



**INFLUENCE OF MARKET INFORMATION COMMUNICATION  
CHANNELS ON THE PRODUCTION OF HIGH-VALUE  
CROPS AMONG SMALLHOLDER TREE TOMATO  
FARMERS IN OL'KALOU SUB-COUNTY**

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**Abstract**

*Access to market information is crucial in accessing market for agricultural production. Farmers should be facilitated to access market information for sustainable production. This study was done to understand the most preferred channels of communication through which information reaches farmers. The study was conducted in June 2020 in Olkalou Sub- County of Nyandarua County, Kenya. It targeted 200 tree tomato farmers. Exponential Non-Discriminative Snowball sampling method was used to select a sample of 135 Tree tomato farmers based on Yamane's formula. A survey questionnaire and interview guide were used to collect data. The instruments were validated by research experts from the Department of Agricultural Education and Extension, Egerton University. A pilot test was carried out in Gatimu ward in the neighboring*

*Ol'joro Orok Sub-County. Cronbach alpha coefficient of 0.785 was obtained for reliability. Descriptive statistics and multiple regression were used for data analysis respectively, using Statistical Package for Social Sciences (SPSS). The results indicated that radios (75.6%), fellow farmers (74.6%), Extension agent (52.6%) and television (48.9%) were the commonly used channels. The regression analysis, at  $\alpha$  level of 0.05 were;  $F(6, 128) = 2.232$ ,  $p = 0.044$  and  $R^2 = 0.052$ ; hence communication channels influenced production by 5.2%.*

*Keywords: High value crops, Smallholder farmer, communication channel, access to market information, Extension contact*

## **INTRODUCTION**

Farmers in most instances, make informed decisions based on the information available at their disposal. Earnings from agricultural outputs stimulate smallholder farmers' participation in output markets and thus engagement in particular agricultural enterprise (Osmani & Hossain, 2015). Economic expectations and actualization of those expectations including returns to investment can make farmers resilient in agricultural production, especially production of high value crops (Nguyen, Nguyen, Lippe, & Grote, 2017). To enable smallholder farmers to realistically and actively engage in marketing and production decisions; especially on high value crops, market information and conditions should be made available to farmers effectively and efficiently (Ogotu, Okello, & Otieno, 2014).

A lot of agricultural information is generated through research and documented with the intention of reaching the target audiences, mostly farmers (Alarcon, Wieland, Mateus, & Dewberry, 2014). Such information coupled with accumulated experience of farmers over time form part of vital component of information that ought to be channeled appropriately and effectively to others especially new entrants into farming. Access to agricultural information plays a vital role in development of agriculture at both policy and farm levels (Goyal, 2010). Information leads to acquisition of knowledge, which in turn increases agricultural production. Farmers should be able to access that information using appropriate and most convenient channel of communication (Rehman, Muhammad, Ashraf, & Ruby, 2013). Without proper understanding on how farmers can access the information; then, that good information out there may be unusable without reaching the consumers of that information.

Access to agricultural market information, and especially in regards to high value crops provides sufficient motivation to farmers to increase production and hence income (Magesa, Michael, & Ko, 2014). The information should be appropriate, effective and timely. Some of the channels of communication ranges from interpersonal sources like lead/contact farmers,

neighbors, fellow farmers, villagers, agricultural extension sources, social media ( WhatsApp, Facebook, twitter etc.) and use of mass media such as radios, televisions, agricultural shows, exhibitions and seminars (Ronald, Silayo, & Abdalah, 2015).

Some channels of communication use information technologies. These are becoming more popular means of disseminating information (Aker, 2011). However use and adoption rate of technology by smallholder farmers at farm level is not commensurate with technological innovation. Most research points that interpersonal channels are frequently used sources of accessing market information than social or mass media. Some studies rate radios as most appropriate means of channeling information, especially market information.

A study by Drafor, (2016) found that fellow farmers are ranked important and less costly in accessing agricultural information. The study conforms to many other researches which acknowledges interpersonal medium as most preferred channels (Okwu & Daudu, 2011). Some studies indicates that 45.89% prefers interpersonal channels, 38.6 % extension agent. Radio was popular among the mass media channels at 81.011percent (Okwu & Daudu, 2011).

Access to market information is vital in production of high value crops. Tree tomato production is an emerging high value crop enterprise in Kenya and particularly Nyandarua County (Muriithi, Matiri, Kihanda, Maina, & Kasungu, 2013). Thus little is known on production and marketing of the crop within the county. The inadequacy of available information poses a challenge in both production and marketing of tree tomatoes (Muriithi et al., 2013). Gathering and documenting the information through research and surveys can be important in fostering production (Babu, Glendenning, Okyere, & Govindarajan, 2012). However, the information should equally be channeled through appropriate and most preferred channel of communication to farmers.

Appropriate channeling of information and more so marketing information influence production and thus income earnings. Moreover with increased commercialization; access to information is very critical in successful production and marketing of Tree Tomato (Ogotu et al., 2014). Production of high value crops; especially tree tomatoes, is pegged on access to the market. However, market information may not be accessible to all especially smallholder farmer. With dynamism in market conditions and requirements; this disadvantages smallholder farmers hence they end up being edged out of production (Shiferaw, Kebede, Kassie, & Fisher, 2015). Understanding how the farmers access market information may bridge the gap and enhance more farmers' access market information effectively and efficiently.

The study thus aimed at determining the influence of market information communication channels on production of high value crops especially tree tomato production in Ol'kalou Sub-County, Kenya. Additionally the study intended to identify the most preferred channels of

communication, among smallholder tree tomato farmers, in accessing market information on the production of high value crops.

