STRENGTHENING TECHNOLOGY UTILIZATION THROUGH FEEDBACK MECHANISM AMONG FARMERS IN SOUTH-EAST-AGRICULTURAL ZONE, NIGERIA

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ABSTRACT

In recognizing the importance of providing opportunities for farmers to ask questions and to voice out their concerns about technologies disseminated to them, the paper seeks to investigate the effectiveness of feedback mechanism put in place by various institutions involved in the technology transfer in the study area. The study was conducted in South East Agricultural Zone. Multi-stage sampling procedure was used in the selection of the sample. South-east Agricultural zone is made up 5 states, in the first stage Abia State was selected because of the presence of National Root - Crop Research Institute (NRCRI) which has cassava as one of its mandate crops to represent the rest of the states. In the second stage, one agricultural zone (Umuahia) was purposively selected, followed by selection of 2 blocks and 3 circles respectively. In the fourth stage 30 farm families involve in cassava production were selected, bringing the total to 180 respondents. Data were generated through the use of structured questionnaire and participatory observation. Data collected were analyzed with descriptive and inferential statistics. Major findings indicated that ADPs (Agricultural Development Programme) uses face to face communication and making staff number available to receive response from the farmers with a mean score of X = 1.96 and X = 2.02respectively, indicating that their feedback is often delayed. Radio and television had a mean score of X = 1.3 indicating that the broadcasting media houses has a power linkage system. This will help the farmers to attain high utilization of the technologies compared to projects that did not include as much audience feedback mechanism farm families utilizing these cassava technologies were selected bringing the total to 180 respondents. Non-governmental organizations and fellow farmers with mean score of X = 2.07 and open community meeting with mean score of X = 2.0, even though had moderate utilization because of its immediate response, information distortion occurs due to lack of experts. So providing opportunity for people to whom a particular innovation is meant for to voice out their concerns will give the agencies in charge the necessary pressure to make changes in their operations. Therefore there is need for ADPs in the state and other stakeholders to maintain on-going all feedback mechanism throughout a life cycle of a particular technology introduced into a social system.

Keywords: Farmers Feedback Mechanism, Utilization and Technology.

INTRODUCTION

Extension is again moving into a position of central responsibility in the agricultural development process. The reason is clear; most national government, donors, and development agencies have given high priority to agricultural development and the corner stone of the policy is technological change. International Agricultural Research Centres (IARCS), working jointly with national research programmes, have made considerable progress in increasing crop yields and total food production through improved genetic

technology combined with improved agronomic practices, including increased usage of fertilizer and other agricultural chemicals. The effective use of improved agricultural technology by farmers is the immense challenge facing extension in South-east agricultural zone and Nigeria in particular. This very difficult task results from the millions upon millions of small producers to be served, the relatively poor resources to extension organizations and the potentially disastrous social consequences of putting inappropriate extension strategies or disseminating inappropriate technology.

