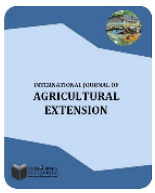

Available Online at ESci Journals
International Journal of Agricultural Extension
ISSN: 2311-6110 (Online), 2311-8547 (Print)
http://www.escijournals.net/IJAE

SMALL-SCALE FARMERS' PERCEPTIONS TOWARDS DEMAND DRIVEN SYSTEM OF AGRICULTURAL EXTENSION SERVICE DELIVERY.

Case Study of Siaya and Kilifi counties in Kenya

[a]Annie H. Ong'ayo, [b]Christophe A. Onyango, [b]Washington W. Ochola
[a] Department of Extension & Community Development, Pwani University P.O. Box 195. Kilifi Kenya.
[b] Department of Agricultural Education & Extension, Egerton University P.O. Box 536. Egerton, Njoro, Kenya.

A B S T R A C T

The objective of present study was to assess the perception of small-scale farmer's towards demand driven extension approach that was implemented by National Agricultural Extension Policy. The study used Ex-post facto survey design and multistage sampling procedure constituting proportionate and simple random sampling technique to select the study area and the sample. One set of questionnaire and one focus group discussion guide were used to collect data from three hundred households selected from the sampling frame obtained from the study area. Data were analysed using t-test and descriptive statistics with the help of the Statistical Package for Social Sciences (SPSS). Findings revealed that after the implementation of NAEP reforms, there was observation of both positive and negative change in perceptions among small-scale farmers towards agricultural extension services. The positive change was due to improved availability of extension services among farmers attributed to use of farmers groups as meeting points for delivery of agricultural extension services by Frontline Extension Service Providers. The observed negative change was caused by the small-scale farmers' inability to adopt modern agricultural practices due to promotion of costly agricultural technologies and information packages by the Frontline Extension Service Providers, farmers' inability to identify problems on their farms and demand for services in time; and the stringent conditions for groups to access funds from credit institutions. The t-test results revealed that the observed general positive change in farmers' perceptions was significantly weak. The paper recommends that policy makers in the field of agricultural extension should place more emphasis on building farmers' capacity so that they are better placed to identify problems on their farms at optimal time and seek for assistance; address the stringent condition that limit farmers access to credit facilities; strengthen farmer groups so that they are effective as arenas for dissemination of agricultural information and technologies and ensure effective small-scale farmers' participation in identification and development of appropriate agricultural technologies aimed at improving agricultural productivity.

Keywords: Perception, Small-Scale Farmers, Extension Service Delivery System

INTRODUCTION

The effectiveness and efficiency of agricultural technology transfer and its advisory services plays an important role in agricultural development and can improve of the welfare of farmers who live in rural areas (International Initiative for Impact Evaluation (3ie), 2010). Inspite the high cost of financing public sector extension whose main role is to disseminate agricultural technology to farmers in most of the developing countries, especially in Africa and Asia, agricultural production has continued to be low and even declined (Madukwe, 2006). The decline in agricultural production was blamed on the agricultural extension services provision system for being ineffective and inefficient (Rivera, 2001; Gustafson, 2002). In Kenya for example, agricultural production declined from 6.7% in 1977 to -2.4 in 2000 (Gustafson, 2002). The decline necessitated the call for reform in extension to allow greater role by private sector in 1999 to 2000 (Rivera, 2001).The need for reforms were anchored on the premise that pluralistic service would provide appropriate mix of

* Corresponding Author:
Email: aong_ayo@hotmail.com

players from public and private funding and delivery mechanisms for extension, which would achieve differing agricultural goals and serve diverse target population (Anandajayasekeram *et al.*, 2008, as cited in Zhou, 2010). The mix of players included mainstream government agricultural extension services, non-profit making non-governmental organizations (NGOs), community based organizations (CBOs), and the profit making private sector that would ensure farming related information and technologies and services were available and accessible to the farmers (GoK, 2001, 2004a). The reforms also emphasised on formation of farmer groups based on common interest (referred to Common Interest Groups (CIGs)). These groups were to be used by extension service providers as a point of meeting to disseminate agricultural technology and information and as a group be empowered to demand for services (GoK, 2001, 2004a). In order to implement the reform initiatives in Kenya, National Agricultural Extension Policy (NAEP) was formulated to guide and harmonize the management and delivery of agricultural extension services (Rivera, 2000, as cited in Rivera 2001; Government of Kenya (GoK), 2001).

