Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 7, Issue, 11, pp.23057-23062, November, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

FACTORS AFFECTING COMMUNICATION CHANNELS PREFFERENCE BY FARMERS IN ACCESS OF INFORMATION ON ADOPTION OF AGRICULTURAL TECHNOLOGY FOR STRIGA CONTROL: A CASE OF BUNGOMA COUNTY, KENYA

***Julius L. Livondo, Anderson Kipkoech, Eunice W. Macharia and Paul O. Odwori**

University of Eldoret, P.O. Box 1125-30100, Eldoret, Kenya

ARTICLE INFO

Article History:
Received 04th August, 2015
Received in revised form
15th September, 2015
Accepted 07th October, 2015
Published online 30th November, 2015

Key words:

Information,
Communication Channels,
Striga control technologies,
Dissemination, Adoption.

ABSTRACT

Information dissemination is a key element in the adoption of the different striga control technologies. Majority of farmers tend to lag in adoption of Striga control technologies due to lack of information about the technologies. Information materials should thus include simple explanations to farmers on how the control measures work. This study sought to establish the most preferred communication channels by farmers in accessing agricultural technology based information. Farmers in Associations (FAs) in Bungoma County have been accessing information on agricultural technologies from various sources like University of Eldoret using Information Communication Technologies and the convention extension methods. The study was carried out in Bungoma County, Kenya. A cross-sectional survey design was adopted. The target population included farmers in Associations and non-member farmers. A sample size of 210 respondents was used in the study. A semi-structured questionnaire and interview schedules were used to collect data from the FAs and Non FAs farmers. Quantitative statistics was used to compute means, percentages and standard deviations. A t-test was performed at 5% significant level. The study revealed that farmers' meetings were the most preferred channel of communication. The findings of this study would be important to extension officers in Bungoma County by providing information on the preferred communication channels for enhanced adoption of striga control technology in maize crops.

***Citation*:** Julius L. Livondo, Anderson Kipkoech, Eunice W. Macharia and Paul O. Odwori, 2015. "Factors affecting communication channels preference by farmers in access of information on adoption of agricultural technology for Striga control: A case of Bungoma county, Kenya" *International Journal of Current Research*, 7, (11), 23057-23062.

INTRODUCTION

Agricultural information and communication sources and channels are varied but can be divided into print media for example journal papers, posters, documentary on DVDs, banners and recipe books, pamphlets, brochures and posters (Amudavi *et al*., 2009); personal reports that include agricultural extension officers, Farmer teacher (FT), farmer-to-farmer, farmer field schools (FFS); and finally the electronic media which includes, radio, television programmes, telephone and mobile road shows. Farmers' Associations are important in agricultural production in dissemination of information to farmers, provision of credit and storage facilities, marketing farmers' products and negotiating market prices as well as improving farmers' access to farm inputs (Pertev, 1994). Farmer groups are therefore crucial in providing new technologies and market information to farmers.

****Corresponding author: Julius L. Livondo,***
University of Eldoret, P.O. Box 1125-30100, Eldoret, Kenya.

New and advanced agricultural technologies provide opportunities for small scale farmers to increase their crop production and household incomes. However, despite the availability of modern technologies developed by agricultural research institutions, most farmers are reluctant in adopting them mainly because of failure of information uptake (Juma, 2009). Agricultural information and communication will help farmers to access agricultural information from credible sources through the right communication channel. Therefore, it is vital that information relayed to farmers be simplified through effective communication channels. Agricultural information and communication channels will also increase production efficiency since in the times of drought, climate change, erosion and pests; the livelihood of farmers is unstable. Thus with the adoption of new technologies like Push-Pull Technology (Muregee*t al*, 2012), the new maize varieties will open up new opportunities to farmers hence promoting dissemination and sharing knowledge and experiences. Farming in Bungoma Kenya is predominantly small-scale subsistence (Woomer & Mukhwana, 2004).

