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A study on communication channels within the service agencies and beneficiaries of linkage system

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The study evaluated the researcher-extension agents-farmers linkage system in Oyo State, with a view to improving production of arable farmers through effective communication. Pre-tested structured questionnaire were used to elicit information from forty researchers from four of the nine research institutes in Oyo state. Forty-four extension agents were randomly selected and interviewed from the States' Agricultural Development Programme (ADP) and National Agricultural Extension and Research Liaison Services (NAERLS). Also, fifty farmers were randomly selected and interviewed from the two ADP zones in the State. Results showed that 76% of farmers had contact with extension agents and 87% of researchers had contact with extension agents. There was a strong communication links between extension agents and researchers and between researchers and farmers. There was a strong communication linkage between researchers and extension agents, researchers and farmers as well as between extension agents and farmers. Demonstration (b = 0.68) and informal contacts (b = 0.37) were significant communication linkages at P < 0.05 between researchers and farmers. Publication in journals (b = 0.55) was the significant communication channel among researchers. The study concluded that a strong linkage exists among researchers, extension agents and farmers. Extension administrators must ensure that linkages among extension stakeholders are always strong.

Key words: Evaluation, linkage, research, extension, farmers, administrators.

INTRODUCTION

Agriculture remains the bedrock of Nigeria's economic and nutritional development with an estimated 70% of the country's over 140 million populace living in rural areas and engaging in agricultural – related activities (Faborode and Laogun, 2008; Koyenikan, 2008; Tomori, 2008; Chidiadi, 2009). Thus, agriculture provides employment for a large percentage of the nation's population, food for the populace and raw materials for agro-based industries. However, despite the involvement of large percentage of the population in agriculture, the country continues to experience perpetual food shortage and continue to spend the lean foreign reserve on importation of food. The perpetual food shortage is often blamed on ineffective agricultural research policies; lack of continuity in agricultural policies and programmes when there is a change of hand in government, poor implementations by administrators, low quality of extension system and poor linkage system of research, extension and farmers.

For agro-technologies to be relevant to local needs, researchers, extension workers, farmers and farm inputs suppliers must play crucial roles in identifying research problems, adapting the recommendations to local conditions and providing feedback to researchers about innovations that have been developed (Faborode and Laogun, 2008).

The lack of close working relationship between national agricultural research and extension organizations, and with different categories of farmers and farm organizations is one of the most difficult institutional problems confronting ministries of agriculture in many

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developing nations (Swanson, 1998). Research and extension organizations generally compete over the same scarce government resources and frequently, leaders of these institutions do not see themselves as part of a broader system: the Agricultural Technology System (ATS). Instead, they try to increase the flow of resources coming to their respective institutions and to solve day-to- day management problems, rather than ensuring that their respective organizations contribute to the broader goal of getting improved agricultural technology to all major categories of farmers. In addition, the leadership and staff of many research and extension organizations do not appreciate the important roles that farmers and farmers' organizations can play, both in disseminating technology as well as effective feedback mechanisms (Swanson, 1998). The concept of linkage implies that the communication and working relationship is established between two and more organizations pursuing commonly shared objectives in order to have regular contact and improved productivity (Agbamu, 2000). Ogunremi and Olaniyan (2010) identified Research-Extension-Farmers-Input linkage (REFIL) as a communication method used by non-University based scientists to contact fish farmers in Nigeria. Linkage system is not without any challenges, if the flow of information is hampered either from research to extension or from extension to farmers, the end product which is increased in food production will be adversely affected. Other challenges observed by Bassir and Ekpere (2002) include expanded range of stakeholders, managing the process of demand and supply of services, setting and enforcing standards for the quality of services provided and funding.

Statement of research problems

The poor inter-organizational relationship between the extension agency and research organization almost guarantees that research results will not reach farmers and if they do, farmers will not be able to use them (Adesoji et al., 2006). Agbamu (2005) identified one of the problems bedeviled agricultural extensions in Nigeria as ineffective agricultural research extension linkages, and poor input supply. He also identified poor feedback from farmers to research. However, the most obvious cases are those where researcher and technology transferred workers are ignorant of each other's activities. In practice, research stops too early and extension starts too late in what should be a continuous process (Oladele, 1995). Also, basic extension directors as well as middle level managers within these respective organizations (research and extension) operate in an independent manner with little appreciation or understanding of how the management of their organization or programme affects the overall system performance (Olajide, 1978). In the light of these, the study will answer the following questions: What are the communication channels within the agencies? What are the characteristics of linkage beneficiaries?