The purpose of the study was to determine whether the implementation of NAEP reform changed small scale farmers' perception towards agricultural extension service system in Siaya and Kilifi Districts. The selection of these two districts was to allow for comparison of the policy implementation based on their agro ecological, socio-economic differences, and potentials for making generalization to other districts.

The Specific objective was to determine whether the NAEP reform had changed the perception of farmers towards Agricultural Extension Service System in Siaya and Kilifi Districts.

The hypothesis that guided the study was:

H_{01}. The implementation of NAEP did not significantly improve the perception of small-scale farmers towards agricultural extension service system.

METHODOLOGY

The sample for this study was selected from Siaya and Kilifi County respectively among whom the NAEP policy reform was implemented. The two counties were selected for the study to allow for comparison of the policy implementation based on their agro ecological, socio-economic differences and potential for making generalization to other districts. The divisions included: Yala, Ugunja and Wagai in Siaya County, and Ganze, Vitengeni and Bamba and Kilifi County. The sample included 1) the accessible population for the study included 51,490 and 21,025 households in Siaya and Kilifi County respectively.

A combination of proportionate random sampling, purposive and snowball sampling was used to select the two districts, the six divisions and the focal areas where the policy reform was implemented. One hundred and fifty (150) small-scale farmers were proportionately selected from each division using proportionate random sampling. Saturated samples of FEWs were sampled from Siaya and Kilifi County, respectively. For successful data collection in the field, a questionnaire was administered to small-scale famers to collect data on details on NAEP reforms in agricultural extensions service delivery system, and perception of small-scale farmers on the status of extension system before and after the NAEP reforms, observation schedule was used in observing the condition/performance of the agricultural productivity in the field. A list of all small-scale farmers within the selected focal areas was obtained and arrangements made with individual FEWs on when to visit the field and administer the questionnaire to the selected sample of small-scale farmers. The qualitative and quantitative data collected were analysed using statements, inferential statistics paired sample t test and frequency distributions forms of descriptive statistics with the help of Scientific Package for Social Scientists (SPSS). A likert scale was used in determining if there was observed change in perception among farmers towards agricultural extension services. In order to apply the likert scale, statistical application of measures of central tendency that would be most applicable to analyse the data was determined. The mean and standard deviation (SD) was calculated. According to Bordens and Abbot (2008), the mean of positively and negatively skewed distributions is not used in the interpretation of the data as it would not give correct inferences. It either under estimate or over estimate the centre, while the median, is used only if the distribution is heavily skewed. The hypothesis was tested at significance level of $\alpha = 0.05$ and the data were then organised into themes and concepts which was then generalised and led to conclusions and recommendations made on the study.

RESULTS AND DISCUSSION

The objective sought to determine the extent to which NAEP reforms improved small-scale farmers' perceptions towards agricultural extension service system in Siaya and

Kilifi Counties. To realise this objective, a likert scale was developed to give farmers an opportunity to state their opinions by responding to five statements. The results in this regard are presented in Table 1.

Table 1. To find Measure of Central Tendency for Analysing Likert Scale Results (N=300).

Variable	Siaya District			Kilifi District		
	μ	SD	Distribution	μ	SD	Distribution
Extension approaches did not improve access to appropriate agricultural technologies	3.0	1.14	Normal	3.1	1.18	Right skew
Satisfied with the way extension delivery system were used	3.1	1.16	Normal	3.4	1.14	Left skew
All farmers accessible to the agricultural extension credits	2.3	0.14	Right skew	2.7	0.44	normal
Sufficient food for all H/H after using agricultural extension services	2.4	0.26	Right skew	2.9	0.30	Normal
Household monetary income from agricultural production improved as a result of using agricultural extension services	2.1	0.15	Right skew	3.2	1.31	Right skew

The results in Table 1 show that the SD for all the items tested for Siaya and Kilifi Districts small-scale farmers ranged from 0.24 to 1.18. In Siaya District, all the items were skewed to the right of the distribution away from zero except for statements 'Extension approaches did not improve accessibility to appropriate agricultural technologies' and 'satisfied with the mode of agricultural extension services that was introduced' that were normal curves. In Kilifi District, except for the statements 'Extension approaches did not improve accessibility to appropriate agricultural technologies' and 'household monetary income from agricultural production improved as a result of using agricultural extension services' that were heavily skewed to the right and 'satisfied with the mode of extension system' that was heavily skewed to the left of the mean. The rest of the responses clustered around the mean at more less the same distance (Table 1). Since most of distributions were left skewed, the results were interpreted using the mode as a measure of central tendency. The results of the Likert scale are presented in Table 2.

