Strategies for Dealing with Low Adoption of Agricultural Innovations: A Case Study of Farmers in Udenu L.G.A of Enugu State, Nigeria

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Abstract
A study to access the level of acceptance/adoption of agricultural innovations by farmers in Udenu Local Government Area of Enugu State was carried out. The aim was to find out the reasons behind the low acceptance/adoption of agricultural 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 study area. Hundred farmers from 5 communities in the study area and 10 staff of 2 agricultural Research Institutes were randomly selected as the major population for this study. Three (3) Alternate Hypothesis set for this study were tested using Chi-square statistical tool at 0.05 probability level of significance and at 4 degrees of freedom; and only one was rejected. Structured questionnaire and scheduled interviews were used to collect data from farmers and staff of the Research Institutes. Result from the study showed that services of extension agents in the rural areas are inadequate and ineffective. It was also found that extension agents are faced with many challenges in their efforts to introduce new agricultural innovations to farmers; most farmers were reluctant to adopt new agricultural innovations/technologies for various reasons. Increasing the ratio of extension agents to farmers, use of indigenous extension agents and local interpreters to disseminate new innovations and technologies, training of model farmers as change agents, use of demonstration method and subsidizing agricultural inputs were recommended as strategies for encouraging acceptance/adoption of agricultural innovations and technologies by rural farmers.
Keywords: Agricultural Innovations, Extension Agents, Technologies, Adoption, Small-Scale farmers.

INTRODUCTION

Government interventions to improve and increase the level of food production in Nigeria including support to researches into various aspects of agriculture is ongoing (Bello, 2004; Larson *et al*., 2004; Davies, 2009). The results of these research works has led to various types of innovations in different aspects of agricultural practice and enterprise; ranging from farm mechanization, effective pests and disease control, production of improved breeds and varieties of livestock and seeds, improved methods of processing and storage of crops and livestock amongst others.

In addition to government efforts in encouraging research work in different fields of agricultural production; there is also need to create awareness on the existence of new innovations and technologies to farmers, especially those in the rural areas. Also farmers should be encouraged to accept and adopt such innovations and technologies in their farming activities. This is very important because rural farmers constitute the greater population of the farming family in most developing countries and they are largely responsible for the nation's crop and livestock production (CGIAR, 1995).

According to Munyua (2000), when the rural farmers lack access to knowledge and information that would help them achieve maximum agricultural yield; they not only grope in the dark but are also forced to move to the urban centres in search of white-collar jobs, may be as the only option for survival. The above dangerous situation should not be allowed or encouraged because of its negative, social and economic consequences.

Government must therefore, sustain and/or increase all her efforts towards mobilizing and motivating the farmers for massive food production. Otherwise, the dream of the nation for increase local production of food and achievement of food security will remain a mirage; until farmers access to agricultural innovations/technologies and their acceptance/adoption is successfully achieved (Ishola, 1987; Blait, 1996; Boz *et al*., 2002; Turkyilmaz *et al.,* 2003).

HYPOTHESES

Three alternate hypotheses were postulated for this study as follows:
H_1: The services of agricultural extension agents in rural areas are effective and efficient.
H_2: There are significant challenges involved in introducing new agricultural innovations to farmers in rural areas.
H_3: There are various means of making introduction of new agricultural innovations easier in the study area.

METHODOLOGY

Twenty (20) farmers each from 5 communities in Udenu Local Government Area (Totaling 100), were randomly selected with 10 extension agents from 2 research institutes as the major population for this study. Data were collected from the respondents using questionnaire and scheduled interviews. Descriptive statistics involving the use of Tables and percentage and Chi-square statistical tool were used to analyze the research questions and the hypotheses set for this study.

RESULT 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 educational qualification of the farmers is shown in Table 2. The educational classification 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 improved technologies 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 date showed that only 521 (46%) of the responses received agreed that extension agents are effective in their duties; while the majority of the responses received 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/technologies are shown in Table 5. The data in table 5 showed that the majority of the responses from the respondents 1,334 (87%) agreed that all the factors listed as limitations to effective introduction of new innovations/technologies affected adoption of such innovations/technologies in one way or the other; while only 193 (13%) of the responses received 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.

Means of introducing new agricultural innovations in the area of study is shown in Table 6. The data from table 6, showed that almost all responses received 1529 (93%) affirmed that all the strategies 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: The services of agricultural extension agents in rural areas are effective and efficient.
Table 7, showed the responses of farmers on the effectiveness and efficiency of agricultural extension agents in the study area. 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 and at 4 degrees of freedom. Therefore, since t-cal 14.8 was greater than t-critical 11.1, the hypothesis was rejected; meaning that the services of extension agents in the study area was below what is expected.
Hypothesis 2: There are significant challenges involved in introducing new agricultural innovations to farmers in the study area.

The responses of farmers on the possible constraints in the course of introducing new agricultural innovations/technologies to them by extension agents is 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 are faced with significant challenges in introducing new agricultural innovations to farmers.

Hypothesis 3: There are various means of making introduction of new agricultural innovations easier in the study area.

Table 9 shows the responses of farmers on the different ways of making introduction of new agricultural innovations easier in the study area. 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 and 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 new agricultural innovations can easily be introduced to farmers in the study area using different approaches.

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 new agricultural innovations and technologies to grass root farmers. Therefore, impediments and obstacles to their effectiveness in this very important job should be totally removed or reduced to its barest minimum.