Objectives of the study

The general objective of the study is to evaluate the linkage among Research-Extension-Farmers' system. The specific objectives are to:

(1) Examine the communication channels within the service agencies
(2) Identify characteristics of beneficiaries of linkage system

Hypotheses of the study

(1) There is no significant relationship between some demographic characteristics (that is, age, gender, marital status, educational level etc) of researchers, extension agents, farmers and their linkage services.
(2) There is no significant relationship between communication channels used by personnel (researchers and extension agents) and the linkage services provided.

METHODOLOGY

Area of study

The area of study is Oyo State. It was created in 1976 with total area covering 27,249 km^2. It is bounded in the south by Ogun State, in the north by Kwara State, west partly bounded by Ogun State and partly by Republic of Benin, east bounded by Osun State (NARP, 1995; Oyo State Diary, 2010).

The ecological zone of this area ranges from rain forest and mangrove forest. The rainfall ranges from 2500 to 3000 mm per annum, which is distributed over April to October with a spell of dry period between late July and early August.

Agricultural sector forms the base of the overall development thrusts of the area, with farming as the main occupation of the people. Crops usually grown include Maize, Yam, Cassava, Cocoyam, Melon, Cowpea, Cashew and Vegetables under mixed cropping practices. The area is highly urbanized with a population of 5,591,589 (NPC, 2006). It consists of thirty-two Local Government Areas, (LGAs) with four zonal Agricultural Development Programmes (ADPs) located at Saki, Ogbomosho, Oyo and Ibadan.

The study area has a distribution of agricultural research institutions namely. Institute of Agricultural Research and Training (IAR&T) Ibadan, National Institute for Horticultural Research (NIHORT) Ibadan, Cocoa Research Institute of Nigeria (CRIN) Ibadan, Forestry Research Institute of Nigeria (FRIN) Ibadan. Others include Nigerian Stored Products Research Institute (NSPRI) Ibadan, National Agricultural Extension and Research Liaison Services. (NAERLS) Ibadan, National Cereal Research Institute (NCRI) Ibadan, Nigerian Institute for Social and Economic Research (NISER) and International Institute of Tropical Agriculture (IITA).

The study population

The target population of this study consists of researchers in

agricultural research institute, extension personnel in extension agencies and farmers.

Research institutes (Researchers)

This population was distributed within the four randomly selected research institutes, NIHORT, FRIN, IAR&T and NCRI.

Extension agents (ADP)

Four ADP zones were in the study area, two of which were randomly selected. The two were Ibadan and Ogbomoso along side with extension agents of NAERLS office.

Farmers groups

There were numerous farmers groups in the study area, only 20 of the groups were considered viable among those registered with the ADP because they meet on regular basis and had not been merged by the extension agents' in-charge. Each group had between 20 and 25 members. These groups were made up of 500 members.

Sampling procedure and sample size

Research institutes (Researchers)

Four research institutes were randomly selected from the existing (nine) in the study area because their mandate covers agricultural activities. Simple random sampling technique was used to select 40 researchers. They cover various categories of researchers in the research institutes that have been involved in linkage activities.

Extension agencies (Extension agents)

Simple random sampling technique was used to select 44 extension agents from the ADP in the state and NAERLS.

Farmers

10% (2) of the registered and viable farmers' groups were randomly selected. One farmer was sampled from each of the selected zones. A total of 50 farmers were selected for the study. The total number of respondents was 134.

Instrument for data collection

Two sets of instruments were employed in obtaining information from the target population. The first, questionnaire was used to elicit information from researchers and extension agents in the areas of demographic characteristics, services provided, communication pattern and linkage types.

The second, interview schedule asked questions on demographic characteristics of farmers, effect of linkage agencies in reaching them, sources of materials and problems facing them.

Data collection

Field survey technique was used to collect primary data for this study from the sampled research institutes (Researchers), Extension agencies (Extension agents) and farmers using questionnaire and interview schedule, respectively. The administration of the instruments on the respondents took place in the offices of researchers, Fortnightly Training (FNT) centers for the extension agents and houses of farmers over time.

Measurement of variables

Linkage services

Respondents indicated the names of collaborators involved in the linkages, the kind of relationship existing between them and the collaborators as well as the farmers. These linkage services form the dependent variable. The independent variables in this study are demographic characteristics of the researchers, extension personnel and the farmers such as age, marital status, education level, gender etc.