The results in Table 2 show that before the implementation of the reforms, some small-scale farmers in Siaya District scored disagree on most of the statements except for the first and third statements on which they scored strongly disagree and strongly agree, respectively. After the reforms, except for 'had sufficient food for all households after using agricultural extension services', respondents scored mostly agree on all statements resulting in the highest total score being agree.

In Kilifi District, majority of respondents scored disagree on all the statements both before and after the implementation of the reforms with none scoring strongly agree resulting in the highest total score being on disagree. Reasons noted to have contributed little change or no change included the promotion of agricultural technologies and information that emphasised on market dependence for farm input whose costs were prohibitive to small-scale farmers; Promotion of agricultural technologies and information that required extra labour which was elusive among most of the small-scale farmers; Inability to access funds despite being in groups due to stringent requirements such as writing of proposals of which some groups lacked technical knowhow; and lack of market for surplus farm produce and those that could not be used directly in the household as food such as cotton, sunflower, napier and jatroper (an oil crop for processing petroleum products). It was noted that some of the agricultural technologies and information that were promoted in the field for increasing agricultural productivity emphasised on external inputs which farmer had to purchase from the market. Study results indicate that the implementation of policy reforms caused positive and no change in farmers' perceptions towards agricultural extension services delivery system in Siaya and Kilifi Districts respectively. The absence of small-scale farmers not scoring strongly agree and scoring very low on agree on any of the statements in Kilifi District is an indication that the change was not effective which is contrary to observation in Siaya District.

Table 2. Likert Scale Results on Farmers' Perception towards Agricultural extension services in Siaya And Kilifi Districts before and after Policy Reform Implementation (N=300).

	Siaya District (n=150)		Responses				
S/No	Statement		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	Extension approach used did not improve access to appropriate agricultural technologies	before	40 (40)	88 (44)	6 (2)	84 (21)	215 (43)
		after	50 (50)	130 (65)	51 (17)	72 (18)	0 (0)
2	Satisfied with the way agricultural extension delivery system was done.	before	35 (7)	48 (12)	6 (2)	182 (91)	40 (40)
		after	105 (21)	476(119)	30 (10)	0 (0)	0 (0)
3	All farmers accessed agricultural credits	before	115 (23)	232 (58)	39 (13)	90 (45)	11 (11)
		after	135(27)	300 (75)	39 (13)	70 (35)	0 (0)
4	Had sufficient food for all H/H after using Agricultural extension services.	before	0 (0)	4 (1)	18 (6)	140 (70)	73 (73)
		after	120 (24)	236 (59)	18 (6)	122 (61)	0 (0)
5	Households' monetary income from agricultural production improved as a result of using agricultural extension services.	before	35 (7)	24 (6)	72 (24)	114 (57)	56 (56)
		after	65 (13)	344 (86)	90 (30)	42 (21)	0 (0)
	Total	before	225	396	142	510	395
		after	475	1,486	228	306	0
Kilifi District (n=150)							
1	Extension approach used did not improve access to appropriate agricultural technologies	before	27(27)	76 (38)	0 (0)	216 (54)	155 (31)
		after	0 (0)	0 (0)	0 (0)	540 (135)	75 (15)
2	Satisfied with the way agricultural extension delivery system was used.	before	30 (6)	96 (24)	6 (2)	166 (83)	35 (35)
		after	0 (0)	56 (14)	30 (10)	186 (93)	33 (33)
3	All farmers accessed agricultural credits.	before	145(29)	208(52)	39(13)	82 (41)	15 (15)
		after	0 (0)	0 (0)	0 (0)	214 (107)	43 (43)
4	Had sufficient food for all H/H after using Agricultural extension services.	before	0 (0)	4 (1)	18(6)	222 (111)	32 (32)
		after	0 (0)	0 (0)	0 (0)	238 (119)	31 (31)
5	Households' monetary income from agricultural production improved as a result of using agricultural extension services.	before	50(10)	12 (3)	72 (24)	174 (87)	26 (26)
		after	0 (0)	96(24)	60 (20)	166 (83)	27 (27)
	Total	before	252	396	135	860	263
		after	0	152	90	1,344	209

The scores are 'strongly agree' (5), 'agree' (4), and 'neutral' (3), 'disagree' (2) and 'strongly disagree' (1). The scores on item one were reversed as the statement was negatively phrased.

