International Journal of Agricultural Science, Research and Technology in Extension and Education Systems (IJASRT in EESs)
Available online on: http://ijasrt.iau-shoushtar.ac.ir
ISSN: 2251-7588 Print
ISSN: 2251-7596 Online
2015: 5(4):236-244

Received: 12 May 2016
Reviewed: 1 June 2016
Revised: 8 June 2016
Accepted: 14 October 2016

Analysis of Farmers' Feedback on Agricultural Development Project's (ADP's) Performances in Kogi State, Nigeria

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Abstract

This study investigated the farmers' feedback on Agricultural Development Project's (ADP's) performance. The study was carried out in Kogi State, Nigeria. Interview schedules were used to collect data from 160 contact farmers and 80 field extension workers who were randomly selected using multistage random sampling techniques. The data collected were subjected to both descriptive and non-parametric statistics. Result shows that both extension agents and farmers highly rated information on credit use (ξ = 2.63), and both also highly rated credits (ξ = 2.58) in terms of material technology needs. However, Mann Withney U statistic analysis shows that there was significant ($P < 0.05$) difference between the perception of farmers and extension agent on the level of information needs of contact farmers implying that the extensionists did know the priority needs of farmers. Farmers claimed that the area of extension messages that were considered effective includes: improved seed/seedlings (ξ = 2.11), pesticides/insecticides application (ξ = 2.27), use of herbicides (ξ = 2.24) and markets/market prices (ξ = 2.25). This study therefore recommends that effort should be made by extension service providers to improve on areas of farmers identified perceived information/material needs such as credit use, tractor hiring, fertilizer supply, pesticides and improved breeds of chicken while training and better remuneration package be put in place to enhance extension workers performance/productivity.

Keywords: Contact Farmers, Extension Agents, Information needs, Service delivery

1. Introduction

The goal of agricultural extension is to guide rural farmers through educational process to help themselves by adopting relevant innovations that should improve their farm output and by extension standard of living. It is only when farmers adopt the introduced innovations that they are self-empowered economically to improve on their standard of living.

Nigerian agricultural technology transfer policy since political independence emphasized transfer of technical information to farmers using various agro-technology transfer systems (Madukwe *et al.,* 2002). Currently, the Agricultural Development Project (ADP) is the prominent government funded agro-technology transfer systems in Nigeria. The mission of the Agricultural Development Project (ADP) is to help farmers increase food production and farm income through the dissemination of information on the use of improved technology. The ADP system is based on the premise that a combination of factors, comprising the right technology, effective extension, access to physical inputs, adequate market and complementary infrastructural facilities are essential to get agriculture moving and to improve productivity in order to raise the living standards of rural dwellers (Akinsorotan and Oladele, 2009). The utilization of agricultural technology transfer systems is based on the

assumption that effective interactions exist between technology generation by research, technology transfer by extension and subsequent utilization by farmers (Madukwe *et al.,* 2002). The situation permits direct linkages and feedback across and among these three actors involved. For technologies to be appropriate, the developer of the technologies and the end user (farmer clientele) must be able to understand and must be fully convinced and aware that the technologies will be economically viable (Adekoya and Tologbonse, 2011). However, for a researcher to be able to develop an appropriate technology, he must be aware and fully comprehend the problems of the clientele (farmers). The researcher must therefore know and realize that the clientele is not an immutable, stereotyped individual with fixed beliefs and ideas but an individual with dynamic mind who is willing to communicate and receive information from his physical and social environment.

According to Idu and Obinne (2009), the weakness in the Research-Extension-Farmer-Input Linkage System (REFILS) in Nigeria as in most developing countries has been a major limiting factor to increased food productivity and sustainable development. The wide gap between the levels of production, which researchers in Nigeria have proved to be attainable under local conditions and that which farmers have achieved, suggested a missing link in the process of technology transfer. Among several possible factors responsible for this is the speed and accuracy of the transfer of the technologies between the source (research) and intermediary (extension agents) and between the intermediary and ultimate users (farmers). Hence, the anticipated results of expanded food production and rural development are not realized. However, there appears to be a yawning gap existing between the Agricultural Development Programme (ADP) extension strategies and the utilization of the many impressive research results at the production end and hence no appreciable impact on the overall agricultural production (Omotayo, 2004). This gap could be as result of inefficient feedback mechanism of research-extension-farmer linkages.