Communication pattern

The use of different communication methods were rated on a four-point-Likert-scale. The methods include those used within and between the institutes and to reach the farmers.

Analyses of data

Data collected were coded and subjected to descriptive and inferential statistical analyses. The descriptive statistical analysis includes the use of tables, frequency distribution, percentages and means. The inferential statistical analysis used the following statistical tools, stepwise multiple regressions analysis to determine the independent variables that contributed significantly in explaining variation in the dependent variable. Chi-square was used to determine association between the dependent variable and some nominal demographic characteristics of researchers, extension agents and farmers.

RESULTS AND DISCUSSION

Demographic characteristics of farmers, extension agent and researchers

Table 1 show that 78.0% of the farmers were male, 97.7% of extension agents were male, while 65% of researchers were male. This suggests that male sex is the dominant gender in Research-Extension-Farmers-Input Linkage System (REFILS). Majority (64%) of the sampled farmers were over 51 years of age. About 75% of the extension agents were between the ages of 41 and 50 years. Likewise 35% of researchers were of 41 and 50 years of age. About 84% of farmers, 100% of extension agents and 87% of the researchers were married. These finding supports Jibowo (1992) that majority of adult population of any society consist of married people. Majority (58.0%) of farmers had between 6 and 10 dependants, and 54% of the farmers had between 1 and 5 dependants. Also, 50% of the extension agents had HND, while 62.5% of the researchers had Masters' degree. About 15.9% of extension agents and 22.5% of

Table 1. Demographic characteristics of farmers, extension agents and researchers

Variable	Frequency		
	Farmers (n = 50)	Extension agents (n = 44)	Researchers (n = 40)
Gender			
Male	39 (78)*	43(97.7)	26 (65.0)
Female	11 (22)	1(2.3)	14 (35.0)
Age			
< 30	1 (2.0)	-	3 (7.5)
31 - 40	8 (16.0)	10(22.7)	12 (30.0)
41 - 50	9 (18.0)	33(75.0)	14 (35.0)
51 - 60	19 (38.0)	1(2.3)	11 (27.5)
> 60	13 (26.0)	-	-
Marital status			
Single	1 (2.0)	-	3 (7.5)
Married	42 (84.0)	2(4.0)	35 (87.5)
Married	5 (10.0)	-	-
Divorced	2 (4.0)	-	-40 (100)
Educational level			
OND		5 (11.4)	1 (2.5)
HND		22(50.0)	5 (12.5)
B. Sc		9 (20.5)	1 (2.5)
M. Sc		8 (18.1)	24 (60.0)
M. Phil		-	1 (2.5)
Ph. D		-	8 (20)
Studying for higher degree			
Yes		7 (15.9)	9 (22.5)
No		37(84.1)	28 (70.0)
Job tenure			
1 - 10		2(4.5)	12 (30.0)
11 - 20		36(81.8)	10 (25.0)
11 - 20		6 (13.7)	14 (35.0)
31 - 40		-	4 (10.0)

*Percentage in parenthesis. Source: Field survey (2010).

the researchers were studying for higher degree. About 81% of the extension agents had between 11 and 20 years working experience, while 35% of the researchers had between 21 and 30 years working experience.

Linkage

Table 2 show that farmers' contact with extension agents had a high percentage of 76 with 90.9% strength in the relationship between the extension agencies and the farmers. This suggests an active transfer of improved technologies to the farmers.

However, extension agents' contact with farmers had 100%; researchers contact with farmers had 97.5% showing a high level of farmer's exposure to modern methods of farming. Researchers contact with extension agents' shows high levels of interacts; also, extension agent had a least relationship (90.9%) with research institutes. This is further explained by the 87.5% strength of research institutes relationship with extension agencies.

Table 2. Linkage involving various contacts and relationships.

Variable	Frequency	Percentage
Farmers contact with extension agents		
Yes	38	76.0
No	12	24.0
Total	50	100
Extension agents contact with farmers		
Yes	44	100
Researchers contact with extension agents		
Yes	35	87.5
No	3	7.5
No response	2	5.0
Total	40	100
Researchers contact with farmers		
Yes	39	97.5
No	1	2.5
Total	40	100
Extension agencies relationship with farmers		
Strong	40	90.9
No response	4	9.1
Total	44	100
Extension agencies relationship with researcher institute		
Strong	40	90.9
Weak	1	2.3
No response	3	6.8
Total	44	100
Research Institutes relationship with farmers		
Strong	23	57.5
Weak	12	30.0
No response	5	12.5
Total	40	100
Research institutes relationship with extension agencies		
Strong	35	87.5
Weak	4	10
No response	1	2.5
Total	40	100

Source: Field survey (2010).

