ASSESSMENT OF THE EFFECTIVENESS OF AGRICULTURAL EXTENSION WORKERS IN DELTA STATE, NIGERIA

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Abstract

This study assessed the effectiveness of agricultural extension workers through the use of six indicators. Simple random sampling technique was used to select 180 farmers and 60 extension workers from 12 Local Government Areas of Delta State. Interview schedule and questionnaire were used to collect data from respondents. The findings revealed low level of contact between farmers and extension workers. The Chi-Square analysis showed that there was no significant relationship between adoption level and extent of contact with extension workers ($X^2_{cal.}$=28.65, $p < 0.05$). Agricultural message situation was good in relevance and comprehension for farmers. The provision of logistics for field work of extension workers was seldom provided. The study revealed that agricultural extension service in Delta State was not effective; it had effectiveness score of 2.47. There was no significant variation in agricultural extension workers' effectiveness in the three agricultural zones of Delta State. For more effective coverage of extension cells, more extension workers should be recruited.

Keywords: Assessment, Effectiveness, Extension Workers

Introduction

The Agricultural Development Programme (ADP) of Delta State is the agency responsible for the delivery of public agricultural extension service. Its main objective is to improve the socio-economic status of farmers through increased food production and provision of rural infrastructure. Increased food production and improved income of small-holder farmers are to be achieved mainly through the use of principles of Training and Visit (T & V) Extension System. Benor (1987) states that the principles of T & V extension system are single line of command for extension workers, concentration of effort on only extension activity, time-band work, regular training of extension of staff and good linkage between research and extension organizations. The attainment of the goals of this public agricultural extension service depends on the effectiveness of the extension workers (Agbamu, 2005). Omotayo, Chikwendu and Adebayo (2001) argued that the ultimate aim of increasing food production and the standard of living of Nigerian farmers have remained largely unachieved due to institutional and funding problems. Food production in Nigeria has not reached the required level as evident from corresponding increase in the country's food import bill from 8.2% in 1989 to 20.5% in 1997 and 11% in 2012 (Agbamu, 2013).

In recent years, without providing empirical research data, scholars have said that there seems to be indications of ineffectiveness in the ADPs' extension service in many States in Nigeria. Effectiveness is a measure of the degree of achievement of an intended result. Higher degree of effectiveness indicates a higher proportion of target accomplished by an activity. Inspite of the work of Delta State ADP to raise farmers' awareness of agricultural innovations and efforts being made to increase their adoption,

the expected increase in level of food production in Delta State remains a mirage. Chikwendu *et al* (1997) noted that there have been indications of ineffectiveness in the agricultural extension service offered by the ADPs in Nigeria. It is against this background that the effectiveness of agricultural extension workers in Delta State needs to be determined through empirical data. This study was therefore designed to provide answers to the following questions: how effective are the agricultural extension workers in the performance of their duties?; how relevant are the agricultural extension messages to the problems of farmers?; what is the level of farmers' adoption of selected agricultural innovations?

The specific objectives of this study were to: (1) determine the level of farmers' adoption of selected agricultural innovations as an indicator of extension workers' effectiveness; (2) ascertain the frequency of contact which agricultural extension agents have with farmers and gauge the situation of agricultural messages; (3) assess farmers' perception of the characteristics of extension workers in discharging their duties; (4) ascertain the congruency of agricultural extension workers' role perception with their role performance as an indicator of extension workers' effectiveness; (5) determine the regularity with which work logistics have been provided by Delta State ADP to enhance the performance of agricultural extension workers; and (6) state the overall score of effectiveness of agricultural extension workers in Delta State.

The three hypotheses that were tested in this study were: (1) the frequency of extension worker-farmer contact has no significant relationship with the level of farmers' adoption of agricultural innovations; (2) there is no significant relationship between agricultural extension agents' role perception and role performance; (3) there is no significant variation in extension agents' effectiveness in the three agricultural zones in Delta State of Nigeria.

Methodology

Brief Geographical Description of Study Area

Delta State has an estimated land area of 17,698sq.km and lies in the South-South geopolitical zone of Nigeria. It has a population of 4,112,445 (National Population Commission, 2006). It has an Atlantic Coastline of 160km. The economy of Delta State is mainly based on agricultural activity, trading, crude oil and gas exploration. The State is made up of 25 Local Government Areas (LGAs) which are classified into three agricultural zones – Delta North, Delta Central and Delta South. Each LGA is regarded as an agricultural extension block (Delta State ADP, 2001).