In the past, the failure of farmers to adopt innovations was usually laid at the door of the farmer that he is conservative, illiterate, resistant to change, poor and so on (Chinaka, 2007). Yet the same Nigerian farmer adopted cash crops like cocoa, oil palm, groundnut and rubber, on scales that sustained the economy of the nation for decades before the advent of the oil boom. It is true that the Nigerian farmer, though sometimes illiterate, is not necessarily conservative but he is prepared to see, experience, learn and buy new technologies provided that: the values of these are demonstrated to him convincingly and consistently and he should have an avenue to give or express the response of his crop and livestock to the technology introduced to him. Even though there is a paradigm change from the top-down to participatory extension in the ADP, there are some lingering problems hindering efficient extension service delivery and feedback mechanism which are anchored mostly on poor funding and shortage of field extension workers. According to KSADP Zone B's report (2014b), the problem of efficient extension service delivery and feedback include: timely availability of seeds/seedlings, poor maintenance culture among farmers, illiteracy and poverty among farmers, lack of female extension agents to help disseminate messages, low sensitization of extension programmes in some local communities, inadequate Block Extension Agents (BEAs) and Village Extension Workers (VEWs), untimely supply of some inputs like fertilizers, untimely establishment of crops on the farm and harvesting, unforeseen climatic conditions, inadequate time/period for collation of farmers data and poor mobilization and motivation of extension staff.

Preconditions for extension agents to be effective include ability to communicate, attitude to extension work, and frequency of contact with farmers and field responsibility, which are examined from the viewpoint of the farmers. The proposition is that the accomplishment of extension service of the ADP goals depends primarily on the effectiveness of the extension agents meeting the needs of farmers. Hence, the specific objectives of this study are to:

i. find out what the felt/priority needs (both information/knowledge and material) of farmers are that will improve their productivity in the study area

ii. compare the actual with potential agricultural production performance to meet their needs in selected crop/livestock

iii. ascertain the perceived effectiveness of extension messages by farmers

2. Materials and methods

The research was carried out in Kogi State of Nigeria. Kogi State was created on August 27th 1991 from Kwara and Benue States with the Capital at Lokoja. Geographically, it is located between latitude $6^{0}30^{1}$N and $8^{0}48^{1}$N and Longitude $5^{0}23^{1}$E and $7^{0}48^{1}$E sharing boundries with Kwara, Ondo, Ekiti, Niger, Benue, Nassarawa, Anambra, Enugu, Edo States as well as the Federal Capital Territory. Annual rainfall stands between 1016 mm and 1524 mm. It has a maximum temperature of 33.2^{o}C and average temperature of 22.8^{o}C, with an average humidity of 70%. Kogi State is marked with two

distinct seasons in a year; these are wet and dry seasons. The wet season spans between middle of March and October and the dry season is usually experienced between the months of October and March. It has a land area of 283,135,359Km2 (KSPC, 1997).

The population for this study was all the contact farmers and extension officers in Kogi State. A sample size of 160 contact farmers and 80 extension officers were selected using a multi-stage sampling technique. The first stage, involves the selection of 4 Block Supervisors from each of the agricultural zone (A, B, C and D) in the study area, making a total of 16 Block Extension Supervisors. The second stage involved a random selection of 4 extension agents from each of the eight cells for which the selected block officers are directly responsible (one block officer is responsible for 8 field Extension Agents). This brought the total of extension agents from all the 4 agricultural zones to be 64 agents, and a grand total of field extension workers (including the Block Supervisors) to be 80. A Sub-cell has 10 farmers and one extension agent is directly responsible for 8 sub-cells, that is, 1:80 extension agent to farmers ratio. In the third stage, for the purpose of fair representation, random selection of forty (40) out of the eighty (80)farmers who are supposed to have direct contacts with the selected extension agents from each of the zone were made. This represents about fifty (50) percent of the contact farmers. Therefore, a total of 160 farmers were randomly selected from all the zones (A, B, C and D). In retrospect, total of 80 extension agents and 160 farmers were selected for this study.