Agriculture accounted for over a quarter of the country's gross domestic product (GDP) and contributed to 34.47% to the GDP in the first guarter of 2012 (National Breau of statistics 2012). A greater fraction of the country's population of over 140 million people depends on agriculture for their livelihood either directly or indirectly (Olowogbon 2011). Despite the importance of agriculture in Nigeria, the sector has not been able to fulfill its traditional role of feeding the population, meeting the raw material requirement of industries and providing substaintial surplus for experts (Sanusi 2010). Sustainability and productivity of agricultural sector worldwide depends on quality and effectiveness of extension services among other factors like improved technology, adequate markets, available supplies and inputs, access to adequate transport and sufficient incentives to motivate the farmers to innovate. There is a gap between agricultural performance and available research information. This has been attributed to poor extension service delivery, as well as limited interaction between technology developers and extension workers. Poor communication between actors in extension service delivery particularly the Government, NGOs and farmers has also been shown to hinder flow of developed technologies to farming communities (Kimano et al, 2010). Technology transfer is one of the critical elements that determine development in the third world countries, especially Nigeria. The success of any extension approach and strategy depends to a greater extent on the extension agent farm family ratio. This explains the number of farm families each EA is expected to reach with the technologies in his cell. The higher the ratio, the lower the effectiveness of extension service delivery in a given period of time. The recommended ratio in Nigeria is 1: 800 - 1000 (World Bank, 2004). In the recent past, this target has not been realized, especially, in the South-east agricultural zone, due to the increasing shortage of EAs, NAERLS/NFRA (2011). Abia state Agricultural Development programme (ADP, 2012), for instance is currently having a ratio of I EA to 5198 farm families (ADP, 012). The performance of Nigerian agricultural so far indicates that the farmers have neither used nor absorb most of the technologies being introduced to them (Atade, 1999). This appear the case considering the finding of Ya yock and Misan (1990) which showed that there existed a wide gap between farmer's improved technology yields and farmers traditional technology yields. This scenario the author attributed to the gap between available agricultural information on improved practices and its use. In recent time, because of the problems of extension services, a lot of other institutions are now engaged in agricultural information dissemination as a way of boosting the productivity of rural farmers without any consideration for feedback mechanism of those channels. Thus, in agricultural information use studies, it is usual to investigate the personal and socio-economic characteristics of farmers in order to understand their relative influence on the farmers' information use behavior (Onu 1991). Not knowing that report on feedback from clientele will go a long way to increase use.

As we can see, feedback mechanism plays an important role in shaping human practices. This is basically because it is crucial mechanism in human learning. Feedback from farmers is information about the outcomes, characteristics and/or consequences of technologies disseminated to them.

At times the extension agents felt-threatening and give inadequate feedback on various technologies disseminated to the farmers, thereby creating a friendly environment that the farmers put the innovation into use. In many states, especially in the South-east agricultural zone, the ADPs do not have effective existing agency-wide mechanism or system for collecting, analyzing, utilizing and responding to farmers feedback. Effective feedback processes require management buy-in, integrating feedback mechanism and loops into program cycles and organizational management systems requires a range of strategies at the headquarters and at the field levels. The institutions who place emphasis on the importance of listening to farmers feedback should be able to put in place, effective system for data collection and analysis. This information gathered through feedback mechanism has to be reported to subject matter specialist in a format useful for making useful decisions. According to (Kimaro et al, 2012) often times, changes made to project operations based on feedback were not difficult to incorporate and changes to some details led to a significant improvement in client satisfaction. In recognizing the importance of providing opportunities for farmers to ask questions and to voice out their concerns or complaining about technologies disseminated to them, this paper tries to investigate the role of feedback mechanism in strengthening technology utilization among farmers in South-east Agricultural zone, Nigeria; with the following: specific objectives to;

- 1. identify the socio-economic characteristics of the respondents in the study area.
- 2. ascertain some selected technologies dissemination to the farmers and their level of utilization in the study area.
- 3. identify the channels for agricultural information accessible to them
- 4. examine the feedback mechanism put in place by institutions involved in disseminating agricultural information to farmers.
- 5. Identifying the socio-economic factors influencing the utilization of feedback loopsin the study area.

METHODOLOGY

The study was conducted in South-East Agricultural zone, Nigeria. South-east comprises of Abia, Anambra, Imo, Ebonyi and Enugu States. The researcher selected Abia State because of the presence of National Root Crop Research Institute (NRCRI), which has cassava as one of its mandate crops.

Multi-stage sampling procedure was used in the selection of the sample size. According to Marriott (2014) this is a sample which is selected by stages, the sampling units at each stage being sub-sampled from the larger units chosen at the previous stage. At each stage, only units within the highest level units selected at the previous stages are considered. In the first stage, one state (Abia) was purposively selected from the zone to represent the rest of the states. In the second stage, one agricultural zone was selected and in the third stage, 2 blocks were selected from these blocks, 3 circles were selected and from each circles thirty farmers were randomly selected making a total of 180 respondents. Data were generated through the use of structured questionnaire and Participatory Observation. Data generated were analyzed with the use both simple descriptive and inferential statistics. Objective 1, - 4 were realized with the use of simple descriptive statistics and level of utilization of technology was captured using a 3 - point rating seal of High 3, medium 2 and non 1. A set of utilization assessment index was listed as indications. The mean of individual index was used for utilization.

