EFFECT OF GROUP INTERPERSONAL COMMUNICATION METHODS ON ADOPTION OF ORGANIC FARMING AMONG MAIZE FARMERS IN MACHAKOS COUNTY, KENYA

[1*] **Chege Anne Njeri**
01chegeanne@gmail.com

[2**] **Professor Hellen Mberia**
hellenmberia@gmail.com

[1*] Student MSc Mass Communication: Jomo Kenyatta University of Agriculture and Technology, Kenya
[2**] Jomo Kenyatta University of Agriculture and Technology, Kenya

Abstract: Interpersonal communication, ranks as one of the most successful means of information transfer and communication and is responsible for simplifying research information and delivering it to farmers in an effective and easy-to-understand manner as well as provide a necessary and timely a feedback mechanism to researchers on problems faced by farmers.

Importance: Farmers' training is intended to promote uptake of knowledge and skills, changing of attitudes and adopt new methods of farming. When improved agricultural practices are systematically and effectively delivered, to farmers, these farmers adopt new and improved agricultural practices which finally improve the social and economic development of the farmer.

Objectives: The objective of the study was to examine the impact of group interpersonal communication methods on adoption of organic farming among maize farmers in Machakos.

Findings: From the research findings, 89% of the respondents agreed that they belong to a farmer group while only 11% of the respondents do not belong to a farmer group. Quality communication leads to effective group decision making and project completion. Therefore, with more farmers belonging to groups it becomes easier to share and interact among people who have a bond thus strengthening the adoption of organic farming. Also, the findings indicated that group members have a consistent interaction which facilitates exchange of ideas by the group members. The study concluded that there was effective interpersonal communication with groups and individuals meeting and sometimes inviting experts or talking via phone to shed more light on the subject matter. The findings also indicate that there was a perfect strong correlation between group interpersonal communication procedures and adoption of organic farming techniques. This was explained by a Pearson correlation coefficient of 0.969 which was significant at 0.01 level. From this finding, it can be concluded that in order for farmers to adopt organic farming, all factors related to group interpersonal communication procedures are very crucial.

Keywords: Interpersonal communication, Kenya Agriculture Livestock Research Organization, organic farming

Introduction

As advancements in technology are rapidly becoming accepted in society, interpersonal communication is better at creating awareness and interest, and to serve as a form of evaluation and trial (Food and Agriculture

Organization, 2006). According to Ojiambo et al., (1995), even though agricultural information can be provided through various formal and informal channels and sources such as mass media, electronic and printed media, libraries, information centres and interpersonal communication, what he calls extension, ranks as one of the most successful means of information transfer and communication. Extension is responsible for simplifying research information and delivering it to farmers in an effective and easy-to-understand manner as well as provide a necessary and timely a feedback mechanism to researchers on problems faced by farmers. Extension officers act as a bridge between researchers and farmers hence providing a two-way communication flow between researchers and farmers (Anholt & Zijp 2002).

Murage et al., (2012) stated that acquisition of information alone is not enough to promote adoption as the source information must be trusted. Information that comes from a trusted source, or a source that is revered by the farmer is more likely to enhance adoption of new technologies. He thus suggested the use of interpersonal channels as a means of communication and as source of information to the farmer as a more likely means to promote adoption. Interpersonal communication methods include; songs, poems, exchange with neighbours, discussions with relatives and friends or peers, faith-based discussions, and community-based channels such as farmer field days, workshops, seminars, on-farm demonstrations, farm-to-farm visits, agricultural shows and public community meetings (Adolwa et al., 2012; Rogers, 2003). Adolwa (2012) also alluded to the use of ICT as a means of information in the field of agriculture in his study which sought to analyse the communication and dissemination channels influencing integrated soil fertility management in Western Kenya. He said that ICT was responsible for reducing the geographical and knowledge gaps as farmers and villagers in general were able to interact with responsible experts through mobile phone technology. In his analysis of communication channels influencing adoption of integrated soil fertility management, Adolwa (2012) categorized interpersonal communication methods in accordance to their reach in accomplishing the task of extension communication namely individual contact, group contact and computer aided contact.