Data were collected through the use of interview schedule to elicit information from 80 extension officers and 160 farmers in the study area. Data collected were subjected to descriptive statistics. Information (knowledge technology) and material technology needs were measured on 3-points Likert scale: low (1 point), moderate (2 points) and high (3 points). A mean score that was equal or higher than 2.0 was considered as high information needs. A multiple bar chart was used in comparing the actual with potential agricultural production performances of farmers in both selected crop and livestock in the study area. Effectiveness of extension messages was measured on 3-points Likert scales as Not effective (1 point), Effective (2 points) and very effective (3 Points). A mean score that was equal or higher than 2.0 was considered as very effective.

Mann Whitney U Test was used to test the significant difference in the level of information needs between the contact farmers and extension agents. The Mann-Withney Test was computed by ranking or rating the extension agents and farmers perception on felt/priority needs aggregate scores. The aggregate scores were ranked in ascending order with lowest score ranked "1" the next score ranked 2 and so on until all the scores were ranked, with the highest scores having the highest rank. After the scores have been ranked, the extension agents and farmers were then separated with their ranks into their original samples. The ranks for each extension agent and farmer group were then summed up to obtain R_E and R_f.

$$U_E = N_E \times N_f + N_E \frac{(NE+1)}{2} - R_E$$

$$U_f = N_f \times N_E + 1 \frac{(Nf+1)}{2} - R_f$$

Where

U_E = Mann Withney calculated value of extension agents

U_F = Mann Withney calculated value of farmers

N_E = Number of sample cases for information needs for extension agents

N_f = Number of sample cases for level of information needs for farmers

R_E = Sum of ranks for extension agents

R_F = Sum of ranks for farmers

In actual practice, only one of the Us need to be calculated since the relationship between both Us is given as:

$U_F = N_E + N_F - U_E$

According to Graham (2011), where we have equal numbers of cases in two groups and the larger N cannot be determined, the Mann-Whitney formula takes account of this as the sample with the larger sum of rank will be taken as the larger sample.

To be statistically significant, our obtained *U* has to be equal to or less than this critical value on the Mann Whitney critical table. Note that this is different from many statistical tests, where the obtained value has to be equal to or larger than the critical value. Alternatively any of the Us can be converted to Z and the obtained Z is evaluated with reference to the table of the areas under the normal curve Where:

$$Z = \frac{U - \frac{NENf}{2}}{\sqrt{\frac{(NE)(Nf)(NE+Nf+1}{12}}}$$

3. Results and discussion

3.1 Level of Information Needs (Knowledge Technologies) by Farmers

The distribution of respondents according to their level of information needs in Table 1 indicates that, 10.00%, 16.88% and 73.13% (low, moderate and high) with the mean score of 2.63 said they

needed the information on credit use for their farming businesses. With respect to markets/marketing prices of their harvested crops, 9.38%, 25.00% and 65.63% (low, moderate and high respectively) with the mean score of 2.56 expressed their need for the information. It was also revealed in the result that 14.38%, 28.13% and 57.50% as low, medium and high respectively with the mean score of 2.43 indicated their need for information on pesticides/insecticides application either to their crops on the field or stored products. In terms of the knowledge of soil management, 16.88%, 34.33% and 48.75% as low, moderate and high respectively with the mean score of 2.32 indicated their need for it. This indicates that the mean scores of these areas of information needs where above 2 hence, they are highly said to sought for by the farmers. This result agrees with those of Meitei and Devi (2009) and Sabo (2007) who found that the information needs of farmers were mostly in areas of market/market prices, credit availability and storage methods.

It was revealed that 65.63%, 15.63% and 18.75% of the respondents with the mean score of 1.53 said they needed low, moderate and high information on labour use respectively. With respect to land tenure system, 28.13%, 61.25% and 10.63% of the respondents with the mean of 1.83 claimed the needed low, moderate and high information on it respectively. In terms of how to increase their income, 30.00%, 56.25% and 13.75% of the respondents with the mean score of 1.84 said the needed low, moderate and high information on it respectively. With respect to intercropping, 38.13%, 30.63% and 31.25% of the respondents with the mean score of 1.93 claimed they needed information on what crop combination would be the best. This means that these areas of information needs were scored below the mean of 2 therefore, it can be deduced that these areas of information needs were the least needed area of priority by the farmers. This result is similar to that of Olaniyi and Adewale (2012) who reported low information needs for land tenure system especially on how to acquire land and that of how to increase their income especially through good record keeping.