To determine the mean response of each of indicators, a mid-point of 2.0 was obtained thus: 3 + 2 + 1 = 6, 6/3 = 2.0). This was used to assess the level of utilization of the technologies disseminated to them using the following decision rule:

0 - 0.99 of utilization

1.0 –1.99 medium level of utilization.

2.0 and above high utilization.

Objective 5 was realized using multiple regression model. The implicit form is stated below. $Y = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7 \pm x_8 + e)$

Where Y (dependent variable; feedback mechanism dummy variable; use1; non; 0.

 $x_1 - x_8$ (independent variables)

where

 x_1 = Age measured in years as supplied by the respondents

 $x_2 = sex$ (dummy variable; male1; female 0).

 X_3 = Time allocated for programmes (enough 1; otherwise 0).

 $X_4 =$ land measured in hectres

 $X_5 =$ type of tenure (owner operator1 : rented 0).

 X_6 = input availability (available 1; otherwise 0).

 X_7 = market (access/available 1; otherwise 0).

 X_8 = Education number of years of formal schooling

e = error term

RESULTS AND DISCUSSIONS

Table 1. selected socio-economic characteristics of the respondents.

Variables	Frequency	Percentage
Age		
30 - 35	71	39.4
40 - 45	65	6.1
50 - 55	44	4.4
Educational level		
Non formal	68	37.8
Primary school	75	41.7
Secondary school	25	13.9
Tertiary education	10	5.6
Income N 000 per annum		
N40 - N80	25	13.9
N120 – N160	61	33.9
N200 - N240	56	31.1
	8	21.1
Marital status		
Married	162	90.1
Single	18	10.1
Sex		
Male	58	32.2
Female	122	67.8

Source: Field data, 2013

Socio-economic characteristics of the respondents

The table shows that 39% for the respondents were between 30-35 years of age. The age range of the respondents indicates that the respondents are active both in production and reproductive work. About 90% of the respondents were married while 10% of the respondents were single. Married farmers are likely to be under pressure to produce more, not only for the family but also for sale. The desire to produce more could lead to agricultural information seeking and use and also necessary feedback mechanism to voice out their concerns when necessary. Results on educational level show that 38% had no formal education, 42% had primary education 12% secondary education while 7% had higher degree certificate. Education enables the individual farmers to know how to seek and apply information on improved farmers practices. This is because as the individual gained the ability to read, he is able to extend the scope of his experience through any channel. With basic education they are better equipped to make informed decisions for their live and for their communities and so the need for appropriate feedback mechanism from farmers to service providers.

The table further reveals that 34% of the respondents earned between N40 – N80, 000 per annum. Income is crucial in agricultural information use because the higher the income of the farmer, the more likely they would seek and obtain information for use. With improved income the farmer will be better disposed to spend more on recommended farm practices that would further increase his earnings. Majority of the farmers cannot afford multiple channels so the need for feedback mechanism becomes necessary.

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Variables		Levels of utilization		Total	Mean	
	High	Low	Non			
Hybrid	282	1042	15	439	2.4	
Cassava						
Line Planting	231	104	51	386	2.14	
Fertilizer App	318	108	20	446	2.47	
Intercropping	408	78	5	491	2.72	
Herbicide	96	28	14	58	1.43	
Арр						

Table 2: Distribution of respondents based on selected technologies on cassava and level of utilization

Source: Field data, 2013.

Decision Rule:

1.0 - 1.49 low utilization level

2.0 1.50 - 2.00 moderate adopters utilization

3.0 2.50 and above high utilization level.

Results on table 2 shows different rate of adoption of the innovations, this can be attributed to the nature of each, innovation which determine what specifies type of relative advantage is important to the respondents. From the results, only intercropping technology has a high level of adoption. This can be attributed to the nature of our land holdings where a women may get a fragmented infertile pieces of land scattered here and there and intercropping enriches the soil and also encourages maximum utilization of the plots. The other technologies were adopted but not as high as inter-cropping. The implication of the result is that even though a number of channels might have been used to disseminate agricultural information if agricultural development programmes (ADPs) charged with the mandate for extension services will maintain on-going all farmers feedback mechanism throughout the cycle of a particular technology disseminated to the farmers will achieve a high level of adoption compared to prior technologies that did not include as much recipient feedback.