Adolwa (2012) divided individual communication into two i.e. communication between two farmers and communication between a farmer and an agricultural expert. Individual communication method consists mainly of dialogue and is considered most effective for activities to be undertaken by or within the full control of the individual farmer or household. It is particularly important as information is tailored to the situation of the farmer. Effective agricultural shows provide farmers with a chance to interact with other famers and agricultural expert and have been shown to improve crop yields, reduce costs of information search, and increase adaptation of proven technologies in smallholder farming (Agricultural Society of Kenya, 2009). Its main disadvantage is that is highly expensive since many extension officers are required and it highly time consuming.

Group communication method involves working with groups or the community at large, is suitable when discussing matters related to the whole community. It avoids a few powerful people in the community from monopolizing the information, as well as ensuring a large number of people is reached. Feder *et al.,* (1985) noted that extension efforts increased the adoption probability of new technology by increasing the stock of information farmers had regarding the product. Scherer (2014) discussed that the most adequate means of teaching people in a large group or community is a combination of the group and individual approach, a process referred to as meetings. Meetings are effective venues for receiving information from the community, for discussing issues of communal or individual interest and for spreading new ideas. The ideas are localised for the community, discussed by the community members and adjusted to suit the needs of the community. Group

communication methods include; discussion between farmers in farmer groups, discussions within farmer groups with agricultural experts, training workshops among others.

Organic agriculture is a set of farming practices that balances ecological and social goals with livelihood diversity (Pugliese, 2001). It links consumer interests in healthy and nutritious foods with producer interests in profitability and rural environmental vitality. It places priority on natural processes for maintaining soil fertility, soil conservation and soil health. It recognizes these processes as key determinants of a viable production system. These systems adhere to minimum use of chemical fertilizers, recycling of crop residues through creation of compost pits, green manures and use of Nitrogen-fixing plants (Kroma M., 2006). It emphasizes on minimum use of external and non-renewable inputs on the farm (Röling & Wagemaker 1998) and instead of using conventional chemical-based fertilizers, it advocates for regenerative bio-fertilizers and bio-stimulants. Organic farming aims at creating farm synergies that work towards optimal plant-animal interactions and enhance natural soil fertilization and soil health (Pretty, 2001). Using refuse from the animals and the crops serves as manure when re-planting in the next season is a good example of plant-animal interactions. Crop rotation and intercropping are a very important means of ensuring plants energize each other (Pretty, 2001).

According to the World of Organic Agriculture (2015), the total field population under organic farming 50.9 million hectares. Of this land, Oceania has the largest share with Africa having the lowest with 1.7 million hectares. The three highest organic producing countries are India, Ethiopia and Mexico.

The organic sector in Kenya is still relatively small but growing fast. Over 182,000 hectares of land is under organic management, which accounts for 0.69 % of the total agricultural area in Kenya. About 40,000 farms have changed over to organic cultivation methods so far (IFOAM & FiBL 2010) with many of these being large scale horticulture and fruit exporters who are diversifying into organic production to meet demand from their international customers. This is a far off cry from the 32.2 million hectares of agricultural land managed organically worldwide by more than 1.2 million producers, including smallholder farmers.

Statement of the Problem

Farmers' training programmes may operate with an assumption that farmers will put into practice the improved practices they are taught while in reality adoption of improved agricultural varieties remains incomplete (Muange *et al*., 2014).

According to Akinbile and Otitolaye, (2008), group communications, which include farmer group discussions, seminars, farm demonstrations, workshops, and agricultural shows, promotes learning in social structures and leads to higher rates of adoption. They attribute this to the fact that farmers have a shared social structure which provides a base to discuss ideas learnt and also have a feeling of collective/shared risk when trying out a new technology.

