INFLUENCE OF EXTENSION COMMUNICATION ON CASSAVA FARMERS' ADOPTION OF SUSTAINABLE AGRICULTURAL TECHNOLOGIES IN OBUDU LOCAL GOVERNMENT AREA OF CROSS RIVER STATE – NIGERIA

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ABSTRACT

This study analyze the influence of extension communication on cassava farmers' adoption of sustainable Agricultural Technologies in Obudu Local Government Area of Cross River State – Nigeria. In recent times, issues of sustainability and natural resources conservation and management have been emphasized globally, and Nigeria has not been an exception. These issues are of importance in Nigeria's agricultural sector development.

The specific objectives were to identify the sustainable agricultural technologies and existing extension communication channels, and how it will provide cassava farmers the necessary information and techniques for sustainable agriculture. The study made use of 100 cassava farmers that were randomly selected from 10 communities in the study area to provide data through the use of structural questionnaire. Data were analyzed using simple frequency square statistics. The study revealed that in the study area (Obudu local government area) mixed cropping and organic agriculture, contact with neighbors/family and television has a positive influence on cassava farmers' adoption of

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technologies. The result equally reveals from the analysis that the calculated x^2 value was greater than the critical value at the degree of 2 and at 0.5 level of statically significance.

Therefore it means the null hypothesis was rejected, meaning that there was a positive significant relationship between channels of communication and adopted technologies.

It is therefore recommended that farmers' experiences and indigenous knowledge should be harnessed through participatory extension for a sustainable agricultural development.

Keywords: *Adoption, Technologies, Sustainability, Communication.*

INTRODUCTION

Agriculture is essentially the oldest and one of the most important occupations of man in Nigeria. As a developing country, Nigeria has been experimenting different agricultural policies and programs leading to a considerable amount of damages in the sector. Nigeria agriculture has emphasized the use of external inputs as a means of improving food production. This is evident in the consumption of pesticides and herbicides as well as in organic fertilizers which has increased steadily. Pesticides and herbicides have replaced the biological, cultural and medical methods of controlling pests and weeds. Inorganic fertilizer have been substituted for livestock manure, compose and nitrogen fixing crops, information for management decision comes from inputs supplies.

These farming practices are unsustainable and have seriously threatened the environment and ecosystem as a whole. Adie (2014). The role of agriculture is to provide food and fibre in quantity and quality, sufficient for the present and future generation, which is why it must be practiced sustainably. If food security must be guaranteed for our immediate and future usage. Hence a range of sustainable farming practices or technologies have been formulated to meet this challenge. It is subsequent upon this that various technological practices in agriculture have been discovered by researchers.

Amalu (1998) asserts that the overall objective of agricultural research is to develop technologies or practice to make a sustainable increase in agricultural production with increasing efficiency while the research based must be enhanced as much as possible. These sustainable technologies are resources conserving e.g integrated pest management soil and water conservation, multiple cropping, nutrient recycling, waste recycling, crop and livestock diversity organic agriculture. Low inputs system and development of systems according to the agro-ecological and social needs of a region etc. Minarovic, etal (2000).

If agricultural practice in Nigeria has to be sustainable, our rural cassava farmers must adhere to the information of sustainable practices whose essence is for the maintenance of sustainable agro-ecosystem as to maintain their national resources base, rely on minimum artificial inputs from the outside arm system manage pest and disease through internal regulatory mechanism as well as recovery from the disturbance or alteration occasioned by cultivation and harvesting.

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Extension communication has played a significant influence on increasing cassava farmers' adoption of sustainable agricultural technologies as the study examines the extension services on the adoption of promoted cassava based technology in Obudu Local Government Area which base its services on the Training and visit system (T&V) of extension with basic aim of disseminating technical information to cassava farmers. This extension services is complemented by input, loan or credit support. The farmers' adoption of promoted cassava based technologies is influenced by such factors as accessibility to extension delivery method and characteristics of the extension components. These adoptions of promoted technologies impacts the cultivation of improved cassava varieties, cropping pattern and yield to the farmers for this reason communication have advanced from teaching to "learning" with a whole new professionalism.