Sampling Procedure and Sample Size

A four-stage simple random sampling technique was used to select the LGAs, villages, farmers and extension workers for this study. In stage one, using simple random sampling technique, 4 LGAs (50% of the LGAs) were selected from each of the 3 agricultural zones, making a total of 12 LGAs. In Delta North Zone, the four Local Government Areas selected were Ika South, Ika North East, Aniocha South and Aniocha North. In Delta Central Zone, Okpe, Ethiope East, Udu and Ughelli South LGAs were selected, while in Delta South Zone, Patani, Warri South, Warri South West and Warri North LGAs were selected. In stage two of the sampling procedure, 5 extension cells were randomly selected from each of the 12 LGAs were randomly selected. This gave rise to 60 extension cells. In stage three, 3 farmers from each extension cell were randomly selected from the 60 cells. This gave a sample size of one

hundred and eighty (180) farmers. In stage four, 5 extension workers were randomly selected from each of the 12 LGAs giving rise to 60 extension workers which is 20% of the workers. In other words, one extension worker was selected by random sampling from each of the 60 extension cells. It should be noted that an extension cell consists of a group of villages or group of districts in a big town.

Method of Data Collection and Measurement of Variables

Data were obtained by use of questionnaire and personal interview. Data were collected on socio-economic characteristics of farmers and those related to six indicators of effectiveness of agricultural extension workers. The six indicators and their measurement of variables are:

1. *Adoption level of selected innovations*

The seven crop-based innovations in this study were:

(a) Fertilizer application – urea for vegetables, NPK 20:20:20 for cassava and yam, muriate of potash for oil palm trees;

(b) Use of herbicides – paraquat and 2, 4 – dichloroacetic acid;

(c) Use of pesticides – DDT and Gamalin 20 for crop pests;

(d) Improved cassava varieties – TMS 30555, K195 and NR 8082;

(e) Recommended spacing for planting cassava, yam, ammaranthus, oil palm;

(f) Modern processing techniques for cassava – grating, pressing and frying;

(g) Use of storage facilities –yam barn, maize silo, refrigeration for vegetables.

Respondents were asked to indicate 'yes' or 'no' against the innovations they have adopted as a result of agricultural extension campaigns. The sigma method of scoring to calculate adoption index as applied by Agbamu (2006) was used. A mean score of 5.0 was regarded as the appropriate adoption index for effectiveness. A score of 5.0 to 10.0 was regarded as high adoption, 3.0 - 4.9 as medium and 0.0 to 2.9 as low adoption level.

2. *Frequency of contact that extension workers had with farmers*

Responses on frequency of contact per year were disaggregated into 1- 6 contacts, 7-12 contacts, 13-18 contacts, and 19-24 contacts per year. Using a Likert-type scale, these ranges were scored 1 to 4 points respectively. A score of 2.5 and above was regarded as reasonable level of contact per year.

3. *Agricultural message situation*

This was measured by use of three parameters: purpose, content and treatment. On purpose, respondents indicated how purposeful or relevant the messages have been on a four-point scale of 0 to 3 points with 1.5 as midpoint. On message content, farmers indicated how extension workers displayed sufficient knowledge of subject matter on a three-point Likert scale that ranged from 1 to 3 points with 2.0 as midpoint on the continuum. Message treatment relates to use of local terms, simple words, simple sentences in communicating messages to farmers to ensure their comprehension and usability of messages. The level of message comprehension was measured on a scale

that ranged from 0 to 3 points. The three parameters of message situation had a cut-off score of 1.67 (1.5 + 2.0 + 1.5 ÷ 3) and this was deemed an effective index.

4. *Farmers' perception on quality of extension workers*

Farmers' perception was measured by use of eight perceptual statements to which they responded with 4 points associated with strongly agree and 1 point for strongly disagree. A favourable disposition to good characteristics of the extension workers was put at a score of 2.5.