This implies that majority of the farmers highly rated information on credit use, market /market prices and pesticides/insecticides use but agricultural insurance and labour use were least needed area of priority.

3.2 The Perception of Extension Agents on the Level of Information Needs by Farmers

The distribution of respondents according to their perception on the level of information needs of farmers in Table 2 indicates that 12.50%, 18.75% and 68.75% of them with the mean score of 2.56 rated farmers information needs on timely planting and harvesting of crops in the order of low, moderate and high respectively. With respect to credit availability for their farming businesses, 17.50%, 12.50% and 70.00% of the extension agents rated farmers' needs as low, moderate and high respectively, with the mean score of 2.53 said the farmers needed the information. It was also revealed in the result that 5.00%, 42.50% and 52.50% of the extension agents (low, moderate and high respectively) with the mean score of 2.48 indicated their perception on farmers' need for information on intercropping. The result indicated that 16.25%%, 33.75% and 50.00% of the extension agents (low, moderate and high respectively) with the mean score of 2.34 claimed it was the level of need by farmers on animal health information. This indicates that the scores on these areas of information needs of contact farmers as perceived by the extension agents were above the mean 2 hence, the farmers were said to have highly sought for these information.

It was revealed that 50.00%, 28.75% and 12.50% of the respondents with the mean of 1.32 perceived the contact farmers had low, moderate and high respectively needs for information on market/market prices. That is, where to sell their commodities and for which price they are sold. In terms of agricultural insurance, 62.50%, 21.25% and 11.25% of the respondents with the mean of 1.39 perceived the contact farmers needed low, moderate and high information on where and how to get agricultural insurance. With respect to information on how to increase their income, 28.75%, 32.50% and 27.50% of the respondents with the mean score of 1.76 said the needed low, moderate and high information on it. This indicates that that the extension agents' perceived mean scores on these areas of information needs of contact farmers were below the mean 2 hence, the extension agents' perception on the farmers' level of information needs in these areas were said to low.

This can be deduced that the farmers perceived areas of high information needs were those of credit use, access to market/market prices, and the use of pesticides/insecticides while extension agent rated timely planting/harvesting, intercropping and credit use as highest priority. The main area of agreement was that of credit use. This result justifies the report of Omeregbee and Ajayi (2009) who opined that there was a serious need for extension officers to be trained especially in the areas of identification of farmers felt needs.

Table 1. Mean Distribution of Farmers according to their Level of Information Needs (Knowledge Technologies)

Areas of Information Needs	Low (1)	Moderate (2)	High (3)	Sum of Responses	Mean Score	Percentage Proportion
Weather pattern	30(18.75)	92(57.50)	38(23.75)	328	2.05**	67.33
Intercropping	61(38.13)	49(30.63)	50(31.25)	309	1.93*	63.67
Timely planting &	33(20.63)	40(25.00)	87(54.38)	372	2.33**	77.33
Agricultural insurance	61(38.13)	89(55.63)	10(6.25)	269	1.68*	54.33
Labour availability	105(65.63)	25(15.63)	30(18.75)	245	1.53*	50.33
Credit use	16(10.00)	27(16.88)	117(73.13)	421	2.63**	87.67
Land tenure system	45(28.13)	98(61.25)	17(10.63)	292	1.83*	60.00
Animal health/Nutrition	32(20.00)	88(55.00)	40(25.00)	328	2.05**	67.67
Pesticide/insecticide use	23(14.38)	45(28.13)	92(57.50)	389	2.43**	81.00
How to increase income	48(30.00)	90(56.25)	22(13.75)	294	1.84*	60.33
Soil management	27(16.88)	55(34.38)	78(48.75)	371	2.32**	77.33
Markets/market prices	15(9.38)	40(25.00)	105(65.63)	410	2.56**	85.33
Use of herbicides	34(18.75)	43(26.88)	83(51.88)	369	2.31**	76.00

Note: Multiple responses, ** =High level of information needs and * = Low level of information needs
Figures in parenthesis represent (%)