The estimated population growth rate of about 2.8% per annum implies that the region needs to intensify Agricultural production (Alila & Atieno, 2006). In a bid to improve agricultural production in this region, farmers in Bungoma Kenya formed Farmer Associations (FAs) comprising of farmers self-help groups. Indeed, it has long been recognized that FAs are one of the main avenues of information dissemination that enable resource to farmers to improve their agricultural earnings and also reduce poverty levels. University of Eldoret, School of Agriculture has also developed Agricultural Technologies to improve agricultural production through a research grant obtained from Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) under the Community Action Research Program (CARP) to carry out a research leading to the strengthening of the linkages between the universities and four Farmers Associations (FA's), namely, Mwangaza farmers group (MFAGRO) in Vihiga, Bungoma small scale farmers organization (BUSSFO) in Bungoma and Angurai farmers development project (AFDEP) in Teso and Appropriate Rural Development Agricultural Programme (ARDAP) through CARP in Busia.

University of Eldoret under RUFORUM and CARP Project used FAs to promote agricultural production in Bungoma Kenya. The Project linked the three FAs in Bungoma Kenya in developing research program and for disseminations of the research findings inform of technologies. In order to off-load the technologies in the universities' shelves the FAs offer entry point to enable the interaction between the University and the community to improve effectiveness of research, equity and build social and human capital with spillover effects (CIAT, 2004).

Theoretical Underpinning

Access to information on new technology by farmers

Technology is a new, scientifically derived, often complex input supplied to farmers by organizations with technical expertise. It is a process designed to achieve a given action while reducing the uncertainty in the cause-effect relationship (Simpson & Owens, 2002). The awareness and use of appropriate technologies largely affect production and productivity of any farm produce. The major challenge however is getting people to use technology. Information dissemination; the process through which information about a new technology reaches the intended users (Parr *et al.,* 1990) is thus important.

Access is the availability or potential for use of information at the individual, household, or community level. Knox and Meinzen-Dick (1999) identified access to information as a critical dimension for technology choice. The decision to adopt innovations depends largely on access to information available (Daberkow & McBride, 2003). Improved information and knowledge flow to, from and within the agricultural sector are a key component in improving small-scale agricultural production. The biggest challenge is not just information but the amount and quality of information available. The small-scale farmers who account for the bulk of agricultural production have lagged behind in adoption of improved practices because of limited access to information (Rutto, 1996). Adoption is the initial use of an input or method by an individual, household, or community. A new technology is useful only if farmers adopt it. Information on innovation transfer involves creation, organization, dissemination, diffusion and use (Achleitner, 1995). Rogers (1995) defined diffusion as a process of communication by which an innovation is spread via certain communication channels to members of a specific community over time. Sudath (2008) noted that agricultural innovation diffusion is largely affected by information available on the innovation.

Extension Communication Channels

Information generated has to be transferred from the source to the end users in a systematic way. An improved information and knowledge flow to, from and within the agricultural sector are a key component in improving small-scale agricultural production (Asaba *et al.,* 2006). A major task in agricultural development is the transfer of improved technologies to farmers (Pipy, 2006). For information access to be effective, dissemination agent, approaches or pathways need to be oriented towards the user's needs, as well as the types and levels of information and in forms and language preferred by the user (Barbara & White, 2001). Information dissemination channels may be broadly grouped into personal, electronic and print. University of Eldoret has employed most of these extension approaches as listed in disseminating new high yielding technologies.

Field Days

The agricultural extension system being one of the personal channels has been considered as a primary vehicle for diffusing technologies (Kidd *et al.,* 2000). Agricultural extension has a strong reliance to transfer agricultural knowledge (Hedjazi*et al.,* 2006) generated through research with the aim of acquiring useful information and changing attitudes and practices by farmers. It is considered as a process of bringing desirable change in the behavior of the farmers to adopt innovations relating to agriculture in such a way that they are clear and convinced of their utility (Khan, 2005). University of Eldoret staffs are a major dissemination channel of information among the small holder farmers in Bungoma Kenya. In a bit to increase the yield, University staff formerly under the School of Agriculture and Biotechnology was involved in field days.
Access to extension services is a key determinant in the adoption and use of improved technologies and farming practices (Ebrahim, 2006). Therefore, the frequency of extension contact has an important role in the access to and utilization of agricultural information.

