (numbers)

X_3 = education (years)

X_4 = access to inputs (access= 1, otherwise = 0)

X_5 = farm size (hectares)

X_6 = access to inputs (yes = 1, otherwise = 0)

X_7 = availability of improved vines (yes = 1, otherwise = 0)

X_8 = types of OFSP variety (yes = 1, otherwise = 0)

X_9 = cooperative membership (yes = 1, otherwise = 0)

ei = error term.

Results and Discussion

The Socio-economic Characteristics of OFSP Farmers

The socio-economic characteristics of respondents are shown in Table 1. Result showed that the mean age of the farmers was 49.1 years. The implication of this result is that farmers were aged and it corroborates the findings of Fashina (2013), who opined that farmers' productivity is deemed to decrease as the age increases. The result also showed that 33.8% of the orange fleshed sweet potato farmers acquired secondary education. Tijani and Sanusi (2019) posited that education is an important socioeconomic factor that influences farmers' awareness, perception, reception and transfer of innovations that can bring about increase in production. The mean farm size of the farmers was 0.42 hectares, indicating that the orange fleshed sweet potato farmers cultivate relatively small sized farms. The result agrees with (Abugu *et al.,* 2013) who reported that majority of farmers in the south east Nigeria are small scale farmers, on the average cultivate less than 2 hectares of land. The mean annual farm income of the respondents was N124, 187.50. The income levels of the farmers may depend largely on the enterprise combination and farm size they cultivate orange fleshed sweet potato vines. This result was consistent with that of Alalade *et al*. (2019) that farm size had a significant effect on farm income. However, majority (88.75%) of the respondents had been members of different cooperative societies. As noted by Nwaobiala *et al*. (2019) the formation of farmers' cooperatives would help raise the production at a minimal cost since the group would be able to take advantages of economics of scale and increase access to information on agricultural production.

Table 1: Distribution of Respondents according to Socio-economic Characteristics

Variables	Frequency (n=80)	Percentage
Age (years)		
20 – 30	12	15.0
31 – 40	10	12.50
41 – 50	43	53.8
51 – 60	5	6.2
61 – 70	10	12.5
Mean	**49.1**	
Education (years)		
No formal Education	14	17.50
Primary Education	18	22.50
Secondary Education	27	33.75
Tertiary Education	21	26.20
Farm Size (hectares)		
0.1 – 1.0	44	36.67
1.1 – 2.0	22	27.50
2.1 – 3.0	14	6.66
Mean	**0.42**	
Annual Farm Income (₦)		
30,000 – 60, 000	9	11.25
61,000 – 90, 000	7	8.75
91, 000 – 120, 000	16	20.00
121,000 – 150,000	32	40.00
151, 000 – 180, 000	14	17.50
181.000 – 200,000	2	2.50
Mean	**124,187.50**	
Cooperative Membership		
Yes	71	88.75
No	9	11.25

Source: Field Survey, 2019

Methods used by Extension in Transferring Orange-Fleshed Sweet Potato Technology to Farmers

The result in Table 2 shows that extension agents used telephone calls ($\overline{X}$ = 2.4), farm/home visits ($\overline{X}$ = 2.1) and on-farm adaptive research occasionally as individual contact methods in transferring orange – fleshed sweet potato varieties to farmers in the study area. The result is in conformity with Onuekwusi and Atasie, (2011) that individual method plays a complementary role in extension delivery when mass and group methods are not readily available. However, they occasionally adopted demonstrations, training workshops and tours/field trips as group contacts for dissemination of these varieties. For mass contacts, they respondents averred that radio/television ($\overline{X}$ = 2.4) and leaflet ($\overline{X}$ = 2.0) were methods occasionally adopted in technology transfer. Nwaobiala, (2017) asserted that mass media methods such as radio and television are effective in technology transfer to farmers as they have large coverage.