The farmers must be guided to understand the concept of sustainability if Nigeria agriculture is to become sustainable. This involves not just implementing sustainable farming practices but management, marketing and profitability of these practices are of immense relevance to sustainable farming system. The farmers then find it difficult to understand and adopt sustainable technologies/practices when these are imposed on them by research and extension agents, it is not effective it has to be participatory in nature. A participatory extension communication will increase cassava farmers' adoption and knowledge of sustainable agriculture if the message is first send to the farmers by extension agents or workers through channel based on the fact that farmers need information on improved methods of farming to sustain agricultural production in the study area.

Significance of the study

Nigeria agriculture could hardly be sustained, if farmers fail or refuse to adopt the requisite knowledge, skills and attitude towards the production of improved varieties and good management practices. Effective extension communication is the same way to facilitating the adoption by our rural farmers which is necessary for developing a sustainable agriculture.

However, for extension communicating to be effective in this regards, it has to be carried out through appropriate channels. The results of this research will be relevant to extension agents, lecturers in the department as well as the staff and students in faculty of Agriculture, extension policy makers farmers and the researchers. This study at this point is considered significant and timely as it tries to X-ray appropriate extension communication channels for the development of sustainable agricultural technologies. As a matter of fact, it attempts to proffer solution to the problems encountered by cassava farmers in the cause of the production.

If cassava, (Mainihotspp) is to keep pace with the risking population and the increase in the demand of gain in the study area, more efficient farming technologies or practices must be adopted. This study is intended to contribute more significantly to adoption in the areas of extension communication processes and channels relevant for sustainable agricultural development.

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METHODOLOGY

Study Area:

The study was conducted in Obudu local government Area, is in the Northern part of Cross River State with the headquarters at Obudu urban. Obudu is made up of two major ethnic groups – the better speaking and the Utugwang speaking groups respectively.

Obudu has ten (10) political wards which includes:

- Alege/Ubang
- Angiaba/Begiaka
- Begiading
- Ipong
- Obudu urban I
- Obudu Urban II
- Ukpe
- Utugwang North
- Utugwang Central
- Utugwang South

In the geographical location, Obudu Local Government Area of Cross River State is situated at 6.67^0 North, latitude 9.17^0 East of longitude and 144 meters duration above sea level. Obudu has a population of 19,668 resident – National population census – (2006). The local government shares boundary with Benue state at the North Bekwara L.G.A from the West, Obanliku Local Government Area and republic of Cameroon from the East respectively. The people are predominantly farmers and their major occupation is growing of food crops. Agriculture is the economic mainstay of the people of the area who involved a system whereby the land labour and other resources are maximally deployed for effective productivity purposes. Land ownership in the area is

a communal property of family units with families organized in terms of paternal and maternal units. The land tenure system in the study area guarantees such family a share of land and members of the family could be allocated any parcel of land for the year's utilization. The soil is rich in cultivation and other allied agricultural processes. They consist of small medium scale farmers who predominantly cultivate cassava yam and other food crops like sweet potatoes, cocoyam and water yam. Apart from the type of farming engaged above, the people of Obudu also engaged in palmwine tapping processing of wild palm fruits, tailoring, welding work, trading and processes food crops into finished goods for sell. They equally rear livestock mainly the ruminants (goats and sheep) also the non-ruminants such as (pigs, chicken duck and dogs). The people speak "Bette" as their major language.

- **Study population**
  The population of the study includes male and female farmers involved in cassava cultivation.

- Sampling Techniques and sample size the study employed purposively and random sampling technique. And the ten council wards in Obudu local government area were selected in each of the council ward, 10 cassava farmers were randomly selected to make up 100 cassava farmers in the study area.