Organic farming training and education has been taking place in Kenya for a long time (since 1970s) with NGOs like Biovision, Kenya Organic Agriculture Network (KOAN) and the government of Kenya through the Ministry of Agriculture setting up centres and education classes all around the country. The aim of these trainings has been to encourage farmers to take up organic farming as an agricultural practice for both local/family consumption and for sale to the larger markets. During these trainings, farmers are educated in their social setting, personalizing the information with their way of life and society in a manner that promoted adoption. Maina S. (2010) while studying 'The effectiveness of agricultural shows and agro-dealers in

enhancing dissemination and adoption of the "push pull" technology among smallholder farmers in Western Kenya' found out that 84% of farmers found agricultural shows informative and ended up adopting technologies learnt at agricultural shows.

While some areas have adopted interpersonal communication methods as a means of training, some have not. And even the areas that have, conclusive monitoring and research has not been done to find out the effectiveness of group interpersonal communication as a communication method to farmer education and interaction. This study therefore sought to find out whether the impact of interpersonal communication methods as seen in Western Kenya and Nigeria can be replicated in Machakos as an effective means of communication between the different stakeholders of organic farming in Machakos with subsequent increase in adoption of various organic farming methods among maize farmers.

Objective of the study

This study sought to examine the effect of group interpersonal communication methods on adoption of organic farming among maize farmers in Machakos.

Scope of the study

The study was conducted in Machakos County. The county has area of 6208.2 km² most of which is semi-arid and is divided into eight sub counties, 40 wards and 75 locations. (Machakos County, Integrated Development Plan, 2015).

The choice to conduct this research in Machakos was influenced by the fact that training regarding organic farming has been taking place in the region for a while now with no visible results (Njoroge, KIOF 2005). The area has a target population of 910 farmers and the training is well structured and organized with farmers already divided into farmer groups with the larger Machakos area being divided into smaller localities with approximately 300 organized farmer groups. From the target population, a sample of 278 was chosen through stratified random sampling, to represent the 300 existing farmer groups.

The study also focused on maize farming because it is a staple food crop in Machakos and Kenya as a whole. Agriculture is the backbone and livelihood of Machakos County with the agriculture sector employs more than 60% of the population (Ariga, Jayne & Njukia, 2010) and is planted both on large scale and small scale across the country.

Empirical studies on group interpersonal communication methods

Bandiera and Rasul (2006) while looking at social networks and farming technology adoption in Northern Mozambique found that the probability of adoption is higher amongst farmers who reported discussing agriculture with others a concept that is seconded by Besley and Case (1993). While studying adoption among farmers in India, Basley and Case (1993) found out that farmers learning through a model where the profitability of adoption of a technology is uncertain and exogenous are only inclined to adopt a technology once they discover the true profitability of adopting it. They also discovered that farmers learning this technology in groups felt a shared sense of responsibility and risk and had a higher chance of adopting it as compared to individual farmers not in groups. Foster and Rosenzweig (1995) found that initially farmers may not adopt a new technology because of imperfect knowledge about management of the new technology; however, adoption eventually occurs due to own experience and neighbours' experience.