5. *Extension workers' role perception viewed against their role performance*

This was measured by compiling selected list of nine agricultural extension activities, next the extension workers were requested to indicate the roles they perceived to be theirs in order of priority or by ranking and do same for the roles they actually performed. The ranking of the columns were then correlated. The absolute difference of the ranks on each of the activities was summed up and divided by nine to obtain a congruency index. An appropriate index for this study was 1.5. According to Ajieh (2009), role perception and role performance of agricultural extension workers were crucial determinants of their effectiveness. This is because role performance of extension workers is influenced by role perception, thus any discrepancy in role perception and role performed could result in ineffectiveness on the part of agricultural extension workers.

6. *Extent to which Delta State ADP had provided logistics and staff needs*

Extent of provisions of logistics for field work, staff training, promotion and favourable working environment by the Extension Organization was measured by use of a three point Likert-type scale. The response option of "very regularly provided" was scored 3 points, "regularly provided" was scored 2 points, "seldom provided" was scored 1 point, while 2.0 was deemed effective on this indicator. The overall index for desired effectiveness in this study is 2.53. This was obtained by deriving a mean from the individual effectiveness scores deemed appropriate for the six indicators of effectiveness (5.0 + 2.5 + 1.67 + 2.5 + 1.5 + 2.0 ÷ 6 = 2.53).

Method of Data Analysis

On data analysis, percentages and means were used to analyze the socio-economic characteristics of farmers; mean scores were obtained for each indicator of effectiveness of extension workers.

Hypothesis 1 that deals with relationship between frequency of extension contact and farmers' adoption of innovations was tested by use of chi-square analysis. The relationship between rankings of role perception and role performance of extension workers was analyzed by use of Spearman's Rank Order Correlation (Hypothesis 2). Analysis of Variance (ANOVA) was used to test hypothesis 3 which sought to ascertain whether significant variation existed in extension workers' effectiveness in the three agricultural zones.

Results and Discussion

1. *Farmers' Characteristics and their Perception on Quality of Agricultural Extension Workers.*

This study found that 52.8% of the farmers were females, while 47.2% were males. The average age of the farmers was 44.6 years. On education level, 5.6% of the farmers had no formal education, 30.6% had primary education, 46% had secondary education, while 17.8% had higher education. The average farming experience of the farmers was 14.1 years; their average farm size was 1.62ha and they had average annual income of N132, 102.78 ($836/annum). It was also found that 66.7% of the farmers belonged to various cooperative societies.

The result of the overall farmers' perception on quality of extension workers gave a score of 2.61. This score is an indication that the farmers have good perception on the quality of the extension workers in Delta State.

2. *Extent of Extension Contact with Farmers and Adoption of Innovations.*

The findings revealed that on the average farmers had 7-12 contacts per year with agricultural extension workers. Majority of the farmers (41.1%) had 1-6 contacts per year. The farmers which have no contact at all with extension workers constituted 6.7% of the respondents. In a nutshell, extent of extension contact with farmers as an indicator of effectiveness in this study scored 2.16 points. This level of extension contact is below the reasonable level of 2.5 stated in the measurement of this variable in the methodology. In other words, there is a low level of contact between agricultural extension workers and farmers in Delta State of Nigeria. This low level of contact could be due to inadequate agricultural extension workers in each local government area. Table 1 shows the adoption scores for seven innovations. The result showed a high level of adoption with an overall mean score of 5.39. The relationship between extent of extension contact with farmers and adoption level of innovations was analyzed by use of Chi-square test (hypothesis 1).

Table 1: Farmers' adoption scores for seven innovations

	Selected Innovations*	No of Adopters	% of adopters n=180	Adoption Scores
1.	Inorganic Fertilizer: urea, NPK 20:20:20, muriate of potash.	153	85.0	5.62
2.	Herbicides: paraquat, 2, 4-D	98	54.4	4.79
3.	Pesticides: DDT, gamalin 20	107	59.4	4.93
4.	Cassava varieties: TMS 30555, K195, NR 8082	168	93.3	5.80
5.	Recommended spacing for cassava, yam, ammaranthus, oil palm	153	85.0	5.62
6.	Cassava Processing: grating, pressing and frying	159	88.3	5.70
7.	Storage techniques: barn, silo, refrigeration	127	70.6	5.25
		Total score = 37.71, Mean = 5.39		