Table 2: Distribution of Farmers according to Methods Used in the Transfer of Orange-Fleshed Sweet Potato Varieties to Farmers

Transfer Methods	Always	Occasionally	Never	Total	Mean	Decision
a. Individual Contacts						
i. Farm and home visits	12(36)	62(124)	6(6)	166	2.1	Occasionally
ii. Telephone calls	56(168)	4(8)	20(20)	196	2.4	Occasionally
iii. O n-farm Adaptive Research	12(48)	58(116)	10(10)	162	2.0	Occasionally
iv. (OFAR)						
b. Group Contacts						
i. Demonstrations (SPATs/MTPs)	14(42)	55(110)	11(11)	163	2.0	Never
ii. Attendance to conferences	9(27)	59(118)	12(12)	157	1.9	Occasionally
iii. Training/workshops	16(48)	51(102)	13(13)	163	2.0	Occasionally
iv. Tours/field trips	17(51)	49(98)	14(14)	163	2.0	Occasionally
c. Mass Contact						
Leaflets	50(150)	8(16)	22(22)	188	2.4	Never
Exhibits/posters	13(39)	21(42)	46(46)	127	1.6	Occasionally
Radio	17(51)	48(96)	15(15)	162	2.0	Occasionally
Television	11(33)	57(114)	12(12)	159	2.0	Occasionally
Total					**22.6**	
Grand Mean Scores					**2.1**	

Source: Field Survey, 2019
Figures in parenthesis are nominal likert values multiplied by frequencies

Effectiveness of Technology Transfer Methods

The result in Table 3 revealed that all the effectiveness items on transfer methods were effective. The farmers ascribed that these method were targeted towards farmers' needs, building and stimulating interest and able to convince them to adopt a technology with mean scores of 3.6 each. Also, orange fleshed sweet potato farmers averred that the transfer methods were avenue for the extension agents to select local leaders and basis for comparison to other technologies disseminated with mean scores of 3.2 each as against large coverage of farmers (X = 3.0). However, they agreed that the transfer methods influence change, easy to understand, enhanced their kills and builds confidence with mean ratings of 3.1each. The mean effective score of technology transfer methods orange fleshed sweet potato was 3.3, indicating that the transfer methods were effective. Musa *et al*. (2019) opined that effectiveness of transfer methods influences adoption of innovations. Declaro-Ruedas, (2019); Ngaka and Zwane (2017) affirmed that technology modalities used by agricultural extension workers were very effective in disseminating improved and proven agricultural innovations to farmers and thus selecting local leaders.

Table 3: Distribution of Farmers according to Effectiveness of Technology Transfer Methods of Orange Fleshed Sweet Potato Varieties to Farmers

Effectiveness Items	VH	H	M	L	VL	Total	Mean	Decision
Large coverage of farmers	13(65)	10(40)	25(75)	30(60)	2(2)	242	3.0	**Effective**
Introduce and influence change	15(75)	14(56)	22(66)	24(48)	5(5)	250	3.1	**Effective**
Targeted towards farmers needs	19(95)	16(64)	21(63)	14(28)	10(10)	260	3.6	**Effective**
Easy to understand	12(60)	21(84)	15(45)	26(52)	6(6)	247	3.1	**Effective**
Building and stimulating interest	12(60)	23(92)	21(63)	15(30)	15(15)	260	3.6	**Effective**
Enhanced skills	17(85)	16(64)	19(57)	16(32)	12(12)	250	3.1	**Effective**
Builds confidence on the instructor and learner	20(100)	18(72)	14(42)	10(20)	17(17)	251	3.1	**Effective**
Avenue to selecting local leaders	19(95)	16(64)	27(81)	15(30)	3(3)	258	3.2	**Effective**
Convince farmers to adopt technology	31(155)	10(40)	20(60)	15(30)	4(4)	289	3.6	**Effective**
Basis for comparison to other technologies disseminated	18(90)	17(68)	19(57)	13(26)	13(13)	254	3.2	**Effective**
Total							**32.6**	
Grand Mean Score							**3.3**	**Effective**

Source: Field Survey, 2019
Figures in parenthesis are nominal likert values multiplied by frequencies

Problems of Technology Transfer of Orange–Fleshed Sweet Potato (OFSP) Varieties

The result presented in Table 4 shows that 60.0% and 58.80% of the farmers affirmed that unavailability of land to practice the technology by farmers and non-accessibility of credit to famers was constraints faced by farmers. However, 57.50% identified non availability of OFSP vines and complexity of technology as a constraints, non-access to credit (56.20%) and cultural factors (55.0%). The challenge with using sweet potatoes in emergency response situations is the crop's low multiplication rate. Ukpabi *et al*. (2012) and Abudu *et al*. (2014) found that unavailability of land for farming as a major constraint faced by farmers in Nigeria.