Table 2. Mean Distribution of Extension Agents according to their Perception on the Level of Information Needs (Knowledge Technologies) of Contact Farmers (N = 80)

Areas of Information Needs	Low (1)	Moderate (2)	High (3)	Sum of Responses	Mean	Percentage Proportion
Weather pattern	20(25.00)	36(45.00)	24(30.00)	164	2.05**	69.58
Intercropping	4(5.00)	34(42.50)	42(52.50)	198	2.48**	85.83
Timely Planting & harvesting	10(12.50)	15(18.75)	55(68.75)	205	2.56**	86.67
Agricultural insurance	54(67.50)	17(21.25)	9(11.25)	115	1.44*	46.25
Labour availability	46(57.50)	23(28.75)	11(13.75)	125	1.56*	51.67
Credit use	14(17.50)	10(12.50)	56(70.00)	202	2.53**	81.67
Land tenure system	71(88.75)	4(5.00)	5(6.25)	94	1.18*	36.67
Animal health	13(16.25)	27(33.75)	40(50.00)	187	2.34**	77.92
Pesticide/insecticide	16(20.00)	34(42.50)	30(37.50)	174	2.18**	70.00
How to increase income	32(40.00)	26(32.50)	22(27.50)	150	1.88*	58.75
Soil management	30(37.50)	30(37.50)	20(25.00)	150	1.88*	59.58
Markets/market prices	47(58.75)	23(28.75)	10(12.50)	123	1.54*	44.17
Use of herbicides	18(22.50)	23(28.75)	39(48.75)	181	2.26**	75.00

Figures in Parenthesis represent (%)
Note: Multiple responses, ** =High level of information needs and * = Low level of information needs

3.3 Difference in the Level of Information Needs as perceived by Contact Farmers and Extension Agents.

Man Whitney (U) statistic was used to test hypothesis one (Ho_1) of the study. As it is reflected in Table 3, there was no significant difference in the level of information needs as perceived by both the contact farmers and extension agents. Therefore, the Ho was accepted and Ha rejected implying that both farmers and extension agents perceived same needs/priority in terms of knowledge needed for sustainable development. The Z score (-0.29) indicated that population distribution was not skewed around the rejection zone of the population distribution curve. This was in agreement with a priori expectation that extension agents should be able to perceive the information needs of the farmers they work with. This should enhance better planning and execution of programmes by extension organizations.

Table 3. Mann Whitney 'U' Statistic Showing the Difference between Perceived Level of Information Need/priority by Farmers and Extension Agents

Extension Agents	Score	Individual Rank	Total Rank	Farmers	Score	Individual Rank	Total Rank
2	24	217.0	434.0	4	27	237.5	950.0
17	22	193.0	3281.0	7	26	232.0	1624.0
3	21	178.0	534.0	8	25	224.5	1796.0
2	20	169.0	338.0	5	24	217.0	1085.0
3	19	160.5	481.5	10	23	208.5	2085.0
4	18	152.5	610.0	4	22	193.0	772.0
2	17	145.5	291.0	6	21	178.0	1068.0
5	16	137.5	687.5	7	20	169.0	1183.0
5	15	126.5	632.5	5	19	160.5	802.5
3	14	118.0	354.0	4	18	152.5	610.0
5	13	109.0	545.0	4	17	145.5	582.0
6	12	98.0	388.0	5	16	137.5	687.5
3	11	87.5	262.5	7	15	126.5	885.5
2	10	76.5	153.0	4	14	118.0	472.0
3	9	66.0	198.0	6	13	109.0	654.0
4	8	53.5	214.0	5	12	98.0	490.0
1	7	40.0	40.0	7	11	87.5	612.5
1	6	31.0	31.0	10	10	76.5	765.0
2	5	24.0	48.5	6	9	66.0	396.0
2	4	16.5	33.0	12	8	53.5	642.0
2	3	9.5	19.0	10	7	40.0	400.0
3	2	3.5	10.5	6	6	31.0	186.0
				5	5	24.0	120.0
				6	4	16.5	99.0
				4	3	9.5	38.0
				3	2	3.5	10.5
$\sum N_E = 80$			$\sum R_E = 9785.5$	$\sum N_F = 160$			$\sum R_F = 19015.5$