**Multiple responses*

The result of the chi-square analysis showed that there was no significant relationship between extension contact and adoption of the selected innovations ($X^2_{cal.}$= 28.65, $X^2_{tab.}$ with df of 24 @ 0.05 = 36.42). This proved that the null hypothesis has been accepted. So, there is no significant relationship between frequency of extension contact and farmers' adoption of innovations in this study. This finding is not in conformity with that of Cleaver (1997) who found that the frequency of extension agents' contact with farmers and the adoption of improved farm practices were significantly related and that adoption level was likely to increase with increase in the intensity and effectiveness of agricultural extension services rendered. The lack of significant relationship between extent of agricultural extension contact and adoption level in this study could mean that a lot of the farmers depended on their farming experience and other sources of information such as cooperative societies, friends and salesmen. Since 63.8% of the farmers in this study had secondary and higher education (46% and 17.8% respectively), it is likely that they read agricultural magazines and leaflets from any source which aided their adoption of innovations.

3. ***Agricultural Message Situation***

From the results in Table 2, extension workers' message was purposeful (Mean = 1.57) and content of message was fair (Mean = 2.44). The result on treatment of message proved that message was comprehensible (Mean = 2.28). It could be concluded that since the perceived effectiveness score of 2.10 for agricultural message situation was above 1.67 which was the threshold, there was message effectiveness in Delta State. According to Roling (1994), once the extension message situation was good and there was effective teaching of farmers, the technicality of agricultural information which was scientific in nature would be clear so that clientele can handle the innovations in question.

Table 2: Distribution of agricultural message situation

	Message situation	Scores (pts.) & frequencies, n=180	% derived from frequency	Mean Score
a.	**Purpose of message**			
	Purposeful or relevant	240 (120)	66.67	
	Fairly purposeful	43(43)	23.89	1.57
	Not purposeful	0 (17)	9.44	
b.	**Content of message**			
	Sufficient knowl. of subj. matter	360 (120)	66.67	
	Fairly sufft. knowl. of subj. matter	80 (40)	22.22	2.44
	No sufficient knowledge	0 (20)	11.11	
c.	**Message treatment**			
	High comprehension	270 (90)	50.00	
	Comprehensible	130 (65)	36.11	
	Fair comprehension	10 (10)	5.56	2.28
	Not comprehensible	0 (15)	8.33	
			Pooled Mean = 2.10	

The values in parentheses are frequency counts

4. ***Relationship between Extension Workers' Role Perception and Role Performance***

Nine selected roles were presented to agricultural extension agents to indicate perceived roles and actual roles performed in order of priority. It was found that both roles are congruent with an index of 1.56 (see Table 3). The roles extension workers perceived and performed were analyzed by use of Spearman's Rank Order Correlation. There was a high degree of relationship between role perception and role performance of extension workers (rho = 0.77). Majority of the workers have high score on role perception and role performance gauged on percentage basis, while only a few have low percentage on role perception and role performance. This is an indication that extension workers in Delta State performed most of their perceived roles.

Table 3: Result of Spearman's rank order correlation on role perception and role performance, n = 60

	Roles *	**Role Perception**		**Role Performance**		**Absolute Rank (Difference)**
		Freq. & %	**Rank**	**Freq. & %**	**Rank**	
1.	Establishment of demonstration farms and on-farm trials.	35 (58)	6	44 (74)	4	2
2.	Regular farm and home visits to farmers and training.	54 (90)	1	48 (80)	3	2
3.	Planning calendar of work.	24 (47)	8	32 (54)	7	1
4.	Evaluating agricultural extension programmes.	40 (67)	5	51 (85)	2	3
5.	Providing farmers with information on market and credit opportunities.	49 (81)	3	43 (72)	5	2
6.	Living in assigned areas so as to develop friendly relationship with the farmers.	51 (85)	2	54 (90)	1	1
7.	Good working relationship with contact farmers.	45 (75)	4	36 (60)	6	2
8.	Translation of research results into relevant agricultural extension messages.	25 (42)	9	27 (45)	9	0
9.	Feed-back function of relating farmers' problems and experiences to scientists and planners.	34 (57)	7	30 (50)	8	1
	Congruency index = 1.56			Spearman's rho coefficient = 0.77.		