The numbers in parentheses are total number of respondents who responded positively to the item according to the specified category. The numbers outside the parentheses are the total points scored for the specific category for every item.

The divergent perceptions between the two districts and weak positive perceptions could be attributed to:

1) The effectiveness of using groups to influence access to agricultural extension services. The use of groups improved the frequency of interactions between agricultural extension service providers and farmers. Its use was more beneficial to farmers who were affiliated to groups and this was evident in Siaya District where groups were more active than in Kilifi District where they disintegrated.

2) The ability to learn and demand for services from agricultural extension officers may not have augured well with the farmers. The shifting of agricultural extension service providers to another area after one physical year on conviction that farmers had gained adequate technical knowledge and information to be on their own and demand for serives when necessary, was not sustainable. It resulted in discontinuation of agricultural extension officers visits to individual or farmer groups, and yet farmers were not able to demand for services on their own as noted in information gathered during data collection and in FGDs. For instance, a participant in the farmers' FGDs asserted that the Demand Driven and Shifting Focal Area Approach did not conform to their way of life, ability and level of farming. Participant said that in most cases, when agricultural extension officers scaled out of their village, they were like neglected orphans. The implications of participants assertion is that farmers perceived the approach to be a foreign idea and difficult to practice. Small-scale farmers, especially female farmers may have found it difficult to seek agricultural extension services from the offices that were dominated by the male agricultural extension officers. This is the case in circumstances where traditional cultural norms and values do not perceive the interaction positively. Also the minimum level of formal education, lack of alternative livelihood causing low economic status and the long distance to extension offices which remained the same as observed in the field may also inhibit the demand for services especially if the service has to be paid for.

3) The disappointment of some farmer groups when they did not access funds for their projects. Data collected from respondents indicated that one reason that influenced group formation was to receive funds for group activities. Some of the farmers did not receive funds due to inability to meet some of the stringent requirements.

4) Unavailability of ready markets for the farm products caused negative attitude. For instance, some farmers in Siaya District asserted that their group could not sell cassava they had planted either in fresh or processed form due to the glut of the crop in the local and the neighbouring markets. So they ended up with no 'money in the pocket' as opposed to promises made by agricultural extension officers that growing cassava would put money in their pockets. The narratives indicate that agricultural extension services providers promoted the same type of crop in the study area resulting in glut and low demand, hence lowering farmers' profits. These results are similar to those of Marenya et al. (2008, as cited in Onyango *et al.,* 2010), Sarker and Itohara (2009) and Onyango *et al.* (2010). Sarker and Itohara found that the effectiveness of agricultural extension services is determined by the frequent visits of agricultural extension officers to farmers, communication ability, credibility of information given to farmers and method of service delivery. Higher frequency of visits and participation of farmers in extension activities improves their acceptability and adoption of agricultural technologies that are demonstrated on their farms. Onyango *et al.* (2010) found that acceptability of agricultural technologies by farmers depend on how well researchers have identified farmers' objectives and constraints. Marenya *et al.* (2008, as cited in Onyango *et al*., 2010) found that farmers' acceptability of technologies also depends on working relationship between farmers and researchers for the technology being developed and tested. The results are also similar to those of Rivera (2001, cited in FAO, 2004) who foresaw the trend to privatize agricultural extension services affecting the traditionally, friendly and informal relationship between government extension staff and the subsistence farmers in developing countries. This is because, until then the farmers had never been asked to pay for extension advice. FAO (2004) explains that there was genuine fear that the zeal for privatization would deprive small farmers from benefiting from the agricultural extension services as they either do not believe that the extension advice is worth paying for, or simply cannot afford to pay.

