Tackling Problem of Low Adoption of Agricultural Innovations by Farmers in Udenu L.G.A of Enugu State, Nigeria

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Abstract
A study to determine strategies for tackling the problem of low adoption of agricultural innovations by farmers in Udenu Local Government Area of Enugu State was conducted. The aim was to find out reasons behind the low adoption of innovations by farmers in the area and to suggest possible strategies to address this ugly situation; as a way to increase food production amongst farmers in the area. Hundred (100) farmers from 5 communities in the area and 10 staff of 2 Agricultural Research Institutes were purposively selected as major sample for the study. Structured questionnaire and scheduled interviews were used to collect data from Respondents. Data on the gender and educational characteristics of the respondents were analyzed using frequency distribution, while the hypotheses postulated for the study were tested using Chi-square statistical tool at 0.05 probability level of significance and at 4degrees of freedom. One of the null hypotheses was rejected while the other was accepted; also the alternate hypothesis was accepted. The study found that greater number of men were involved in agriculture than women, that the level of education of respondents was low and adoption of agricultural innovations low; also the study found that services of extension agents in the rural areas was inadequate and they were faced with many difficulties in their efforts to introduce new innovations to farmers; most farmers were reluctant to adopt new innovations for various reasons. The researchers recommended increase in ratio of extension agents to farmers, use of indigenous extension agents and local interpreters to disseminate innovations, training of model farmers as change agents, and subsidizing agricultural inputs as strategies for encouraging adoption of innovations by rural farmers.
Key words: Agricultural innovations, Adoption, Small-scale farmers.

Introduction:
Food security a concept dealing with the ability of a nation being able to produce enough food for her citizens in quality and quantity, and at affordable price is yet to be attained by most developing nations, Nigeria inclusive. In support of the above reality Ojo and Adebayo (2012) observed that despite the pretensions to the contrary, Nigeria as a nation is far from being completely food secured. The above pressing need calls for concerted efforts to explore all available resources to attain food sufficiency if the increasing level of hunger, poverty and their attendant evils must be avoided. According to Isife and Albert (2009) a nation cannot be seen as a great nation until her agricultural potentials and her concomitant institutions are developed and properly harnessed.

Successive governments, organized private sectors, non-governmental organizations (NGOs) and other stake holders have made and are still making commendable efforts to improve the agricultural fortunes of Nigeria as a nation. However, such efforts seem to be faced with many obstacles one of them being the reluctance of rural farmers to adopt agricultural innovations like- use of improved seeds, use of agro-chemicals to control pests/diseases, use of modern farm machinery and modern storage facilities etc in their farming enterprises. Commenting on the decline in the agricultural development in developing countries Nigeria inclusive, Kiplang and Wallace (2003) attributed this ugly trend to a number of constraints including- inappropriate and inconsistent agricultural policies, inadequate information provision, low level adoption of improved agricultural technologies and institutional frameworks.

This study was carried out to find out the factors behind low adoption of agricultural innovations by farmers in the study area; with the aim of providing strategies for encouraging use of such innovations to boost food production in our rural areas – being the major locations for food production in the country.

Statement of Problem:
Available evidence from observations and interactions with farmers in the area of study showed that the level of food production is far below the expected projections; this is worrisome considering the abundant natural and human resources in this area. Most farmers in this area still practice subsistence agriculture characterized by use of crude implements to cultivate small pieces of land. Literature search showed that previous studies dwelt more on problem of acceptance of innovations among farmers in the rural areas than on adoption of agricultural innovations. The above underscores need for more research to encourage use of agricultural innovations and technologies by farmers to increase the size of farmland to be cultivated, make farming in the area of study drudge-free, more productive and more profitable.

Hypotheses:
Two null and one alternate hypothesis were postulated for this study as follows:
Ho_1: There is no significant difference between the effectiveness of extension agents and the acceptance of their services by farmers.
Ho_2: There is no significant difference between challenges to introduction of innovations and the success of extension agents in service delivery.
H_3: The means of introducing agricultural innovations has significant effect on its adoption by farmers.

Methodology:

Twenty (20) farmers each from 5 communities in Udenu Local Government Area (Totaling 100) were selected with 10 extension agents from 2 research institutes as the major population for this study. Purposive sampling of farmers was done using their sex, level of education, experience and willingness to participate in the study as basis for selection. Data were collected from the respondents using questionnaire and scheduled interviews. Demographic characteristics of the respondents were presented in Tables using frequency distribution and simple percentages; while Chi-square statistical tool was used to test the hypotheses set for the study.

Results and Discussion:

The sex of the farmers is shown in Table 1. Out of the 100 farmers sampled, 68% were male, while only 32% of them were female. The above means that majority of the farmers were male. The above finding agrees with that of Egwu (2015) who observed need to involve women more in agriculture. This author further observed that in northern part of Delta State, Nigeria about 75% of farmers were male. Similarly FAO (2000) reported that women involvement in agriculture is affected by many factors including lack of support from extension agencies, input suppliers and credit institutions. Policy makers should therefore deliberately make policies that will address such challenges in order to encourage more women to take to agriculture as a means of earning their livelihood.