Farmers Field Schools

Farmer Field School Approach (FFS) was first developed for rice farmers on integrated pest management (FAO, 2001). FFS is a model of extension developed by FAO as part of integrated Pest Management programme in Indonesia. University of Eldoret has initiated the same method to help farmers to focus on available experiences that are participatory to access

relevant information and knowledge during annual UoE agricultural open day to all farmers.

Fellow farmers

Farmers also acquire agricultural information from fellow farmers. This becomes a better source of information especially since the information being disseminated comes from those who might have had experiences with the potential technologies that other farmers seek to adopt. . More experienced farmers become the best discussion partners for other farmers (Place *et al.,* 2005). Other famers who are not Farmer Association (FAs) members can learn from fellow farmers who have successfully managed in profitable agricultural production in Bungoma Kenya. As a group, they assess the technologies and suitability to their farming conditions since most of them are usually neighbors (Minja*et al.,* 2004). Fellow farmers may use to complement the extension agents due to their easy reach. The efficiency of its utilization may however be limited by lack of trust amongst farmers.

Mass media

Mass media includes electronic media such as radio, television and internet and print like newspapers, magazines, posters and extension brochures (Abubakar, 2007). Mass media plays a great role in provision of agricultural information in the shortest possible time over a large area (Tadesse, 2008). Djojomartono and Pertini (1998) noted that radio and television are more appropriate for one-way communication, reaching a lot of people quickly with fairly simple ideas. University of Eldoret has engaged local and national radio and TV station to reach out to farmers. One of the station listened locally is Fish Fm and Mulembe fm. Radio has been acknowledged as the most important medium for communicating with the rural populations of Sub-Saharan African countries (FAO, 2001). Local television like SayareTv and Citizen Tv have been airing farmers'showsamong them the famous *shamba shape programme*aired every Saturday in Kiswahil and Sundays in English. This programmes source information from research institutions and disseminate to farmers as a means of extension. They have employed use of posters, videos recorded on compact disk and use of internet by hosting website on available technologies.

Mohammed and Wanaso (1993) pointed out that the choice of communication channels is to a large extent a factor of farmer's circumstances. Different dissemination channels influence adoption at different stages of the individual decision making process (Rogers, 1995). For instance, Mass media is particularly effective in making farmers aware of new technologies (Venkatesan et al, 2011). Therefore, multiple dissemination channels of information need to be used to deliver relevant information to farmers. Farmer's access to different information channels at various stages helps them to get information about improved technologies and enhance the adoption of new innovations.

MATERIALS AND METHODS

The study was carried out in Bungoma County in Western Kenya. With a coverage area of 2,207 km²and a population of 1.375 million (Population Census, 2009), Most people in this area depend on maize farming either for consumption or as a cash crop. Maize is life to some communities in Kenya, Bungoma in particular for its famous use to prepare the staple dish "*ugali*". The study focused on areas that host farmers' association of Bungoma Small Scale Farmers Organisation (BUSSFO) and regular farmers (non-members) involved in maize production.

A cross-sectional survey design was adopted for the study to help gather data over the stipulated time. This would help achieve a logical finding based on circumstantial evidence of the farmer's (target population) activities in adoption of the *striga* technology. Both primary data through field survey and secondary data from websites, journals, books, published and unpublished documents were obtained. Data analysis was then done with respect to the target population.

Semi-structured questionnaires consisting both open-ended and closed questions were used for data collection. Observation was also used to establish the adoption rate of *striga* control technologies by sampled farmers based on objective achieved through the project.

Simple random sampling technique was used to determine the sample size that constituted farmers from one farmers association (Bungoma Small Scale Farmers Organization (BUSSFO). For non-members, 100 farmers not affiliated to any of the farmer associations was also selected purposively.