Determination of significant improvement in small-scale farmers' perception towards agricultural extension service system: The main objective of NAEP

reforms was to improve agricultural extension service provision which had been perceived by stakeholders to be waning and blamed for lack of agricultural technologies in the hands of farmers, resulting in poor agricultural productivity and low income from agricultural produce. Improvement in agricultural extension service was anticipated to positively change small-scale farmers' perception by ensuring that they access appropriate agricultural technologies, consequently use them to increase agricultural productivity sufficient for household food security and surplus for the market to meet their monetary needs and in turn alleviate poverty. In order to ascertain any significance differences between the level of perception to agricultural extension services by small-scale farmers before and after the reforms, a paired sample t-test at significance level of $p \leq 0.025$ was performed on the hypothesis that "The implementation of NAEP did not significantly improve the perception of small-scale farmers towards agricultural extension service system" using data collected for both periods before and after the reforms on the following statements: extension approaches did not improve accessibility to appropriate agricultural technologies, satisfied with the mode of extension system, all farmers accessible to agricultural credits, sufficient food for all households after using agricultural extension services and household monetary income from agricultural production improved as a result of using agricultural extension services. The results are summarised in Table 3 indicate that:

1) The t-values for the two tailed significance levels in both Siaya and Kilifi districts were 0.000 and 0.006 respectively, which were less than 0.025. The results in both Siaya and Kilifi Districts, indicate that there were statistically significant differences at $p \leq 0.025$ observed in change in perceptions towards agricultural extension service delivery system caused by the system ability to avail appropriate agricultural technology and information to small-scale farmers.

2) The t-values for the two tailed significance levels in both Siaya and Kilifi districts were 0.000 and 0.000 respectively, which were less than 0.025. The results in both Siaya and Kilifi Districts, indicate that there were statistically significant differences at $p \leq 0.025$ observed in change in perceptions towards agricultural extension service delivery system caused by its ability to deliver agricultural extension services.

3) The t-values for the two tailed significance levels in both Siaya and Kilifi districts were 0.007 and 0.000 respectively, which were less than 0.025. The results in both Siaya and Kilifi Districts, indicate that there were statistically significant differences at $p \leq 0.025$ observed in change in perceptions towards agricultural extension service delivery system caused by its ability to enable all small-scale farmers' accessibility to desired agricultural technologies and information.

4) The t-values for the two tailed significance levels in Siaya district was 0.000 which was less than 0.025 while in Kilifi Districts it was 1.000 which was greater than 0.025. Perceptions towards agricultural extension service delivery system caused by its ability to improve food sufficiency for all households after using agricultural extension services in Siaya District were significant while in Kilifi District, there were no statistically significant difference.

5) The t-values for the two tailed significance levels in both Siaya and Kilifi districts were 0.000 and 0.008 respectively, which were less than 0.025. The results in both Siaya and Kilifi Districts, indicate that there were statistically significant differences at $p \leq 0.025$ observed in change in perceptions towards agricultural extension service delivery system caused by its ability to improve monetary income from agricultural production within households.

In Siaya District, the t values of all statements had significance level of less than 0.05. This indicate that there were statistically significance differences in the means of all the statements used to measure small-scale farmers' change in perception towards agricultural extension service system. The difference was statistically significant at two tailed significant level of less than 0.025. The null hypothesis was therefore rejected. While in Kilifi District, except for the statement; had sufficient food for all households after using agricultural extension services which had significance level of greater than 0.05, the rest had p values less than 0.025. The differences for most of the statements were therefore statistically significant at two tailed significant level of 0.025. The null hypothesis was therefore rejected as there was statistically significant difference in 80% of the statements that were used to measure change in small-scale farmers' perception towards agricultural extension service system.

The results indicate that the reforms caused changes in perception towards agricultural extension services delivery system among small-scale farmers. The change in Siaya District was 100% positive contrary to Kilifi District in which the significance response was 80%

positive. The observed 100% positive change in Siaya District could be attributed to effectiveness use of farmer groups that facilitated interaction among farmers and with the agricultural extension officers.

The interaction among farmers and collaboration among various extension agents was further improved by the presence of more projects and effective collaboration among various extension agents. Effective collaboration facilitated joint transport of agricultural extension officers and holding of various agricultural activities in the field. Demonstration and field days exposed farmers to various technologies and provided suitable environment for interaction and sharing of ideas and information that was necessary for increasing production. The negative significance observed in Kilifi District could be attributed to ineffective collaboration among various stakeholders due to fewer projects and inadequate funds by NALEP-GoK that spearheaded the facilitation of reforms.