Table 3: Distribution of respondents	based on channels	for accessing	agricultural	information
and feedback mechanism.				

Variables	Feedback mechanism	Total	Mean
Channels			
Extension	Focus group discussion	354	1.96
contact	Making staff phone number available	365	2.02
Radio/Television	Reporting to H/quarters	24	1.3
NGOs/Fellow farmers	Visiting the farmers at	72	2.07
	home		
	Open community	60	2.0
	meetings		

Source: Field data, 2013.

Results on table 3 shows channels used by respondents in accessing agricultural information and the feedback mechanism system. The table reveals that 36% of the respondents access agricultural information through extension agents. Oladoja (20040 affirmed that agricultural extension still remain the most crucial and most critical means to reaching households in rural areas, and feedback mechanism as identified by the respondents were focus group discussion with a mean score of X = 1.96 and making staff number available = x 2.02. according to the respondents, through focus group discussion, the extension worker learns about us and his credibility and integrity nurtured but their response to our complaints are of the delayed. The extension agents also drop their inser to the farmers and most of the time, when they call to seek information there is no service resulting in poor feedback mechanism. Proper feedback mechanism will provide opportunity for the farmers to whom a particular innovation is meant for to voice out their concerns on complaints. Pressure to make changes in their operation because they may felt a sense of responsibility to the farmers. About 26% of the respondents access their agricultural information through radio and 16% through television. Byerlee (1998) stressed that effective extension involves adequate and timely access by farmers to relevant information but unfortunately the ratio of extension agents to farm families is small. In an efficient to reduce food insecurity in the country, many media houses now joined the crude in disseminating agricultural information. On feedback mechanism, utilization radio had a mean score of x = 2.0 while television has a mean score of 2.07. According to the respondents, after listening to the radio or watching televisions on agricultural programmes, only few of us can go to their station to clarify issues arising from the broadcast. The implication of the result is that the production unit of the agricultural information broadcast feedback loop has a poor linkage system. The results also indicated that non-governmental organizations NGOs had 17% with access through fellow farmers had 11%. There are some generic difficulties in the operation of the public extensive system and because of these problems, NGOs and other went into advocacy for innovative practices.

The feedback mechanism employed by the BGOs and fellow farmers include visiting the farmers at home, with a mean score of x = 2.07 and open community meetings with x = 2.07. the respondents stated that, the home visit and community meetings enable the NGOs to learn how they are practicing what they taught them and the problems that is existing at the farm

and farm households, then provide information and assistance. Those channels provide immediate feedback, with its problem of information distortion that may occur along the loop.

Hypothesis Testing

Ho: There is no significant relationship between the socio-economic characteristics of the respondents and their utilization of feedback mechanism in the study area.

Ha: There is positive and significant relationship between the socio-economic characteristics of the respondents and their utilization of feedback mechanism of the respondents in the study area.

Table 4: Relationships between some selected socio-economic characteristics of the respondents and their utilization of feedback mechanism

Variables	Regression coefficient	Std error	T-value	
Age	0.00423	0.002	2.020 ^{xx}	—
Sex	0.03609	0.043	0.698	
Time	0.01721	0.006	-2.722	
Land	0.000112	0.000	3.665 ^{xxx}	
Tenure	0.109	0.055	1.967 ^x	
Input	0.001643	0.014	0.118	
Market	0.00113	0.000	3.555 ^{xx}	
Education	0.06053	0.007	9.108^{xxx}	
Intercept	0.283	0.103	2.740^{xxx}	
R – square	0.707			
R2 Adjusted	0.679			
F- ratio			32.454^{xxx}	
Source: Field	survey, 2013.			_
Note:	-			

Note: Xxx significant at 1% Xx significant at 5%

X significant at 10%

Results on table 4 show the hypothesis testing for the relationship between selected socioeconomic characteristics of the respondents and their utilization of feedbacks mechanism. Four functional forms tried include linear, exponential, doube-log and semilogarithms functions. In selecting the lead equation, certain statistical criteria were considered. These are the magnitude of the coefficient of determination (R^2) the a prior expectation signs and the level of significance of the variables. The exponential regression model was chosen as the lead equation based on the value of the adjusted R- square. The overall level of significance was given by F-ratio of 34.454^{xxx}, this was highly significant showing that the model used highly fitted the data.