In an effort to measure the impact of extension services on adoption of new farming technologies, ICRAF studied the effect farmer volunteers and trainers in Ebukhya and Emuhaya Villages in Vihiga District, Farmer trainers provided training on 30 technologies across the study sites, which included soil fertility, fodder and crop residues, food crops, vegetables, and livestock technologies. The most important means of disseminating new technologies was through farmer group discussions. The trainers however also used various other dissemination channels such as field days, chief's meetings and community gatherings such as at funerals and churches, demonstration plots and study tours to other villages where there had been successful adoption of technologies. Other than word of mouth, these trainers also used various types of materials when undertaking their training activities such as farm implements, seed and planting materials, and leaflets. The results of the training they carried out is indicated in the table below;
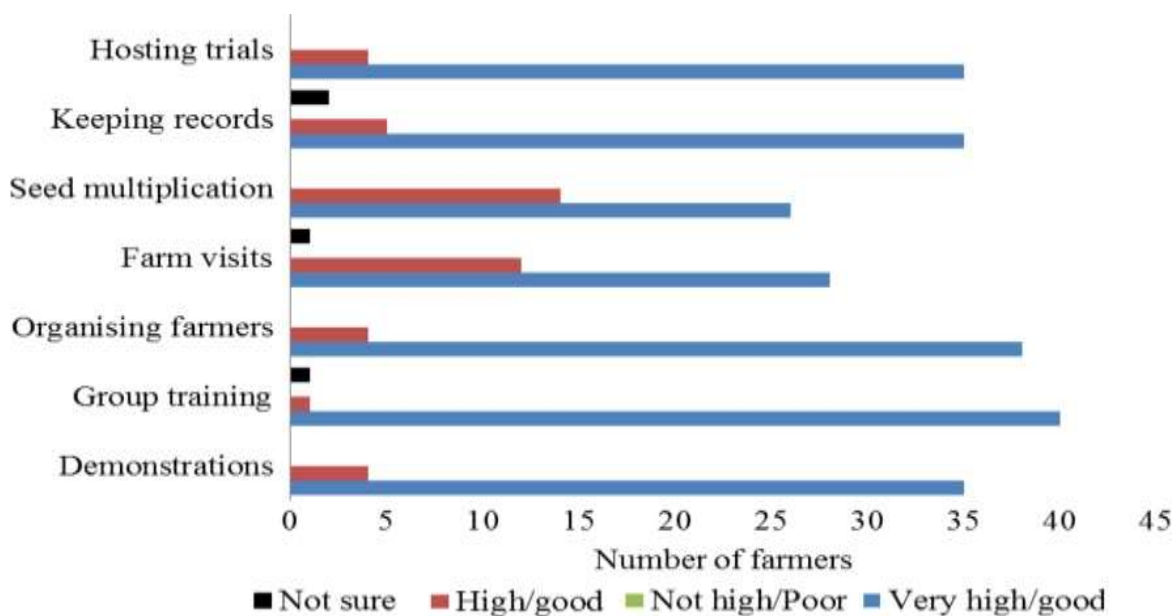
From the results of the study above, it is clear that interactions with farmers learnt huge lessons from the technologies through the officers. Group training, farm visits or demonstrations play a huge role in encouraging a farmer to adopt the particular technology being forwarded by the extension officers.

Research Gaps

A survey by Kenya Horticulture Competiveness Project (USAID Funded Project, 2013) indicated that the adoption of agricultural technologies and subsequently food production in the country is low (KHCP 2014). Despite lots of communication between farmers' and researchers, most of the technology remains unadopted. Research has shown that this is because most of the communication done encourages the farmer to take up particular technologies while assuming he is a passive consumer of knowledge something that makes interpersonal communication stand out as it views the farmer as an active communicator and seeks to educate him from this perspective. In interpersonal communication much emphasis is laid on the communication means which the farmer uses to communicate with others in his related field be it experts or other farmers and how that communication influences his overall adoption. This study therefore sought to find out if the successful use of interpersonal communication as seen in different areas and as attributed by various scholars can be said to be an effective communication means among farming stakeholders in the same as in Machakos County and if this interpersonal communication subsequently leads to adoption of various organic farming methods.