The study findings are consistent with those of the studies done by Maalouf *et al*. (1991, as cited in Rivera, 2001) who found that neither public nor private supported extension work could address the problems that agricultural extension faced in developing countries alone or separately. Maalouf *et al*. (1991, as cited in Rivera *et al.,* 2001) noted that cooperation and complementation of the public and private sectors in the area of extension is required. This offers: 1) increased resources for agricultural extension services to farmers; 2) reduced overlap and significantly increase the number of farmers reached by extension; 3) increased and improved utilization of agricultural research findings from both public and private interests supporting agricultural research and development investment. Despite the implementation of the reforms that aimed at improving the performance of agricultural extension service system, the change in perception was significant among small-scale farmers within the study area. The observed significant change in perception towards extension service delivery system among small-scale farmers in both Siaya and Kilifi Districts was caused by:

Increased interaction with the agricultural extension services providers attributed to collaboration among the various agricultural extension services providers which improved the number of extension service providers in the field. Joint collaborative activities such as field days and on farm demonstrations by agricultural extension services providers improve farmers' accessibility of agricultural technologies. However, the quality and relevance of technology to farmer's current needs, and suitability to the ecological requirements in a specific region may be a limiting factor that may influence their perception towards extension service delivery system. Formation and strengthening of the existing farmer groups by extension service providers' as meeting point for disseminating agricultural technologies. Farmer groups improved small-scale farmers' accessibility to agricultural extension services. It also improved farmers' synergy and cohesion to seek for services and provided an arena for meeting extension officers. However, the improved accessibility due to lack of funding was not sustained and it failed to translate to increased agricultural production due to up-scaling of the project activities and small-scale farmers' inability to demand for services. Farmers' low economic status and technical knowledge on determining when it was necessary to seek for advice was a challenge. Most of them preferred regular visits by agricultural extension officers than having to call them and this had a negative effect on access to extension services and consequently production and failure to translate in improving food security and household income for small-scale farmers.

CONCLUSIONS AND RECOMMENDATIONS

The change in farmers' perceptions was influenced by use of farmers groups as meeting points for delivery of agricultural extension services. However, farmers had reservation on the demand driven approach. Farmers felt they were not well prepared to demand for services given their inadequate knowledge and capability for timely recognition of crop and livestock related pests and diseases including other diverse problems on their farms.

On the basis of the key findings and conclusions of this study, the following recommendations were made:

Development of a policy that will cover the following aspects:

b) **Extension approach:** The Ministry of Agriculture should develop a policy that will endeavour to enhance an extension approach that is generally farmer-centred. Farmers will accept an approach that they participated in developing and one that meets their needs and suits their life-style, culture and ability.

c) **Farmer-centred agricultural technologies:** Agricultural extension officers in collaboration with researchers need to develop policies that will guide the development of agricultural food production and soil fertility enhancing technologies that fit in the life and ability of the various categories of farmers. For instance,

the government through the Ministry of Agriculture needs to identify means for improving soil fertility that is not beyond the ability of the small-scale farmer. Such alternative could be the production of manure on large scale by digesting and treatment of waste products from both humans and animals. Researchers should take small-scale farmers values, needs and taste of the consumer into consideration when breeding for new varieties.

d) **Sustaining farmer groups:** The Ministry of Agriculture and other organizations should promote farmer group sustainability. This can be done through effective institutional mechanisms in supportive policies, capacity building on group management and leadership, networking and resource mobilization. Such structures will ensure sustainability of farmers groups that are necessary as meeting points for agricultural extension officers and for networking among farmers. Networking allows farmer empowerment through sharing of knowledge across organizational boundaries and among diverse stakeholders learning from each other and putting their resources together. In the process of interaction, the individuals involved may influence the planned interventions, and consequently influence adoption of interventions.

e) **Ecological distribution of agricultural production:** The Ministry of Agriculture and its researchers should enhance breeding and promotion of agricultural crops and livestock for increased production based on ecological requirements by introducing effective and supportive policies. The farm produce will do well if they are grown and kept in areas where they fit naturally. This will boost market availability and income for farmers by avoiding the glutting of the produce in the local market. It will also enhance income by allowing for exchange of farm produce from one region to another and even reintroduce barter trade.

Suggestion for Further Studies: The following suggestion for further study was recommended:

A research to be carried out so as to provide guidelines on how development of agricultural technologies can be contextualised in the formulation of policy reforms to suit specific abilities of the farmers.