Table 1: Distribution of respondents according to sex/gender:

Sex	Frequency	Percentage (%)
Male	68	68
Female	32	32
Total	100	100

The educational qualification of the farmers is shown in Table 2. The educational qualifications of the farmers showed that only 30% of them possess post-secondary education, the majority of them 14%, 23% and 33% have non-formal education or are holders of primary and secondary education certificates respectively. The above means that the level of literacy amongst local farmers is still low.

Farmer's awareness of the existence of agricultural extension services in the study area is shown in Table 3. Out of the total 1,398 responses received 644 (46%) are aware of existence of agricultural extension services; while the majority 754 (54%) have no such knowledge. This result agrees with the finding of Ishola (1987) who reported that lack of knowledge of agricultural innovations was the main constraint to agricultural production in most rural communities.

Effectiveness of agricultural extension agents in the study area is shown in Table 4. The data showed that only 521 (46%) of the respondents agreed that extension agents are effective in their duties; while the majority of the respondents 618 (54%) disagreed with the above view. This result agrees with the finding of Ozowa (1995) who reported that most extension agents are ill-prepared for their jobs at the grass root level and hence cannot deliver their services effectively to their clients.

Limitations to effective introduction of new agricultural innovations are shown in Table 5. The data in Table 5 showed that majority of the respondents 1,334 (87%) agreed that all the factors listed as limitations to effective introduction of innovations affected adoption of such innovations in one way or the other; while only 193 (13%) of the respondents disagreed. The above result agrees with the findings of Lucky and Achebe (2013) who reported that ability to read and write, proficiency in certain local language are factors for effective dissemination of new agricultural innovations to farmers in the rural areas.

Table 2: Distribution of respondents according to their educational qualifications:

Educational Qualification	Frequency	Percentage (%)
No formal education	14	14
Primary education	23	23
Secondary education	33	33
Tertiary education	30	30
Total	100	100

Table 3: Farmers' awareness of the existence of agricultural extension services in the area of study:

S/N	Item	SA	A	D	SD
1.	You are always aware of extension services.	7	24	58	11
2.	Extension agents visit you regularly with updates on agricultural innovations.	8	18	60	14
3.	The population of extension agents in my locality is adequate.	10	11	57	22
4.	My relationship with extension agents is cordial.	14	19	66	1
5.	The extension agents are effective in their job.	5	19	63	13
6.	Instead of extension agents, I get relevant information from other sources.	27	29	41	3

Keywords: SA = Strongly Agreed, A = Agreed, D = Disagreed and SD = Strongly Disagreed.

Table 4: Effectiveness of agricultural extension services in the area of study:

S/N	Item	SA	A	D	SD
1.	Extension agents organize workshops and trainings for farmers regularly.	7	22	59	12
2.	Farmers get current information in new technologies/innovations.	4	33	51	12
3.	Extension agents educate farmers on new skills and know-how in agriculture.	8	25	51	16
4.	Effective farmer education has encouraged cultivation of more farmlands by farmers.	10	22	60	8
5.	Your awareness of new technologies/innovations in agriculture has improved.	12	17	54	17

Table 5: Limitations to effective introduction of agricultural innovations in the area of study:

S/N	Item	SA	A	D	SD
1.	Difficulty in integrating rural and agricultural policies.	32	42	21	5
2.	Lack of basic infrastructure: bad road – network, no pipe-borne water, electricity, hospitals etc.	35	48	13	4
3.	Inability to speak/communicate in the language of the people.	38	46	14	2
4.	Poor literacy level of farmers.	29	46	19	6
5.	Lack of knowledge of the customs, culture of host community.	21	56	19	4

Table 6: Methods of introducing agricultural innovations in the area of study:

S/N	Item	SA	A	D	SD
1.	Use of drama, folklores, group discussions, exhibitions/demonstrations.	51	44	5	0
2.	Use of Radio stations and other mass media.	34	48	14	4
3.	Use of information centres, and government agencies.	32	44	18	6
4.	Training of model farmers for them to train other farmers.	37	57	8	0
5.	Use of interpreters conversant with the local languages/dialects.	55	38	7	0

Methods of introducing agricultural innovations in the area of study are shown in Table 6. The data from Table 6, showed that almost all respondents 1529 (93%) affirmed that all the methods listed for successful introduction of new agricultural innovations are effective; while a negligible number of respondents' 114 (7%) disagreed. This result agrees with the finding of Kidd (1987), who reported that even though recommendations made by the Ministry of Agriculture in the former Western Region of Nigeria on the adoption of improved farm inputs were well-known to farmers, such were not adopted by farmers. This was because the programmes were only broadcast on air with little efforts to reach the farmers in rural areas in a less formal style. Also Ozowa (1995) reported that agricultural information that cannot sustain farmers' interest and those written or broadcast in English language instead of their local languages; cannot make any attitudinal change in them and such may not be widely accepted by them in the long run.