Methodology

The study adopted the descriptive research design which allowed the researcher to collect information from respondents, analyse it and make inferences (Mugenda and Mugenda, 2003). Questionnaires were administered to farmers, who were the majority study respondents. The target population for this study was 910 maize farmers and their trainers in the Machakos County region, who plant it either for commercial or domestic purposes. The study used the official register containing an annotated list of farmers available at the Kenya Agriculture Livestock Research Organization (KALRO) office in Machakos County. To get the farmers used in this study, the researcher employed stratified random sampling. Stratified random sampling involves splitting a heterogeneous population into fairly homogeneous groups, then randomly selecting a sample from the homogenous group (Kothari, 2003). Farmers were divided according to location and a random sample selected from each group as per the table:

Table 1: Sample size

Location	Number of farmers	Sample size
Muumbuni & Ngelani/Mutituni ward	180	55
Mua ward and lower part of kimutw'a ward	250	76
Kiimakimwe & Muvuti wards	190	58
Watema –Makueni	140	43
Kimutw'a ward –and bordering areas along Mombasa road	150	46
TOTAL	910	278

Reliability analysis and results from pilot study

The Pilot test of the study was carried out prior to implementation of the study to ensure that the questionnaires measured what was intended (Cooper and Schindler, 2010). The researcher distributed 10 questionnaires to maize farmers in Machakos County randomly selected before the actual study to test if the questionnaire met the required standards before subjecting it to the actual study. Reliability Test was done where Cronbach's Coefficient Alpha was used. A coefficient of 0.70 or more implied a high degree of data reliability which was the case with this study results which indicated that all the variables were reliable for the study (Mugenda & Mugenda, 2003). The items on each of the variables in the questionnaire were subjected to Cronbach's Coefficient Alpha test of all the items were found to be reliable for measurement because the reliability coefficient were found to be above the recommended threshold of 0.7 (Kline, 1999) and therefore accepted for the research as indicated in Table 2.

Table 2: Reliability tests

	Cronbach alpha	N items
Group Interpersonal Communication Methods	.756	7

Results And Discussions

Group Interpersonal Communication Methods

The researcher in this section set to find out how many farmers are in groups and how the group interpersonal communication methods affect organic farming adoption

You part of a farmer group

Table 31: you part of a farmer group

	Frequency	Percent	Cumulative Percent
Yes	238	89	89
No	30	11	100
Total	268	100	

From the research findings, 89% of the respondents agreed that they belong to a farmer group while only 11% of the respondents do not belong to a farmer group. Quality communication leads to effective group decision making and project completion. Therefore, with more farmers belonging to groups it becomes easier to share and interact among people who have a bond thus strengthening the adoption of organic farming. Bandiera and Rasul (2006) while looking at social networks and farming technology adoption in Northern Mozambique found that the probability of adoption is higher amongst farmers who reported discussing agriculture with others because the farmers felt like they have a shared risk and more knowledge on the product.

Number of group members

Table 4: Number of Group members

	Frequency	Percent	Cumulative Percent
Less than 5 members	89	33	33
5-10 members	111	41	75
10+ members	38	14	89
N/A	30	11	100
Total	268	100	

From the research findings, 75% of the respondents belong to groups of 10 members or less. However, only 14% belong to groups of more than ten members. According to Doss (2003) and Conley (2010) relatively small groups are recommended for interaction since they increase the peer to peer interaction enhancing the quality of output and internalization of quality content from group members.

Frequency of Meetings

Table 52: Frequency of meetings

	Frequency	Percent	Cumulative Percent
Once a month	74	28	28
2-3 times a month	104	39	66
Once a week	60	22	89
N/A	30	11	100
Total	268	100	

The researcher also went ahead to establish how frequent group members meet. A majority of farmers were found to be meeting 2-3 times a month as indicated by 39% of the respondents, 28% of the respondents indicated to be meeting once per month while 22% once per week. This results indicated that group members have a consistent interaction which facilitates exchange of ideas by the group members.

Do you invite experts to your group discussions

Table 6: Do you invite experts to your group discussions?