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REFERENCES

Bello, A. (2004). Keynote Address Presented by the Honourable Minister for Agriculture and Rural Development, at the ARMTI Annual Lecture, Ilorin, March 24, 2004.

Blait, S., Calvelo Rios, M., and Masias, L. (1996). Communication for Development for Latin America: A Regional Experience. FAO, Rome, Italy.

Boz, I., Akbay, C., Orhan, E. (2002). The Factors Adoption and Diffusion of Corn Production in Kahramanmaras Turkey. The Congress of Agricultural Economists (18-20 September), Erzurum pp 440-448.

CGIAR (1995). Renewal of the CGIAR: Sustainable Agriculture for Food Security in Developing Countries. Ministerial Level Meeting, Luceme, Switzerland, CGIAR, Washington, D.C. USA pp. 133.

Davies, A.E. (2009). "Food Security Initiatives in Nigeria: Prospects and Challenges", Monograph, Department of Political Science, University of Ilorin, Nigeria.

FAO (1993). "The State of Food and Agriculture". Rome. Food and Agricultural Organization of the United Nations.

Ishola, A. (1987). "Improving the Relevance and Effectiveness of Agricultural Extension Activities for Women Farmers". In: FAO (1995); FAO Corporate Document Repository.

Kidd, O. (1987). "Factors Affecting Farmers". Responses in Western Nigeria. CSNRD Report, No 30, pp. 5.

Larson, O., Anderson, J., & Vargingis, P. (2004). Policies in Managing Risk in Agricultural Markets. The World Bank Research Observer, Vol. 19.

Lucky, A.T. and Achebe, N.E.E. (2013). "Information and Communication Technology and Agricultural Information Dissemination; A Case Study of Institute of Agricultural Research, Ahmadu Bello University, Zaria. *Research Journal of Information Technology* 5 (1) pp. 11-17.

Munyua, H. (2000). Application of Information Communication Technologies (ICTs) in the Agricultural Sector in Africa: A Gender Perspective. In: Rathgeber, E. and Adera, E.O. (Eds.) Gender and Information Revolution in Africa IDRC/ECA. Pp. 85-123.

Olawoye, J.E. (1993). Gender Priorities and Issues in Agricultural Extension Delivery. Paper Presented at the National Conference of the Society for Agricultural Extension of Nigeria, 24 to 26th February.

Ozowa, V.N. (1995). "Information Needs of Small-Scale Farmers in Africa: The Nigerian Experience". Quarterly Bulletin of the International Association of Agricultural Information Specialists IAAIS/CABI 40 (1).

Turkyilmaz, M.K., Bardakcioglu, H.E. & Nazligul, A. (2003). "The Socio-Economic Factors Effective for the Adoption of Innovations at the Dairy Farms at the Province of Aydin". *Turkey Journal of Veterinary Animal Scientists*. 27 (6): 1269-1275.

TABLES

Table 1: Distribution of the Respondents According to Sex/Gender.

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

Table 2: Distribution of the 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 Study Area.

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.

Likert – Scale Analysis for Table 3

Item	SA	A	D	SD	TR	TA	TD	A%	D%
1.	28	72	116	11	227	100	127	44	56
2.	32	54	120	14	220	86	134	39	61
3.	40	33	114	22	209	73	136	35	65
4.	56	57	132	1	246	113	133	46	54
5.	20	57	126	13	216	77	139	36	64
6.	108	87	82	3	280	195	85	70	30
Total	284	360	690	64	1,398	644	754	46	54

Key   =   Likert – Scale Scores

SA = 4

A = 3

D = 2

SD = 1

Table 4: Effectiveness of Agricultural Extension Activities in the Study Area.

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

Likert – Scale Analysis for Table 4

Item	SA	A	D	SD	TR	TA	TD	A%	D%
1.	28	66	118	12	224	94	130	42	58
2.	16	99	102	12	232	115	117	50	50
3.	32	75	102	16	225	107	118	48	52
4.	40	66	120	8	234	106	128	45	55
5.	48	51	108	17	224	99	125	44	56
Total	164	357	550	65	1,139	521	618	46	54

Table 5: Limitations to Effective Introduction of New Agricultural Innovations in the Study Area.

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

Likert – Scale Analysis for Table 5

Item	SA	A	D	SD	TR	TA	TD	A%	D%
1.	128	126	42	5	301	254	47	84	16
2.	140	144	26	4	314	284	30	90	10
3.	152	138	28	2	320	290	30	91	9
4.	116	138	38	6	298	254	44	85	15
5.	84	168	38	4	294	252	42	86	14
Total	620	714	172	22	1,527	1,334	193	87	13

Table 6: Means of Introducing New Agricultural Innovations in the Study Area.

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

Likert – Scale Analysis for Table 6

Item	SA	A	D	SD	TR	TA	TD	A%	D%
1.	294	132	10	0	346	336	10	97	3
2.	136	144	28	4	312	280	32	90	10
3.	128	132	36	6	302	260	42	86	14
4.	148	171	16	0	335	319	16	95	5
5.	220	114	14	0	348	334	14	96	4
Total	836	683	104	10	1,643	1,529	114	93	7

Table 7: Responses of Farmers on the Effectiveness and Efficiency of Agricultural Extension Agents in the Study Area.

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 8: Responses of Farmers on the Challenges in Introducing New Agricultural Innovations to them.

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					

Table 9: Responses of Farmers on the Different ways of making Introduction of New Agricultural Innovations easier/acceptable in the Study Area.

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					