In carrying out the sampling exercise a sampled frame was drawn from each of the sample ward each frame consists of about 25 to 30 farmers and from each frame, 10 farmers were now randomly sampled in other to achieve the

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representativeness in the data to be obtained. Consequently 100 cassava farmers were used as a sample size for the study.

- **Methods of Data collection**: Primary data were obtained using a structural questionnaire which distributed to 100 farmers in the ten council wards in the study area and through personal interview of the farmers. The instrument used for the collecting of data for this research was two sets of structured questionnaires consisting of both open and close ended questionnaire and the data were to be collected without minimum of bias.

- Measurement of variables
  The various set of variable were used in the study area.
  A. **Dependent variables**
     – Extension communication channels: This was accessed based on the channels of communication and the present condition of the existing communication facilities against the acceptable condition of what the facilities will be for sustainable Agriculture.

  B. **The independent variable** for the study includes:
- Crop notation
- Natural pest control
- Mixed cropping
- **Method of data analysis**
  Descriptive statistics such as frequency distribution and percentage were used to resent data and variables specified in objectives 1, 2 and 3 and a five-point likert scale was used to analyze objectives

Response	Categories	Numerical value
strongly Agree	SA	5
Agree	A	4
Strongly Disagree	SD	3
Disagree	D	2
No response	NR	1

The above numerical value was to be assigned to the response categories the cumulative average was calculated. The mean response was equally calculated and used as a bench mark to rank the problems according t their severity: mean response (MR) = <u>Total Cumulative average</u>

 Number of question

Cumulative point (CP) = numerical value of each number of respondent X number of respondent that answered.

Objective 4 was addressed using chi-square statistical model. This was used to determine the effect of extension communication on cassava farmers adoption of sustainable agricultural technologies. The chi-square model was used as a subject and classified based on values of a set of predicator variables.

RESULTS AND DISCUSSION

Data collected from respondents in the study area through questionnaire were analyzed, discussed and presented thus:

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Table 1: Socio-economic characteristics of the respondents

S/N	VARIABLE	FREQUENCY	PERCENTAGES
1	Gender.		
	a. Male	44	44.00
	b. Female	56	56.00
	Total	100	100.00
2	Age of Respondents	100	100.00
	a<25 years	14	14.00
	b. 26 – 30	26	26.00
	c 31 – 40	40	40.00
	d 41 – 50	20	20.00
	e 50 and above	00	00.
	Total	100	100.00
3	Marital status		
	a married	64	64.00
	b single	36	36.00
	c divorced	00	00.00
	d widowed	00	00.00
	total	100	100.00
4	Farm size of respondents	68	68.00
	a < one ha	22	22.00
	b 1.2 – 2.0 ha	10	10.00
	c 2.1 – 2.5 ha	00	00.00
	d 2.1 – 3.0 ha	00	00.00
	e > 3.5 ha	100	100.00
	total		
5	primary occupation		
	a civil servant	15	15.00
	b public servant	10	10.00
	c traders	25	25.00
	d farming	50	50.00
	total	100	100.00
6	income		
	a <₦20,000	56	56.00
	b ₦21,000 – ₦30,000	30	30.00
	c ₦31,000 – ₦40,000	14	14.00

	d ₦41,000 – ₦50,000	00	00.00
	e >₦50,000	00	00.00
	total	100	100.00
7	farming experience		
	a < 10 years	18	18.00
	b 10 – 15 yrs	52	52.00
	c 16 – 20 yrs	25	25.00
	d 20 – yr and above	5	5.00
	total	100	100.00