	Frequency	Percent	Cumulative Percent
Yes	183	68	68
No	55	21	89
N/A	30	11	100
Total	268	100	

Majority of farmers indicated that they invite experts to group discussions as indicated by 68% of the respondents, while only 21% of the respondents said they do not invite experts to their group discussions. Experts play a significant role in conveying professional knowledge with regards to adoption of organic farming. Feder et al., (1985) noted that interaction with extension efforts increased the adoption probability of new technology by increasing the stock of information the farmers have. Farmers were more inclined to choose a farming method where they had more information as opposed to one where they had less information.

How often do the experts come to the group

Table 7: How often do the experts come to the group?

	Frequency	Percent	Cumulative Percent
0 Visits Per Year	55	21	21
1-3 visits a year	60	22	43
4-6 visits a year	77	29	72
6+ visits a year	46	17	89
N/A	30	11	100
Total	268	100	

The researcher through the findings of the study established that experts visit farmers groups at least once and more times per year as indicated by 68% of the respondents. Only 21% of the respondents do not have expert visits in their groups. These results asserted further the importance of expert interaction in boosting farmers' knowledge and skills towards organic farming. According to Makokha et al., (1999) more interaction with the expert made the process of adoption easier as the expert answered the questions raised and gave the farmers a chance to practice the technology taught also.

Interactions with an expert has had an impact in their adoption of organic farming

Table 8: Interactions with an expert has had an impact in their adoption of organic farming

	Frequency	Percent	Cumulative Percent
Strongly agree	42	16	16
Agree	61	23	39
Neutral	23	9	46
Disagree	36	13	59
Strongly disagree	21	8	67
N/A	85	33	100
Total	268	100	

Interactions with an expert was found to have an impact in adoption of organic farming as indicated by 39% of the respondents who agreed, while only 21% of the respondents disagreed on the same. These result was an indication that expertise knowledge play a crucial knowledge in channeling professional knowledge to farmers who have largely embraced the practice. These findings were seconded by Feder et al., (1985) who said that groups that had more interaction with extension officers were seen to adopt more of the technology proposed by the expert, as opposed to groups that spent less time with the expert. This can be attributed to the fact that the farmers now had more information regarding how to go about the process and the outcome they expect from it.

Interactions within the group has had an impact in your adoption of organic farming

Table 9: Interactions within the group has had an impact in your adoption of organic farming

	Frequency	Percent	Cumulative Percent
Strongly agree	16	6	6
Agree	104	39	45
Neutral	42	16	60
Disagree	21	8	68
Strongly disagree	55	21	89
N/A	30	11	100
Total	268	100	

From the results, 45% of the respondents agreed that interactions within the group has had an impact in adoption of organic farming, while only 21% disagreed on the same. Group influence was found to play a key role in enlightening members towards a certain direction which in this case is organic farming. Thus if used well, groups can be an instrumental force in championing organic farming amongst members. These findings are in line with those done by Foster and Rosenzweig (1995) who found that initially farmers may not adopt a new technology because of imperfect knowledge about management of the new technology; however, adoption eventually occurs due to own experience and neighbours' experience.

Correlation analysis for group interpersonal communication methods and adoption of organic farming

Group interpersonal communication methods were understood to have a relationship with adoption of organic farming. In order to test the extent and direction of the relationship, the researcher conducted a correlation analysis and the findings were summarized in table 10.

Table 10: Correlation Between Group Interpersonal and Adoption

		Adoption	**Group interpersonal**
Adoption	Pearson Correlation	1	.969[**]
	Sig. (2-tailed)		.000
	N	268	268
Group interpersonal	Pearson Correlation	.969[**]	1
	Sg. (2-tailed)	.000	
		268	268
**. Correlation is significant at the 0.01 level (2-tailed).			