The summary of the interviews granted to extension agents showed that other factors including shortage of extension agents, especially female extension agents, lack of working materials and other logistics are adversely affecting their effectiveness in carrying out their duties. The above agrees with the findings of Olawoye (1993) and FAO (1993), they reported that lack of mobility, shortage of qualified female extension staff, lack of co-ordination between the unified extension services system and the parallel extension services (amongst others) are the major constraints to effective service delivery by extension agents.

Test of Hypotheses:

Hypothesis 1: There is no significant difference between effectiveness of extension agents and the acceptance of their services by farmers.

Table 7: Responses of farmers on the effectiveness of extension agents and the acceptance of their services by farmers:

Item	O	E	(O – E)	(O – E)^2	X^2	t-cal	t-critical	Df	Level of Significance	H$_1$ (Remark)
1.	227	233	-6	36	0.2					
2.	220	233	-13	169	0.7					
3.	209	233	-24	576	2.5					
4.	246	233	13	169	0.7	14.8	11.1	4	0.05	Rejected
5.	216	233	-17	289	1.2					
6.	280	233	47	2209	9.5					
Total	1,398	1,398			14.8					

Table 7 showed the responses of farmers on the effectiveness of agricultural extension agents in the area of study. The total observed value was 1398 while the expected value was 233; the value of t-cal 14.8 was greater than that of t-critical value 11.1 at 0.05 probability level at 4 degrees of freedom. Therefore, since t-cal 14.8 was greater than t-critical 11.1, the hypothesis was rejected; meaning that effectiveness of extension agents positively affected acceptance of their services.

Hypothesis 2: There is no significant difference between challenges to introduction of innovations and the effectiveness of extension agents

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Table 8: Responses of extension agents on constraints to effective introduction of innovations in the area of study:

Item	O	E	$(O-E)$	$(O-E)^2$	X^2	t-cal	t-critical	Df	Level of Significance	H_2 (Remark)
1.	301	305.4	-4.4	19.4	0.1					
2.	214	305.4	8.6	74.0	0.2					
3.	320	305.4	14.6	213.2	0.7	1.6	9.5	4	0.05	Accepted
4.	298	305.4	-7.4	57.8	0.2					
5.	298	305.4	-11.4	130.0	0.4					
Total	1,527	1,527			1.6					

The responses of extension agents on the constraints to effective introduction of agricultural innovations to farmers are shown in Table 8. The result showed that the observed value 1527 was higher than the expected value 305.4, also the t-cal 1.6 was less than the t-critical 9.5 (1.6 < 9.5). Therefore, this hypothesis was accepted. This means that extension agents even though faced with many challenges in carrying out their duties were not deterred by such challenges.

Hypothesis 3: The means of introducing agricultural innovations has significant effect on its adoption by farmers.

Table 9: Responses of farmers on the effect of different methods of introducing agricultural innovations and their adoption:

Item	O	E	$(O-E)$	$(O-E)^2$	X^2	t-cal	t-critical	Df	Level of Significance	H_3 (Remark)
1.	346	328.6	17.4	302.8	0.9					
2.	312	328.6	-16.6	275.6	0.8					
3.	302	328.6	-26.6	707.6	2.2					
4.	335	328.6	6.4	41.0	0.1	5.1	9.5	4	0.05	Accepted
5.	348	328.6	19.4	376.4	1.1					
Total	1,643	1,643			5.1					

Table 9 shows the responses of farmers on the effect of different methods of introducing agricultural innovations and their adoption. The result showed that the observed value was 1643, while the expected value was 328.6. Also calculated t-value was 5.1, while the Table t-value was 9.5 at 4 degrees of freedom when tested at 0.05 probability level of significance. Therefore, since calculated t-5.1 is less than the Table t-9.5 (t-cal 5.1 < t-critical 9.5) this hypothesis was accepted. This means that agricultural innovations can easily be adopted by farmers if the strategy for introducing such is acceptable to them.

Conclusion:

From the results of this study it was concluded that agricultural extension agents are key factors to achieving the goal of food sufficiency/security in Nigeria; through the dissemination of agricultural innovations to grass root farmers. Therefore, impediments and obstacles to their effectiveness in this very important job including lack of finance, working materials and other logistics should be promptly addressed by the government and other stakeholders.

Recommendations:

From the results of this study the researchers recommended the following as strategies for encouraging adoption of innovations by farmers in the area of study:
- i) Increase in the ratio of extension agents to farmers,
- ii) Use of indigenous extension agents and local interpreters to disseminate innovations,
- iii) Training of model farmers as change agents in the area of study, and
- iv) Subsidizing of agricultural inputs

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