Table 3. Communication link between extension agents and farmers (n = 44).

Communication method	Frequently used	Rarely used	Not used	No response
Extension agents	27 (61.4)*	12 (27.3)	0 (0)	5 (11.4)
Progressive farmers/Model farmer	27 (61.4)	11 (25.0)	3 (6.8)	3 (6.8)
Subject matter specialist	31 (70.5)	9 (20.5)	0 (0)	4 (9.1)
Demonstration	32 (72.7)	7 (15.9)	0 (0)	5 (11.4)
Informal contact	32 (72.7)	6 (13.6)	1 (2.3)	5 (11.4)

*Percentage in parenthesis. Source: Field survey (2010).

Table 4. Communication link between extension agents and researchers (n=44).

Communication methods	Frequently used	Rarely used	Not used	No response
Publication in Journals	32 (72.7)*	8 (18.3)	2 (4.5)	2 (4.5)
Conferences	40 (90.9)	4 (9.1)	0 (0)	0 (0)
Technical reports	38 (86.4)	6 (13.6)	0 (0)	0 (0)

*Percentage in parenthesis. Source: Field survey (2010).

Table 5. Communication link between researchers and farmers (n = 40).

Communication method	Frequency	Rarely	Not used	No response
Extension agents	24 (60)*	12 (30)	0 (0)	4 (10)
Progressive farmers/Model farmer	24 (60)	11 (27.5)	3 (7.5)	2 (5.0)
Subject matter specialist	28 (70)	9 (22.5)	0 (0)	3 (7.5)
Demonstration (Research method)	30 (75)	7 (17.5)	0 (0)	3 (7.5)
Informal contact	29 (72.5)	6 (15)	1 (2.5)	4 (10)

*Percentage in parenthesis. Source: Field survey (2010).

Communication link between extension agents and farmers

Table 3 show that agents communicate with farmers frequently, using different communication methods. The results show that both demonstration (72.7%) and informal contact (72.7%) were frequently used and rated high. Subject matter specialist (SMS) was frequently used by 70.5% as an extension linkage. This indicates a high demand for SMS for effective communication linkage in extension services. Extension agents (61.4%) and progressive farmer/model farmer (61.4%) were also effective linkage in the extension system. Importance of these groups cannot be over emphasized in reaching farmers to improve on their production and enhance their standard of living through one on one extension teaching methods.

Communication link between extension agents and researchers

Table 4 show that technical reports (86.4%) had contributed in strengthening the communication links. Majority of the extension agents (90.9%) indicated conferences as the most frequently used communication link with researchers.

Communication links between researchers and farmers

Table 5 show that demonstration had the highest (75.0%) among the communication devices used by researchers. This was followed by informal contact (72.5%) and SMS (70.0%). Also, high extension agents were 60.0% and progressive farmer/model farmer, 60.0%.

Demonstration was rated high, implying their great involvement in Small Plot Adoption Technique (SPAT), On Farm Adaptive Research (OFAR) and training during field days, field tours or excursion by farmers to research institutes.

Hypothesis 1

There is no significant relationship between some demographic characteristics (that is, age gender, marital

Table 6. Chi-square analysis of association between demographic characteristics and linkage services.

Variable	X^2 values	DF	Asymp. Sig	Decision
Researchers				
Gender	3.600	1	0.058	Not significant
Age	7.000	3	0.072	Not significant
Marital status	52.850	2	0.000	Significant
Educational level	60.200	5	0.000	Significant
Extension agents				
Gender	40.091	1	0.000	Significant
Age	37.136	2	0.000	Significant
Marital status	-	-	-	-
Educational level	15.455	3	0.001	Significant
Farmers				
Gender	15.680	1	0.000	Significant
Age	17.600	4	0.001	Significant
Marital status	93.520	3	0.000	Significant

Significant at $p < 0.05$; not significant $p > 0.05$. Source: Field survey (2010).

status, educational level etc) of researchers, extension agents, farmers and their linkage services.