Table 4: Distribution of Farmers according to Problems to Technology Transfer of Orange-Fleshed Sweet Potato Varieties

Categories of Problems	Frequency	Percentage*
Unavailability of land	48	60.00
Non – accessibility to other variable farm inputs	47	58.80
The improved OFSP vines are not readily available	46	57.50
Complexity of the technology to the farmers	46	57.50
Non – accessibility of credit to farmers	45	56.20
Cultural factors affect technology transfer	44	55.00
The technology is costly	36	45.00
The technology transfer is location specific	32	40.00
Non – adaptability of the technology on farmers' farm	29	36.20

Source: Field Survey, 2019
***Multiple Responses Recorded**

Factors Influencing Technology Transfer Methods of Orange –Fleshed Sweet Potato Varieties

The result of multinomial Logit regression analysis of factors influencing technology transfer methods of Orange-Fleshed Sweet potato (OFSP) in the study area is shown in the Table 5. The result presents Chi^2 (χ^2) of 37.71 which was significant at 5.0% level of probability indicating regression line has a best fit or a strong explanatory power. The likelihood ratio tests indicate that the slope coefficient was significantly different from zero for the two methods of technology transfer used in the study. The result shows that coefficient for age was positive and significant at 10% level of probability of the group method. This indicated that a unit increase in age will lead to a proportionate increase in transferring of OFSP technology using group method. This is expected as the aged will prefer to learn and be comfortable in a group discussion than their young ones. The coefficient for access to input was significant at 10% level of probability and negatively related to transferring of OFSP technology to the farmers using mass media method. This implies that any increase in access to input will lead to a proportionate decrease in the transferring of OFSP technology using mass media method. This also implied that those with access to input can easily be reached on individual contact. As reported by Momodu (2002) information needs and information seeking behaviour of rural dwellers in Nigeria on agricultural information is based on the personnel needs. Farmers will often time, require information on "where to purchase fertilizers", "how to use them", information on pesticides, herbicides, storage, and improved varieties of crops on personal contact or farmer to farmer information exchange. The coefficient for education was positive and significant at 5.0% for both group and mass media methods. This implies that any increase in years of formal education will bring about a corresponding increase in using group and mass media. This is expected and accordance with *a prior expectation.* Farmers with higher education levels are more likely to be reached on improved technologies and application of the technology in a group such as seminars, group presentations, conference among others following Ayalew and Abebe (2018). The literate farmers will develop interest to learn about and adopt technologies in group discussion where ideas are flowing. This is because information seeking, information giving capacity and use of improved technologies were determined by level of convincing (Adugna, 2013). In addition, farmers who are educated will likely be reached through mass media networks alike. Momodu (2002) noted that information can be made available to farmer through ICT tools such as mobile phones and radio and are able to transmit information in real time. The result supports the previous finding of Soleiman and Saed (2013) who indicated the significant relationship of farmers" education characteristics with the rate of technology adoption through social media dissemination method. In contrast, Alemna and Sam (2006), noted a negative effect in the use of ICTs in the rural areas of Ghana because literacy rates are very low and situation gets worse when it comes to computer literacy. The coefficient of household size was significant at 10% and had a direct relationship with group transfer method. This implies that any increase in household size will lead to a proportionate increase in the use of group methods. This is expected and accordance with a prior expectation. As number of household increases in size, group method will be preferred in conveying the message or information on Orange fleshed sweet potato rather than using other methods. More so, the coefficient of income is significant at 5.0% and had a direct relationship with the mass media transfer method. This

indicated that any increase in income of a farmer will lead to a corresponding increase in the use of mass media method in conveying OFSP messages to farmers. This is expected as income level of farmers influences their purchasing power not only in accessing mass media gadgets (such as television, radio, laptops, phones among others.) but also in using and maintaining them. Ayalew and Abebe (2018) reported that data for accessing and browsing information through phones and laptops gadgets are quite expensive. They also noted that significant proportion of the farmers indicated that the cost of ICT gadgets are among the factors that hinder the use in transferring newly emerging technologies. The coefficient of farm size was significant at 1.0% and had an indirect relationship with the group and mass media method of transferring OFSP technology to farmers. This implies that an increase in farm size will lead to proportionate decrease in the use of group and mass media in transferring method OFSP technology to farmers.. In other words, farmers with large farms holding would have higher tendency of being reached with group and mass media methods of transferring technology. This is in line with *a prior expectation* as most farmers in the study area have small farm holdings and can collectively addressed in group rather than on individual basis to save cost and time. Information can also be made available to these categories of farmers using mass media.