Proportionate stratified random sampling was used to determine the sample of Farmer Field School participants. Participants were stratified into their FFSs and simple random sampling method through the use of table of random numbers, applied in selecting the respondents. The total of FFS Participants was 735 and was distributed into eighteen FFSs as shown in Table 1. Assuming a sample of size n respondents from Farmers Associations (FAs) and an equivalent sample of non-members of FAs, the sample size was obtained by Tuchman's (1978) formula:

$$\frac{Ps}{\Sigma Ns} \times n = ns$$

The sample of FFS respondents will be 180 and proportion will be worked out using the following formula derived from

Where: Ps = Population in the stratum

ΣNs = Total population of FFS Participants.

n= Required Sample

ns= Sample size per FFS

Example Siritanyi - is $\frac{30}{735} \times 110 = 4$

Table 1. FFS population and sample per Association

Name of FFS	Population	Sample
1) Siritanyi	30	4
2) Lusanyela Focal Area	47	7
3) Bakongolo	30	4
4) Nalutiri	35	5
5) St. Monica Masuno	22	3
6) Matunda	22	3
7) Lukala	100	15
8) Namawanga	23	3
9) Tunya CBO	100	15
10) Tumaini	51	8
11) Tabuti Lima	65	10
12) Biliso	30	4
13) Upendo	25	4
14) SengeliMukwa	30	4
15) YetanaBakokholo	25	4
16) Mbambe Rural Resource management programme	30	4
17) Consultative children centre	20	3
18) Namikelo	50	7
Total	735	110

Using the formula recommended by Kathuri and Pals, (1993) quoted from Krejcie and Morgan (1970) the sample size was calculated as follows:

Formula: - $n = \frac{X^2NP(1-P)}{d^2(N-1) + X^2P(1-P)}$

Where:

n = required sample size.
N = the given population size (735 – trained FFS farmers and 6,004 Non-FFS farmers estimated).
P = Population proportion assumed to be 0.5.
$d = \pm 1.96\ \sigma P$.
X^2 = table value of chi-square for one degree of freedom relative to desired level of confidence, which is 3.84 for the .95 confidence level/represented by entries in the table.

Two hundred and ten (210) farmers were chosen as the sample size instead of 590 farmers which is statistically justified since Kathuri and Pal (1993) recommends a minimum sample size of one hundred (100) for a survey research.

Data analysis and presentation was performed by use of SPSS version 20. Triangulation of quantitative and qualitative data analysis techniques was considered. A t test was performed at 5% level of confidence. Descriptive statistics, percentages, including means, cross tabulations, pie charts and bar graphs, are used to present the results.

RESULTS AND DISCUSSION

Preferred Source of information on *Striga* control

Available Sources of information

The table below showed the major sources of information used by all farmers; those in an association and those without.

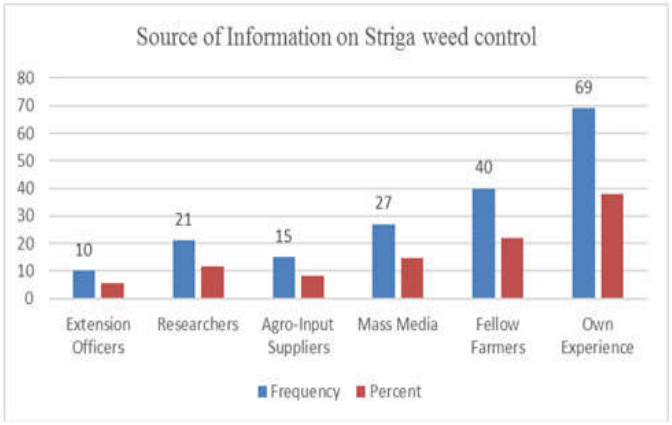

Figure 1. Main sources of information

Most participants (n=69) agreed that they used their own past experience to control the weed in their farms while another group (n=40) acquired information on *striga* control by networking with their fellow farmers. However, a small number of farmers (n=10) mentioned extension officers to have provided them with the information they needed to know on the control of the weed. Mass media was mentioned by a group of farmers 27(14.8%) through such channels as radio, TV programs and print media as being their source of information on the weed control.

Table 2. Calculated and Chosen sample per category

Category	N	Calculated Sample N	Chosen sample N	Remarks
FFS-trained Farmers	735	110	105	Reduced by 2%
Non-FFS farmers	6,004	480	105	For comparison
Total	6,739	590	210	210 respondents.