Source. Field survey, 2017

Analysis of data in table 1 above revealed that by sex 56% of the respondents were female while 44% were male and this implies that cassava farming in the study area is dominated by females. 14% of the respondent were less than 25 yrs old, 26% of the respondents were between the age bracket of 26 – 3090, 40% of the respondents fall within the age range of 31 – 40, 20% falls between 41-50 years old whereas, 0% falls between 50 and above. This implies that cassava farming in the study area is effective for all ages except from 50 years and above and majority of them fall between the ranges 31 – 40 years representing 40%. The table equally revealed that 64% of the farmers that responded were married 36% of the respondents were single. 0% were divorced 0% were widows and widower. Hence, the result shows that majority of cassava farmers in the area of study were married and majority single. From the table, it was equally shown that 10% of the respondent had no formal education at all 25% of the respondents had completed their primary education 45% of the respondents had secondary education, 20% of the respondents had tertiary education. From the result, it is revealed that the educational distribution of cassava farmers in the study area were crooked towards primary secondary and tertiary education. It was hitherto, observed that 68%

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of the respondents used less than one hectare of land for cassava cultivation in the study area 22% of the respondents used between 1.2 – 20 hectares of land 10% new between 2.1 – 25 hectare of land 0% of the respondents need 2.6 – 3.0 hectare of land. And finally 0% used less than 3.5 hectares of land and above.

The result shows further that, majority of cassava farmers in the study area used less than one hectare of land for cassava cultivation at a particular place.

The table above equally revealed that 15% of the respondents were civil servants. 10% were public servants, 25% were traders and 50% of the respondents were predominantly local farmers. This indicates that majority of the cassava farmers were basically local farmers.

It was also revealed that 56% of the respondents had an income level of less than N20,000.30% had an income level of N31,000 to N40,000 . 0% had between N41,000 to N50,000. And 0% had > 50,000 income. This means that majority of the cassava farmers fall within the income level of less than N20,000 in the study area.

The table finally observed that 18% of the respondents had been farming for less than 10 years. 52% of the respondent have had 10-15 years farming experience. 25% of the respondents have 16-20 years of farming experience and above. In furtherance, it is obvious that from the table above, majority of the cassava farmers fall within the range of 10-15 years of farming experience, which would be a useful assets and experimental learning processes in extension education.

Table II. Summary of sustainable agricultural technologies

S/NO	ITEM	FREQUENCY	PERCENTAGES
1	crop Rotation	68	0.68
2	Natural pest control	42	0.42
3	Organic agriculture	72	0.72
4	Farming across slopes	43	0.43
5	cover cropping	56	0.56
6	Mulching	65	0.65
7	Minimum zero tillage	20	0.20
8	mixed cropping	79	0.79
9	use of improved high yield varieties	42	0.42
10	mixed farming	51	0.51
11	shifting cultivation	63	0.63
12	organic fertilizer application	14	0.14
13	precision farming	10	0.10
14	favourable or unfavorable	08	0.08

Source: field survey 2017

From table 11 above, it was observed that 68% respondents practiced crop rotation, 42% practiced national pest content strategy. 72% respondents practiced organic agriculture, 43% respondent practiced farming across shapes, 56% respondents practiced cover cropping, 65% respondents practiced mulching, 20% respondents practiced minimum zero tillage. 79% respondents practiced mixed cropping. 42% respondents practiced improved high yield, 63% expanded practices shifting cultivation, 14% respondents practiced organic fertilizer application 10% respondents practices precision farming 5% respondents practiced favourable farming.

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From table 11 above, it can be deduced that mixed cropping organic agriculture, mulching, crop rotation, mixed farming, shifting cultivation cover cropping and national pest control and effectively practiced in the area of study hence these practices and the development and effective cultivation of cassava in the study area. This is because the practices ensure that the soil nutrients are enhanced and replaced.