Table 5: Multinomial Logit Regression Analysis of Factors Influencing Technology Transfer Methods of Orange Fleshed Sweet Potato (OFSP) Varieties among Farmers in the Study Area

Variables	Parameters	Group	Mass media
Age	β_1	0.3389(2.13)*	-0.1716(-0.64)
Access to input	β_2	0.2805 (0.77)	-0.3345(-1.75)*
Education	β_3	3.4018 (2.53)**	2.3289 (2.24)**
Household size	β_4	0.5071 (2.22)*	0.7845(0.41)
Income	β_5	-0.00001 (-0.18)	0.0013 (2.92)**
Vine availability	β_6	0.0189 (0.06)	0.2311 (0.62)
Farm size	β_7	-1.5277 (-4.10)***	-4.0294 (-5.50)***
Type of variety	β_8	0.1640 (0.21)	-0.2910 (-0.27)
Cooperative Membership	β_9	-0.1531 (-0.06)	0.2879 (0.08)
LR Chi^2	37.71		
Prob > Chi^2	0.0067		
Log likelihood	-24.3401		

Source: Field Survey, 2019
Values in parenthesis are t - values
***P≤ 0.10, ** P≤ 0.05 and ***P ≤ 0.01**

Marginal Effect of Multinomial Logit Regression of Determinants of Factors Influencing Technology Transfer Methods of Orange Fleshed Sweet Potato

The result in Table 6 shows the marginal effects for continuous determinants of factors influencing the technology transfer methods of orange fleshed sweet potato in the study area. To further discuss the interpretation of the estimated results presented in Table 5, the marginal effects of the continuous variable on the predicted probability were estimated. The marginal effect of multinomial logit provides the probability that farmers will be reached through these transfer methods. The results of the marginal effect of the multinomial Logit regression showed that there is a probability of 0.0019% that the farmers will be reached through group transfer method if age of the respondents increase by one year. The probability that the sweet potato farmers will be reached through mass media as a result of decrease in access to input is given as 0.0024%. If education increases by 1 year at mean value, then the likelihood of using group and mass media methods will increase by 0.0570% and 0.0162% respectively. The results also show that if the household size increases by one person, the probability of using group transfer method will increase by 0.0103% in the study area. On the other hand, there is a probability of 9.29 e-07% for the farmers to be reached through social media if income increases by one Naira. The marginal effect also shows that there is probability of 106.80% and 2.849% that the group and mass media groups transfer method respectively will be used to reach the farmers if the farm size decreases by one hectare.

Table 6: Marginal effect for Continuous determinants (Multinomial Logit) of Factors Influencing Technology Transfer Methods of Orange Fleshed Sweet Potato

	Marginal effect (dy/dx)	
Variables	**Group**	**Mass media**
Age	0.0019	
Access to input		-0.0024
Education	0.0570	0.0162
Household size	0.0103	
Income		9.29 e-07
Farm size	-1.0623	-0.02849

Source: **STATA 13A Results**

Conclusion

Result from the study affirmed that technology transfer methods were effective. Telephone calls, farm/home visits, on-farm adaptive research, demonstrations, training workshops, radio/television and leaflets were methods used in transferring orange–fleshed sweet potato varieties to farmers. Age, education, household size, farm income and farm size influenced group and mass media methods of transfer of these varieties to farmers. The study therefore calls for policies to encourage the use of mass media method for transferring OFSP technology to farmers in the State. There is need to review the land tenure policy in order to ensure effective methods of technology transfer of orange fleshed sweet potato. There should be stakeholder's support policies for farmers in the rural areas; serving as linkages between farm households to fleshed sweet potato transfer technology.

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