Z = -0.29, Note: NS = Not Significant

3.4 Estimate of the Current and Potential Yield of Maize and Cassava, and of Chicken and Goats by Contact Farmers

As it is shown in Figure 1, the average current yield of maize by a farmer in Kogi State is estimated to be 1.03 tons/ha, while the potential yield could be up to 3.00 tons/ha according to the report of the project carried out by the African Agricultural Technology Foundation (AATF, 2013). An average current yield of cassava was estimated to be 15.18 tons/ha, while the average potential yields according to Okoro and Ujah (2009), could be up to 18.10 tons/ha. This means the average yield/ha of both cassava and maize were still below the expected. This difference between the actual and the potential yields can be reduced if areas of priority needs in information and materials can be effectively attended to.

The analysis on the estimate of the current and potential flock size of goat per household and chicken farmers in Figure 2 indicated that the average current flock size of goats per household was 16, while average potential flock size according to Assan and Sibanda (2014) was estimated to be 20 goats per household (Assan and Sibanda, 2014). With respect to chicken production, 27 birds per household was estimated to be the average current flock size, while the average potential flock size according to Yakubu *et al*. (2014) was 28.7 birds . This means that the current average flock size of chicken and goats per

household still stand below the expected. This implies that the difference in the current and potential flock sizes can be reduced if the goat and chicken contact farmers had access to both knowledge and material technologies where they have priority needs.

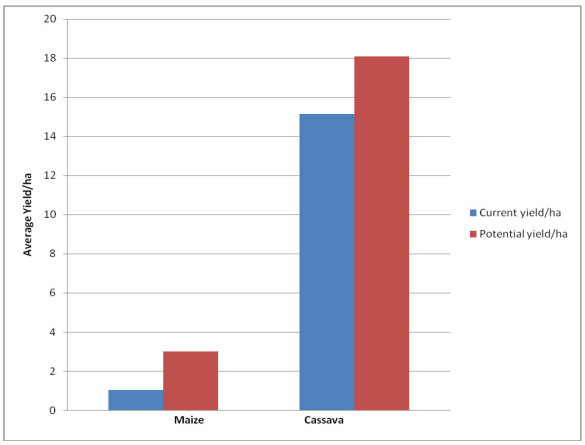

Figure 1. Bar Chart showing Current and potential Yield of Maize and Cassava in the Study Area

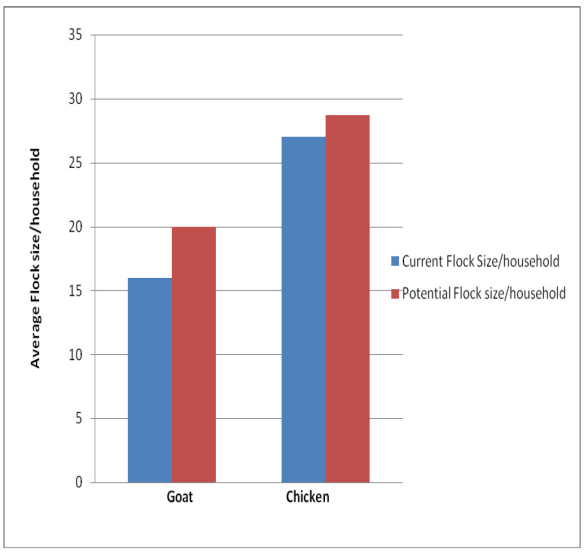

Figure 2. A Bar Chart Showing Current and Potential Flock Size of Goat and Chicken in the Study Area

3.5 Farmers Perception on the Effectiveness of Extension Messages

As it is reflected in Table 4, the mean distribution of farmers according to their perceptions on the effectiveness of extension messages shows that 16.88%, 40.63% and 42.50% of the contact farmers with the mean score of 2.27 perceived that the messages on pesticides/insecticides application extension agents passed on to them were not effective, effective and very effective respectively. It was revealed in the result that 52.50%, 27.75% and 48.75% of them with the mean score of 2.25 claimed that the information on markets/market prices were not effective, effective and very effective respectively. It was also indicated that 23.75%, 28.13% and 48.13% of the contact farmers with the mean score of 2.24 said that the messages on the use of herbicides they received from the extension agents were not effective, effective and very effective respectively.