The findings from table 10 indicated that there was a perfect strong correlation between group interpersonal communication procedures and adoption of organic farming techniques. This was explained by a Pearson correlation coefficient of 0.969 which was significant at 0.01 level. From this finding, it can be concluded that in order for farmers to adopt organic farming, all factors related to group interpersonal communication procedures are very crucial. These findings are similar to those Foster and Rosenzweig (1995) noted as they studied adoption of organic farming in Emukhuya village. According to them, group training, farm visits or demonstrations play a huge role in encouraging a farmer to adopt the particular technology being forwarded by the extension officers. The researcher then went extra mile to determine the regression analysis to understand the ability of group interpersonal communication methods to affect the adoption of organic farming. The findings were summarized in table 11.

Table 11: Model Summary for group interpersonal communication methods

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.969[a]	.939	.938	1.27928

a. Predictors: (Constant), group interpersonal

Cooper and Schindler (2010) argued that regression analysis can also be used determine the strength of the relationship between the independent and dependent variables and to determine the combined effect of all the independent variables on the dependent variable. The coefficient of determination (R^2) was used to measure the change in dependent variable explained by the change in independent variables. The results from table 4.28 designated the multiple linear regression model summary and overall fit statistics. The findings indicated an adjusted R^2 of 0. .938 with the R^2 of 0.939. This means that the linear regression explains 93.9% of the variance in the data. An indication that group interpersonal communication procedures explain 93.9% of adoption of organic farming. The remaining percentage can be explained by the remaining variables including those that have not been put into this test.

Table 12: Regression Analysis Coefficient for Group interpersonal communication methods

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	-2.588	.195		-13.301	.000	-2.971	-2.205
Grp interpersonal	.688	.011	.969	63.796	.000	.667	.709

a. Dependent Variable: Adoption

The findings from table 12 indicated the beta coefficients of each predictor variable which is in this case group interpersonal communication methods. From the coefficients, the researcher was able to develop a fitted regression equation as follows.

$Y = -2.588 + .688X_1 + e$

Where X_1 stands for group interpersonal communication methods.

ANOVA for Group Interpersonal Communication Methods.

The Analysis of Variance was conducted to examine the significance levels of group interpersonal communication techniques against the adoption of organic farming. The results were summarized in table 13.

Table 13: ANOVA for Group Interpersonal Communication Methods.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6660.688	1	6660.688	4069.946	.000[b]
	Residual	435.323	266	1.637		
	Total	7096.011	267			

a. Dependent Variable: Adoption
b. Predictors: (Constant), group interpersonal

The ANOVA test was conducted in order to determine how useful group Interpersonal Communication Methods predicts the adoption of organic farming. The researcher was more concerned on the significance column. Table 13 indicates that the regression model predicts the dependent variable significantly well. This is because it had a significance level of P = 0.000 which is less than 0.05 and indicates that, overall, the regression model statistically significantly predicts the outcome variable.

Summary

Groups were defined as meaningful and purposeful interactions among individuals who take each other as equal participants in learning. The researcher asked the respondents to explain how many of them are in groups. Most of the farmers were in groups which was the most common interpersonal communication method. The researcher went ahead to find out the size of the farmer groups. Majority of the farmers were in groups of 5-10 followed by less than 5. The least popular group size was groups with 10+ members. The frequency of meetings was the next thing the researcher wanted to find out. Most groups meet 2-3 times per month. If the groups invited an expert is the next thing the researcher wanted to find out, with a larger majority saying yes, and some saying no. Out of those that said yes, the researcher wanted to know what was the frequency of

interaction with the expert. Most groups invited experts 4-6 times an year followed by those that invited experts more than six times an year. The researcher went ahead to determine if the group interpersonal communication methods had an impact on adoption of organic farming. Majority of the respondents found group interpersonal communication methods had an impact on their adoption of organic farming as opposed to those that found otherwise. The interpersonal communication method was easy and effective in impacting adoption of organic farming.

Recommendations

From the above findings, the researcher recommends that:

To strengthen group interpersonal communication for farmers, this study recommends the adoption of lead farmer approach. Farmers should be encouraged to communicate with the lead farmer in their region for accurate localized information regarding organic farming. This will ensure easier interpersonal exchange and timely access to information.

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