Table 3. Paired Sample Statistics t test on Siaya and Kilifi Districts Small-Scale Farmers' Perception towards Agricultural extension services before and after the Implementation of the NAEP.

	Small-scale Farmers' perception towards Agricultural Extension Services	Siaya District (n=150)						Kilifi District (n=150					
		NAEP implementation		Mean	t-test	df	Sig 2-tailed)	NAEP implementation		Mean	t-test	df	Sig 2-tailed)
		Period	Mean					Period	Mean				
1.	Extension approach used did not improve availability of appropriate agricultural technologies	before after	1.59 1.99	-0.40	-9.967	149	.000	before after	1.43 1.00	0.11	2.783	149	.006
2.	Satisfied with the agricultural extension system used	before after	1.47 1.00	0.47	9.379	149	.000	before after	1.87 1.97	-0.10	-4.069	149	.000
3.	The system enabled all farmers access the desired agricultural technologies	before after	1.85 1.42	0.43	10.530	149	.007	before after	1.55 2.00	-0.31	-5.843	149	.000
4.	Had sufficient food for all H/H after using agricultural extension services.	before after	1.79 1.45	0.34	8.761	149	.000	before after	2.03 2.00	0.00	0.000	149	1.000
5.	Monetary income from agricultural production increased as a result of using agricultural extension services	before after	1.81 1.34	0.47	11.418	149	.000	before after	2.07 2.00	0.07	2.701	149	.008

ACKNOWLEDGEMENT

This research was funded by Winrock International and my acknowledgement goes to Professor Christopher A. Onyango, and Dr. Washingtone O. Ochola of the Department of Agriculture Education and Extension of Egerton University.

REFERENCES

Anandajayasekeram. P., Puskur, R.,Workneh, S. & Hoekstra. D. (2008). Concepts and Practices in Agricultural Extension in Developing Countries. Source Book ISBN 92-9146-217-9. Ethiopia International Livestock Research Institute.

Food & Agricultural organization (2004). Modernizing National Agricultural Extension Systems: A Practical Guide for. Rome. FAO, UN

Government of Kenya. (2001). National Agricultural Extension Policy (NAEP), Kenya. Industrial Printers Press.

Government of Kenya. (2004a). Interim Poverty Reduction Strategy Paper. Ministry of Planning. Nairobi.

Gustafson, D.J. (2002). Supporting the Demand for Change: Recent Project Experience with Farmer Learning Grants in Kenya. A case study prepared for the workshop: Extension and Rural Development. A convergence of views and international approaches. Washington D.C.

International Initiative for Impact Evaluation (2010). The impact of agricultural extension services. 3ie synthesis review. SR009 Protocal.

Madukwe, M. (2006). Delivery of agricultural extension services to farmers in developing countries CTA Publication. Wageningen. The Netherlands.

Maalouf, W. D., T.E. Contado, & R. Adhikarya. 1991. "Extension Coverage and Resource Problems: The Need for Public–Private Cooperation," in W.M. Rivera and D.J. Gustafson (eds), Agricultural Extension: Worldwide Institutional Evolution and Forces for Change . London: Elsevier.

Madukwe, M. (2006). Delivery of agricultural extension services to farmers in developing countries CTA Publication. Wagenigen. The Netherlands.

Marenya, P., Barrett, C.B. & Gulick, T. (2008). Farmers' perceptions of soil fertility and fertilizer yield response in Kenya. Cornell University.

Onyango, E. M. Odendo, M. & Reginala, W. (2010). Socio economic factors that influence farmers' perception of crop vigour enhancing strategies for soil fertility management in Nandi South District.

Rivera, W. M. (2000). Changing Nature of Agricultural Information And the conflictive global development shaping extension. Journal of Agricultural Education and Extension. Wageningen.

Rivera, M. W. (2001). Whither Agricultural Extension Worldwide? Reforms and Prospects: A revised version of Paper prepared for the conference on Knowledge Generation and Transfer. Implications for Agriculture in the 21st Century. University of California, Berkeley.

Sarker, A. & Itohara, Y. (2009). Farmers' perception about the agricultural extension services and agricultural extension officers: the case of organic extension programme by PROSHIKA. American Journal of agricultural and biological sciences.

Zhou, Y. (2010). Reinventing agricultural extension to smallholders. Report of Syngenta Foundation.