Table III Summary of extension communication channels

S/N	EXTENSION COMMUNICATION CHANNELS	NO	PERCENTAGE
1	Networking with expansion agents	23	0.23
2	Personal extension contacts	46	0.46
3	Result demonstration	15	0.15
4	method demonstration	10	0.10
5	Contact with neighbour/family	65	0.65
6	Radio	56	0.56
7	Television	59	0.59
8	Panel discussion	10	0.10
9	Participatory group discussion	25	0.25
10	Seminars	15	0.15
11	posters and bulletins	65	0.65
12	Participatory on farm test	10	0.10

Source: field survey, 2017

From table III above, it is indicated that 23% respondents were involved in networking with extension agents 46% respondents were involved in personal contact with extension agents, 15% were involved in result demonstration, 10% were involved in method demonstration 65% were involved in contact with neighbors, 56% were involved in radio, 59% respondents were involved in television channels, 10% respondents were involves in ravel discussion 25%

respondents were involved in participatory group discussion, 15% went involved in seminar 65% were involved poster and bulletins 10% were involved in participatory farm test. All intended to enhance extension communication channel on adoption of sustainable practice on cassava farmers.

The above table revealed that the most commonly and effective used channels were posters and bulletin television, contact with neighbour's/families, radio, personal extension contacts and to some extent, participatory groups discussion it is thus observed that extension communication channels could play a significant role in cassava farmers adoption of sustainable practice.

Table iV Problem of Extension Communication in the Dissemination of Sustainable Agricultural Technologies

S/No	Problem of Extension Communication	SA	A	SD	D	NR	cum	X	R
1.	The use of radio is not effective to the dissemination of agricultural technology/ information.	10(10)	15(30)	25(75)	50(200)	0(00)	315	3.15	2
2.	Channels of communication used, does not allow cassava farmers to learn about new practices.	62(62)	14(28)	10(30)	14(70)	0(00)	190	1.90	10
3.	Personal communication channels like extension contacts are not adequately supported by government.	72(72)	18(36)	5(15)	5(20)	0(00)	143	1.43	13
4.	Does internal noise affect cassava farmers' mental ability to interpret the message correctly or effectively thereby causing communication to be difficult.	04(04)	06(12)	68(189)	22(88)	0(00)	293	2.93	4
5.	Does environmental noise disturb the extension agent from sending the message to the cassava.	10(10)	10(20)	40(120)	15(70)	25(125)	345	3.45	1
6.	Does environmental noise (Physical noise) distract the cassava farmers from receiving the message sent by extension farmers?	35(35)	26(52)	29(87)	05(20)	05(25)	219	2.19	7
7.	Does this channels used allow or no participation by cassava farmers?	40(40)	28(56)	12(36)	10(40)	10(50)	222	2.22	6
8.	Does participation and focused groups' discussion expensive?	46(46)	18(36)	10(30)	18(72)	10(50)	234	2.34	5
9.	Does technology development processes participatory	05(05)	15(30)	52(159)	28(112)	0(00)	306	3.06	3
10.	Are message communicated to cassava farmers, those that emphasized on high eternal inputs?	68(68)	18(36)	12(36)	06(24)	06(30)	194	1.94	9

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11.	Channels of communication do not incorporate farmer's ideas and practices	71(71)	18(36)	6(18)	05(20)	0(00)	145	1.45	12
12.	Cassava farmers have never been called to attend seminar or workshop on improved varieties.	56(56)	32(64)	12(36)	0(0)	0(0)	156	1.56	12
13.	There is continuous reliance on conventional communication technology dissemination as opposed to local communication media	86(86)	04(08)	06(18)	04(16)	0(0)	128	1.28	14
14.	Are message developed for communication, science base technologies? Which does not take into consideration the situation of complicity of the farmers' environmental sustainability.	56(56)	28(56)	10(30)	06(24)	0(0)	166	1.66	11
15.	Cassava farmers are not given forum to discuss their problems with researchers	52(52)	6(12)	18(24)	12(48)	12(60)	196	1.96	8

Source: Field Survey 2017
$\Sigma \dot{X}$=32.53,32.53 ÷ 15 = 2.17

Decision Rule: Any mean value greater than 2.17 indicate the extent which the identified variables affects the dissemination of sustainable practices.