This means that while the contact farmers perceived information on pesticides/insecticides use, markets/market prices and use of herbicides respectively, they claimed messages on weather pattern, labour availability and agricultural insurance did not make any effect on their farm. This result agrees with that of APhunu and Otoikhian (2008) who carried out research on the perception of farmers' on the effectiveness of extension agents of Delta State Agricultural Development (DADP), reported that farmers claimed that the message they received from extension agents were relevant and effective. They further found that the there was a significant relationship between the effectiveness of extension agents and adoption of technologies by contact farmers. The implication of this is that many farmers who have not been able to use knowledge passed to them by extension agents may not be persuaded to adopt technologeis related to such information disseminated. This could be due to irrelevance of the information or inability of the information to meet the priority need of the farmers. As such, farmers' felt needs, aspirations, values and agrarian setting should be put into consideration by both research and extension so as to avoid ill-adoption and ill-adaption of technologies.

4. Conclusion and Recommendations

Farmers in the study area found information received on improved seeds/seedlings, pesticides/insecticides use, markets/market prices as effective but did not find information on intercropping, agricultural insurance, labour availability, animal health, improved animal breeds and weather pattern very useful. Effort should be made by extension service providers to improve on areas of farmers identified perceived information/material needs such as credit use, pesticides and improve breeds of chicken, while training and retraining, better remuneration of service of extension workers should be put in place to enhance performance and inspire them to disseminate information that will effectively improve farmers productivity. Based on the outcome of this study, the following recommendations are made:

1. Extension services especially that of KSADP should be based on the felt needs identified

(both technical and economic, Knowledge and material needs) of the contact farmers. This can be chiefly achieved through active participation of the contact farmers in both technology development and transfer programmes

2. The gap between actual and actual and potential production performance of farmers should reduced through effective demand driven extension service delivery of the KSADP. .

3. Effectiveness of the extension agents can be improved through training and re-training of the agents. In-service training or on-the-job kind of training can be of immense help to improve the agents' capabilities and competences.

4. Improvement in remunerations of the extension staff and other motivational favourable condition of service such as mobility, accommodations, allowances good working environment and others should be given priority attention by extension service providers.

5. This type of research should be carried out very frequently by extension service providers as feedback and feed-forward mechanism to improve meeting the felt needs of farmers and closing the gap between actual and potential production abilities of rural farmers.

6. The interventions of the government and other Non Governmental Organsiations (NGOs) in bettering the income of farmers should be intensified.

Table 4. Mean Distribution of Farmers' perception on the Effectiveness of Extension Messages

Extension Messages	Not Effective (1)	Effective (2)	Very Effective (3)	Sum of Responses	Mean Score	Percentage Proportion
Improved seeds/seedlings	42 (26.25)	58(36.25)	60(37.50)	338	2.11**	68.00
Weather pattern	122(76.25)	22(13.75)	16(10.00)	214	1.34*	35.33
Intercropping	79(49.38)	60(37.50)	21(13.13)	262	1.64*	51.00
Pesticides/insecticides application	27(16.88)	65(40.63)	68(42.50)	361	2.27**	74.33
Use of herbicides	38(23.75)	45(28.13)	77(48.13)	359	2.24**	74.00
Soil management	52(32.50)	48(30.00)	60(37.50)	328	2.05*	65.33
Credit availability	76(47.50)	39(24.38)	35(21.88)	259	1.62*	53.66
Agricultural insurance	120(75.00)	30(18.75)	16(10.00)	228	1.43*	38.33
Labour availability	118(73.75)	28(17.50)	14(8.75)	216	1.35*	39.00
Land tenure system	86(53.75)	53(33.13)	21(13.13)	255	1.59*	51.67
Animal health	78(48.75)	37(23.13)	45(28.13)	287	1.79*	53.00
Improved animal breeds	109(60.56)	20(12.50)	31(19.38)	242	1.51*	45.33
Markets/market prices	38(52.50)	44(27.50)	78(48.75)	360	2.25**	72.33

Figures in Parenthesis represent (%)

Note: Multiple responses, ** =message is very effective and * = Low message not effective

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