Table 6 shows that researchers' gender and age ($p > 0.05$ each) were not significantly associated to their linkage services, showing that none of the two characteristics posed a limiting effect on their linkage activities. Linkage services can be carried out by either male or female (gender) and whether old or young (age), the linkage message and activities are the same. Marital status and educational level ($p = 0.000$ each) would affect linkage services. The marital status will determine the level of responsibilities of the researchers and the educational level would determine the exposure and skills possessed to carry out these activities.

Extension agents on the other hand had gender, age and educational level ($p < 0.05$ each) significantly related to their linkage services; gender significance may be due to the preference for agent's sex by farmers and socio-cultural reasons restricting human interaction in the study area. Marital status did not show any form of important contribution. Educational background of the agent could be used to explain their skill techniques and involvement in linkage activities. More so, farmers' gender, age and marital status ($p < 0.05$ each) are significantly related to their linkage service. Gender significance suggests that linkage activities may be tailored to certain farm tasks that are gender specific. Contrarily, the World Bank (1990) reported less participation of women in linkage activities. Age significance may be due to the fact that age has been an important factor in adoption. Pierre and Ellen (1995) stated that elderly farmers are more likely to be popular within their areas and thus, have contact with extension agents than the younger and less popular ones.

Marital status significance explained that both men and women contribute substantially in decision-making processes on their farms.

Hypothesis 2

There is no significant relationship between communication channels used by personnel (researchers and extension agents) and their linkage services. Table 7 show the regression analysis for communication methods on linkage services of extension agents.

It has R-square value of 0.97 implying that 97% of the total variation of linkage services could be explained and a multiple R of 0.985 indicating a strong correlation. Demonstration and informal contact were the most contributory methods (b-values of 0.679 and 0.372, respectively). This may be due to the frequency with which these methods were used. The enhancement factors as possessed by the agents would also ensure their versatility and adaptability in forms and language. The F-value of 80.645 is significant thus, the hypothesis is rejected.

Table 8 show the result of the regression analysis for communication method on linkage services. It has R^2 value of 0.548 implying that 54.8% of the total variation of linkage services could be explained and a multiple R of 0.74 indicating a strong correlation. Only publication in Journal had a contributory effect on linkage services with b-value of 0.552. This is due to the frequency with which it is used. The F-value of 2.544 is significant showing a significant relationship between communication pattern variables and the linkage services.

Table 7. Stepwise multiple regression analysis of extension agents' communication channel variables in linkage services.

Variable	B	Standard error	Beta	T	Sig. T
Demonstration (X_1)	1.604	0.284	0.679	5.658	0.000
Informal contact (X_2)	0.781	0.225	0.372	3.477	0.002
Constant	-0.505	0.811		-0.623	0.539

Significant at $p < 0.05$. Source: Field survey (2010). Multiple R = 0.985; R-square = 0.970; Adjusted R-square = 0.958; Standard error = 0.2794. $Y = -0.505 + 0.679X_1 + 0.372X_2$. Y, Linkage services; X_1, demonstration; X_2, informal constant.

Table 8. Stepwise multiple regression analysis of researchers communication channel variables in linkage services.

Variable	B	Standard error	Beta	T	Sig. T
Publication in Journals	0.681	0.320	0.552	2.126	0.046
Constant	7.387	2.676		2.760	0.012

Significant at $p < 0.05$. Source: Field survey (2010). Multiple R = 0.740; $R^2 = 0.548$; Adjusted $R^2 = 0.332$; Standard error = 0.475. $Y = 7.387 + 0.552\ X_1$.; Y, Linkage serves; X_1, Publication in Journals.

CONCLUSIONS AND RECOMMENDATION

The results of the study showed that education was an important factor that influenced linkage among researchers-extension agents and farmers. There were good linkages between researchers and extension agents as well as between the extension agents and farmers. Demonstration and informal contacts were important communication methods used by extension agents, while technical reports and conferences were common among the researchers. Agricultural extension administrators should consider the significant variables when planning and implementing linkages in agricultural extension systems. The study thus recommend that the linkage strength among researchers, extension agents and farmers be improved upon so that farmers could relate freely with researchers and extension agents, thereby improve the bottom-top approach system of communication. Furthermore, there is the need to develop close linkage and cooperation among extension agencies and research institutes, input, credits and marketing to provide farmers with efficient services. The mechanism of feedback to research institutes and solution back to farmers should also be strengthened.

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