From table 4 above, the problems of extension communications channels were identified using a 5 point likert scale to measure the attitude of farmers towards these problems.

The mean response was calculated as follows

Mean response MR=TCA=<u>32.53</u>
                    15
                        =2.17

The mean response was used as a bench mark to rank the problems according to importance. All the problems with cumulative averages (CA) less than the mean response value of 2.17 Were not considered much of a problem.

The problem with cumulative averages above the mea n response (MR) were considered important and ranked accordingly. From the analysis therefore, the following were identified as problems of extension communication channels in

disseminating sustainable agricultural technologies in the study area, does environmental noise disturb the extension agent from sending the message to the cassava farmers (3.45). The use of radio is not effective to the dissemination of agricultural technologies/information (3.15): Does technology development processes participatory (3.06), does internal noise affect the cassava farmers mental ability to interpret the message correctly or effectively thereby causing communication to be difficult (2.93). Does participation and focused groups discussion expensive (2.34), does this channels used allow little or no participation by cassava farmers (2.22), does external noise (physical noise) distract the cassava farmers from receiving the message sent by the extension agent (2.19).

TEST OF HYPOTHESIS

The Null Hypothesis:

Extension communication channels have no significant relationship with cassava farmers adoption of sustainable agricultural technologies.

In testing the hypothesis a chi-square statistical study was used. A test of channels of communication was conducted against adoption sustainable agricultural technologies and from the analysis, the calculated X^2 of 5.9919 was greater> critical X^2 of 4.6919 at degree of 2 and o.5 level of statistical significance.

From the analysis, since X^2 calculation is > X^2 tabulated, the null hypothesis is that extension communication has no significant relationship with cassava farmers adoption of

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sustainable agricultural technologies is rejected thus we accept the alternative hypothesis.

Inference:

The result indicates that extension communication has an influence in adoption of sustainable cassava production in the study area.

CONCLUSION

There is no single communication channel that is effective, in dependently for cassava farmers to utilize the innovation of sustainable practices recommended for use, appropriate measure must be taken to make them available and useful to farmers. To ensure that Nigeria agriculture becomes sustainable, agricultural practice as to acquire the requisite knowledge. To this end, Agricultural Development Programmes (ADPS) must ensure that extension communication channels employed must be participatory interactive and re-enforceable. From the result of the analysis, it was clear that cassava farmers adoption of sustainable practiced was influenced by the source of information earning them and also available to them.

There were constraints to the initialization, communication methods reaching them until these constraints and obstacle imitating against farmers adoption behaviour on sustainable practice and eliminated, an increase in cassava productivity will not be achieved.

RECOMMENDATIONS

In view of the findings from this research the following recommendations are proffered.

1. To ensure successful extension approached, cassava farmers organizations should be encouraged to enhance their participation in extension delivery.
2. The use of extension communication channels that allow participation and centralization of farmers should be encouraged by the Cross River State Agricultural Development Project (CRADP).
3. Extension teaching methods should have much emphasis on personal visit and demonstration plot which has been found most effective method of farmers to ask questions about the practices.
4. The Cross River State Government should provide adequate faming for participatory and focused group discussion.
5. The research institute should work effectively in other to bring viable, good, early maturity and high yield stem of cassava for farmers.
6. Extension workers should be made mobile for them to reach out to many rural farmers without much stress through the problems of transport facilities.
7. There is need to increase the number of workers in the study area to support the effort of existing agents as this will enhance the level of farmers adoption of sustainable agricultural technologies.
8. Farmers experiences and indigenous knowledge should be harnessed through participatory extension for sustainable agricultural development.
9. Extension teaching should be participatory to ensure an effective adoption of sustainable agricultural practices among farmers.
10. The study recommend that further study should be carried out on the   relationships between extension

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communication channels and sustainable agricultural practices among rural farmers.

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