Source: (Kathuri and Pals, 1993).

Table 3. Most preferred channel

No.	Channel	SD	D	Neither	A	SA	Mean
1	Phone Calls	6	14	8	26	128	4.41
2	Short Message Service (SMS)	16	6	10	30	120	4.27
3	Internet (Websites and social media)	38	70	16	46	12	2.58
4	Workshops	12	10	28	100	32	3.71
5	Radio and TV	6	16	18	30	112	4.24
6	Consultations	2	14	14	36	116	4.37
7	Demonstrations	2	8	32	112	28	3.86
8	Brochures/Newspaper/Magazines	22	16	18	30	96	3.89
9	Meetings	4	12	10	30	126	4.44

Preferred Communication Channel

The responses on the order of most preferred source of Communication Channel are as in Table 3 below. Frequency analysis gave the results in Table 3. Farmers' meetings was the most preferred channel of information dissemination to farmers with a mean of 4.44 followed closely with n=128 farmers who strongly agreed that phone calls was their most preferred channel with a mean of 4.41.

Short Message Service (SMS), Radio & TV and Consultations had an average mean of 4.29 which makes this category the third most preferred channels by the interviewed farmers. Internet was the least preferred channel where n=70 participants disagreed that it was their preferred channel. This gave a least mean of 2.58. Khan et al. (2009) and Atera (2010) in their works give reasons for non-adoption as farmers being in doubt about the technologies especially based on the rumours that the methods do not work, and thus they are unwilling to test them. Meetings being a source of communication preferred most in Bungoma County are a clear indication that farmers would easily adopt the technology if they get first hand information from fellow farmers.

Conclusion

Information dissemination is key in the adoption *striga* control technologies. Farmers are most likely able to adopt agricultural technologies if they receive correct information through the right sources. Information materials should thus include simple explanations to farmers on how the control measures work.

Recommendation

Farmers should be empowered to participate as equal partners in development of new technologies that will fit into their farming systems. *Striga* weed undermines the struggle to attain food security, and so its control must be addressed by all means. The author recommends that researchers and farmers should have an active linkage to technology transfer, as currently transfer oftechnology seems to be the limiting constraint.

REFERENCES

Abubakar, S. Z. 2007. Approaches, Strategies and Challenges for Information Management and Usage in Fostering Sustainable Agricultural Growth and Rural Economic Development in Sub-Saharan Africa. Zaria, Nigeria. Retrieved on February 12, 2012 from: *http://ebookbrowse.com/codi-v-klis-information-management-usage-sustainable-development-abubakar-en-pdf.*

Achleitner, H. K. 1995. Information transfer, technology, and the new information professional. In *The impact of emerging technologies on reference service and bibliographic instruction*, ed. Gary M. Pitkin, 137-149. London: Greenwood Press.

Amudavi, M. D., Zeyaur, R. Khan, Japhether, Wanyama, M., Midega, C.A.O., Pittchar, J., Hassanali, A. and Pickett, J. A. 2009. Evaluation of farmers' field days as a dissemination tool for push-pull technology in Bungoma Kenya. *Crop Protection, 28*, (3), Pages. 225–235.

Asaba, A. Hattori, T., Mogi, K. & Kikusui, T. Meteorological Station 2009. *In:* Meteorological Bulletin Lagos 2009.

Atera, E. A. 2010. *Effect of Striga infection on NERICA rice cultivars and farmers' perception on its control mechanisms in sub-Saharan Africa*. M.Sc. Thesis, Kobe University, Japan, September 2010.

Barbara G. & White, D. 2001. Developing an Effective Dissemination Plan. United States of America.

Djojomartono, M. & Pertini, S. 1998. Present Status of Information Technology Utilization in Indonesian Agriculture. Bogor: The Asian Federation for Information Technology in Agriculture. Indonesia.

Doss, C. R. 2001. Designing Agricultural Technology for African Women Farmers: Lessons from 25 Years of Experience World Development. Mexico.