** Multiple responses which do not add up to 100 percent. The values in parentheses are percentages.*

5. ***Extent to which Logistics and Staff Needs were provided***

Provision of logistics such as transportation for field work and other needs listed in Table 4 could motivate agricultural extension workers to be more effective in performance of their duties. The results showed that Delta State Agricultural Development Programme (ADP) has an overall score of 1.02 on provision of logistics and other incentives to agricultural extension workers. The implication of this score is that the Delta State ADP seldom made provision for logistics for field work and other staff needs. The agricultural extension workers attributed this to government's poor funding. This finding is in agreement with the assertion by Agbamu (2005) which identified poor logistic support for field staff as one of the problems facing agricultural extension service in developing countries.

Table 4: Distribution of respondents according to provision of logistics and other incentives to agricultural extension agents (n = 60)

	ADP Provisions	Very regularly provided 3pts	Regularly provided 2pts	Seldom Provided 1pts	Not Provided 0pt	Mean Score
1	Means of transportation	10 (30)	11 (22)	26 (26)	13 (0)	1.31
2	Effective and regular promotion of extension agents	4 (12)	16 (32)	27 (27)	13 (0)	1.18
3	Regular training of agricultural extension agents	7 (21)	6 (12)	29 (29)	18 (0)	1.03
4	Favourable working environment	4 (12)	5 (10)	12 (12)	39 (0)	0.57
						Pooled mean = 1.02

The values in parentheses are scores from Liket-type scale.

6. ***Effectiveness of Agricultural Extension Workers***

From the results in Table 5 the pooled mean for effectiveness of extension workers was 2.47 which was lower than the expected standard of 2.53. This shows that agricultural extension service in Delta State of Nigeria was not effective. This ineffectiveness could largely be attributed to the low level of contact between agricultural extension workers and farmers, poor coverage of extension cells and poor provision of logistics for field work and other staff needs.

Table 5: Mean distribution of scores according to indicators of agricultural extension workers' effectiveness.

	Indicators of Effectiveness	Delta Central	Delta South	Delta North
1.	Adoption Level	5.37	5.40	5.41
2.	Extent of Extension Contact	2.36	2.01	2.10
3.	Agric. Message Situation	2.07	2.17	2.05
4.	Farmers' Perception of Extensionists	2.85	2.81	2.16
5.	Role Perception & Role Performance	1.57	1.55	1.56
6.	Provision of Logistics & other Staff Needs	1.04	1.02	1.01
	Mean	2.54	2.49	2.38
	Pooled mean = 2.47			

7. Variation in Extension Workers' Effectiveness in the Agricultural Zones

To ascertain how the three agricultural zones vary in agricultural extension service effectiveness, the average scores from the six indicators of effectiveness were analyzed by use of analysis of variance (hypothesis 3). The result in Table 6 showed that there was no significant variation at 0.01 in the effectiveness of agricultural extension workers in the three agricultural zones of Delta State. The variation in the effectiveness of the extension workers in Delta State was not significant because they operated under the same working conditions provided by the Agricultural Development Programme of Delta State.

Conclusion and Recommendations

The profile of the Delta State farmer in this study is one that is predominantly female, fairly educated, poor income earner, well experienced in farming and belonged to a cooperative society. The farmers had a good perception of the quality of extension workers. There was a low level of contact between the farmers and agricultural extension workers in Delta State. Although adoption level was high, there was no significant relationship between adoption level and frequency of extension contact with farmers. Delta State ADP seldom made provision for logistics for field work and other staff needs. This work found that role perception of agricultural extension workers was congruent with their role performance in Delta State.

Table 6: Summary of ANOVA for extension workers' effectiveness in three agricultural zones.

Sources of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	$F_{cal.}$
Between Group (Column)	2	0.12	0.06	
Within Group (Error)	15	35.27	0.08	0.75NS
Total	17	35.39		

NS = Not Significant @ 0.01; $F_{tab.} = 6.36$

Agricultural extension workers in Delta State were not effective. There was no significant variation in the effectiveness of extension workers in the three agricultural zones of Delta State.

Based on the findings of this study, the following recommendations are made: More agricultural extension workers should be recruited to ensure effective coverage of extension cells. It is expected that the increased number of extension workers will boost the extent of agricultural extension contact with farmers. The Delta State Agricultural Development Programme should exhibit renewed vigour in providing required logistics such as transportation for field work and favourable working environment that will motivate agricultural extension workers to be more effective.

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