Results show that age, education time, allocated to broadcast size, arrangement, access were the significant variables influencing level of utilization of feedback mechanism available to the respondents in the study. Age was significant and positively related to utilization of feedback mechanism, so the null hypothesis should be rejected and the alternative hypothesis accepted. The implication of this findings is that as the farmers mature in age, their ability to analyse the contents of a term broadcast becomes less and the seek for more information for clarification on essential farm management issues relating to their problems on ground.

Education was positive and significantly related to level of utilization of feedback mechanism at 1%. Here the null hypothesis is rejected and the alternative hypothesis accepted. The result of this study is not surprising considering the fact that exposure to education permits an individual to control the rate of message input and develop the ability to store and retrieve information for later use. When well informed through the feedback loops, they are better equipped to make more informed decision for their lives and for their communities. Time of broadcast of agricultural information was negative but significantly related to utilization of feedback mechanism. The result suggests that time is an important mechanism but decreases over certain period. Agriculture is a timely operation and so there is for a timely agricultural information broadcast to serve the farmers need. Land size was positive and significantly related to utilization of feedback mechanism. Size of land holdings affects individual decision to adopt or not to adopt if for example, there is a broadcast on farm mechanization, the farmer can only ask, questions when his land holdings is large.

Further increase his farm earnings. Majority of the farmers cannot afford multiple accesses, so the need for effective feedback mechanism becomes necessary so as the farmer will voice out their complaints and their complaints and the service providers will respond timely. Questions when his land holdings are large. Type of tenure nature was positive and significantly related to feedback mechanism at 10%. Therefore the null hypothesis is rejected and the alternative accepted. The implication of the result is that the type of tenure determines the level of utilization of agricultural information on a particular farm plot. If the tenure is own operator, he/she will be willing to ask more questions for clarification leading to more effective utilization. Market was positive and significantly related to feedback mechanism. The null hypothesis should be rejected and the alternative hypothesis accepted. Location of market, availability of storage facilities and transport facilities level of utilization of agricultural information wants to an. When a respondent adopts a particular innovation he/she is sure of available market for surpluses he/she will adopt the technology and the frequency of use of feedback mechanism will be higher. Getting good relationship with the local community based on mutual understanding and trust is a first step in getting meaningful feedback. Community members knowing what systems are in place or what system are likely to be effective for their own context; gaining insight into this knowledge is social for disseminating agencies seeking to establish feedback mechanism is any social system.

CONCLUSION

The dissemination of technical production recommendation is a matter of gaining new knowledge. Skills and feedback from farmers regarding the problems arising from the introduced technologies are rarely recorded and take serious from the disseminating institutions. These extension agents who are in contact with the farmers who tried to bring feedback from the farmers are not encouraged by either extension administrations or researchers. Therefore, if ADPs or other institutions should maintained on-going all feedback mechanism throughout a life cycle of a particular technology introduced into a system, this will help them to achieve a high level of utilization of the technologies by the respondents compared to projects that did not include as much audience feedback mechanism.

RECOMMENDATIONS

- Regularly scheduled mass media programmes beamed at meeting of forum members • gathered in homes or public places to hear the broadcast will serve as an impetus for the group discussion that follows. This gathering will usually provide regular feedback reports of decisions and questions for clarification to the broadcast.
- Frequency of extension contacts to farm-families showed also be encouraged.
- Providing opportunity for people to whom a particular innovation is meant for to voice their concerns, will give the agencies in change the necessary pressure to make changes in their operations;

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