Food and Agriculture Organization (FAO) of the United Nations, 2001. Agricultural and Rural Extension Worldwide: Options for Institutional Reform in the Developing Countries. Rome, Italy.

Juma, C. 2009. Science Meets Farming in Africa. *Science, 334,* (6061), 1323

Kacharo, D. K. 2007. Agricultural Information Networks of Farm Women and Role of Agricultural Extension: The Case of Dale Woreda, Southern Nations, Nationalities and Peoples' Region. Msc Thesis in Rural Development and agricultural Extension, Haramaya University Ethiopia.

Kathuri, J.N., & Pals, D.A. 1993. *Introduction to Educational Research*. Njoro: Egerton University Press.

Khan, Z. R., Midega, C. A. O., Wanyama, J. M., Amudavi, D. M., Hassanali, A., Pittchar, J., & Pickett, J. A. 2009. Integration of edible beans (*Phaseolus vulgaris* L.) into the push–pull technology developed for stemborer and *Striga* control in maize-based cropping systems *Crop Protection, 28*, 997-1006. http://dx.doi:10.1016/j.cropro.2009.05.014

Kidd, A.D., Lamers, J.P.A., Ficarelli, & P.P. Hoffmann, V. 2000. Privatising agricultural extension: *caveat emptor*. *Journal of Rural Studies,* 16: 95-102.

McBride, William D. & Daberkow, Stan G., 2003**.** Information andthe Adoption of Precision Farming Technologies, *Journal of Agribusiness, Agricultural Economics Association of Georgia,* Vol. 21(1)

Meinzen-Dick, R. and Markelova, H. 2009. Necessary nuance: Toward a code of conduct in foreign land deals. In M. Kugelman and S. Levenstein (Eds.), *Land grab: The race for the world's farmland*. Washington, D.C. Woodrow Wilson International Center for Scholars. http://www.wilsoncenter.org/topics/pubs/ASIA_090629_Land%20Grab_rpt.pdf

Mohammed, I. & Wanaso, T.J. 1993. Analysis of sources of farm Information: A case study of Farmers in the Bungoma zone of Plateau State Agricultural Development project. *The Nigerian Journal of Rural Extension and Development* 1:49 – 55.

Parr, J.F. R. I. Papendick, S. B. Hornick, & Meyer, R.E. 1990. Sustainable Agriculture in the United States. P. 50-67. In C. A. Edwards, R. Lal, P. Madden, R.H. Miller and G. House (ed) Sustainable Agricultural Syatems. Soil and Water Conservation Society. Ankeny, lowa.Pertev R (1994). The Role of Farmers and Farmers' Organizations. *Ciheam-*

Options Mediterranean **2**(4), Available: http://ressources.ciheam.org/om/pdf/c02-4/94400041.pdf.

Place, F., Adato, M., Hebinck, P. and Omosa, M. 2005. The Impact of AgroForestry-Based Soil Fertility Replenishment Practices on the Poor in Bungoma Kenya.IFPRI, Resaerch Report No. 142.

Rogers, E.M. 1995. Diffusion of Innovations. Free Press, New York

Rutto, J.K. 1996. Strategies for financing tea research in Kenya. Presented at "The First Kenya Forum on Strengthening Partnership of Agricultural systems for Rapid Growth in Kenya", Whitesands Hotel, Mombasa, Kenya. 24th - 26th April 1996.

Simpson, B.M. and Owens, M. 2002. Farmer Field Schools and the Future of Agricultural Extension in Agriculture. *Journal of International Agricultural and Extension Education,* 9:29-36.

Sudath, A. 2008. The role of information technology in disseminating innovations in agribusiness: A comparative study of Australia and Sri Lanka. Ph.D. Thesis, Victoria University.

Venkatesan, V., Prema, O. and Selvaraj, G.S.O. 2001. Sediment and water characteristics of selected prawn farming sites of Cochin during premonsoon months. *J. Mar. BioI. Ass. India,* 43(1&2): 41-48.

Woomer, P. L. & Mukhwana E. J. 2004. Working with small holder farmers to improve maize production and marketing in Western Kenya. *Uganda Journal of Agricultural Sciences, 9*, 491-500.

****