## RESEARCH METHODOLOGY

The study was conducted in Ol'kalou Sub-County of Nyandarua County, Kenya. It targeted smallholder tree tomato farmers. From the Sub-County estimates; about 200 smallholder farmers growing Tree tomato. Using Yamane's formula, Exponential Non-Discriminative Snowball sampling technique was used to select 135 respondents. Five agricultural extension officers were interviewed as key informants and one focus group discussion of twenty tree tomato farmers conducted. Data collection involved use of questionnaires, focus group discussion and key informant interviews. Reliability of the instruments was tested using cronbach alpha method. Thirty respondents participated in a pilot study done in Ol'joroorok Sub-County of Nyandarua. A reliability coefficient of 0.785 was obtained and thus the instruments were accepted. Data analysis was done using the Statistical Package for Social Science (SPSS) computer software version 22. Data was analyzed using descriptive statistic and Multiple Regression.

## RESULTS AND DISCUSSIONS

### Average Size of Land under Production of Tree Tomatoes

The study focused on smallholder farmers. The variable was crucial in the study to ensure only smallholder farmers were captured. Land under production of tree tomatoes ranged from 0.02 acres to 2.5 acres. The average size of land under production of tree tomatoes were as indicated in table 1.

Table 1 Average Land under Production of Tree Tomato

Average acreage under production of Tree Tomato	Average production per year	Average income per year
0.3739	3201.5	136141.01

From table 1, it shows that average acreage under tree tomato was 0.374 acres against a total farming land of 4.41 acre. This represent about 8.5 percent of total land put under tree tomato production. This indicates that farmers apportion a greater part of their land to other enterprises. Similar studies indicates that smallholder farmers less diversify into relatively technical high value crops like tree tomatoes and Macadamia at 18 percent and six percent (Kanyua, Waluse, & Wairimu, 2015). This is probably due to technical nature of the crops and difficult in accessing

market information. The result may imply that information on production and marketing of some high value crops is not easily accessible to smallholder farmers.

The average annual production was 3201.5kgs. This represents an annual production of 8537.3kg an acre against recommended annual production of 18,000kg to 24,000kg per year (Bakshi, Kour, & Ahmed, 2016). This was way below the recommended rate. This implies that production is relatively low probably due to insufficient access to technical knowledge on production. The average income for the farmers was Ksh. 136,141. This implies that averagely, the farmers sold 1kg of tree tomatoes at Ksh.42.5 at the market. This is way below the average income per acre of Ksh.70,000(Bakshi et al., 2016). This is in conformity with (Ogutu et al., 2014) which found that insufficient access to market information has impact on technical and farm productivity.

### Use of Communication Channels

The study sought to establish the most common communication channels used in accessing market information for the production of high value crops among smallholder tree tomato farmers.

The farmers were required to state the communication channel used to access market information (Table 2).

Table 2 Use of Communication Channels (N= 135)

Communication channel	Frequency	Percentages
Fellow farmers	100	74.1
Extension Officers	71	52.6
Farmer groups	07	5.2
Mobile phones	16	11.9
Newspapers	13	9.6
Radio	102	75.6
Television	66	48.9
Internet	12	8.9
Agricultural seminars and workshops	7	5.2
Agro vets	29	21.5
Field days	43	31.9
Local market surveys	10	7.4

The results from table 2 indicate that radios and fellow farmers' advice were the most used channels of communication at 75.6 percent and 74.1 percent respectively. Those were followed

by extension officers (52.6%), Television (48.9%) and field days at 31.9 percent. This again reaffirms the critical role of farmer to farmer interaction in extension delivery. Radios are easily accessed across the various groups of farmers compared to Television. However most farmers acknowledged use of television in information delivery but due to flexibility (portability) and power connectivity; radio still remains the most commonly used media of information access by farmers. Farmer groups and agricultural seminars and workshops are least popularly used communication channels at 5.2 percent.

The research conforms to the findings on Extension communication channels' usage and preferences by farmers in Benue state; Nigeria (Okwu & Daudu, 2011). The research found that interpersonal channels of communication (fellow farmers, lead/contact farmers, neighbors, relatives and villagers) was more available to farmers at 45.9 percent followed by use of extension agents at 38.6 percent. In the same study, radio was more available among the mass media channels at 81.0 percent. Therefore the commonly used communication channels are: *Radios, Fellow farmers, extension officers, and Television.*

### Channels of Communication

The farmers were asked to identify the communication channel that has been most useful and preferred for accessing market information from the channels identified earlier. This was necessary to isolate one most useful channel that farmer relied in accessing market information. The results were as indicated in table 3.

Table 3 Most Preferred Source of Information

	Frequency	Percent
Fellow farmers	35	25.9
agricultural extension officers	31	23.0
mobile phone	1	.7
Newspapers	1	.7
Radio	35	25.9
Television	18	13.3
Internet	8	5.9
agro-vets	1	.7
field days and exhibitions	2	1.5
local markets	3	2.2
Total	135	100.0

As shown in the table 3; 25.9 percent of the farmers identified fellow farmers and radios respectively. 23 percent identified extension officers while 13.3 percent identified Televisions.

The study also agrees with another study done in Tanzania on Access and use of agricultural information and knowledge (Jain, Nfila, Lwoga, Stilwell, & Ngulube, 2011). The study established that the main sources of information for farmers were largely fellow farmers/local (neighbors, friends and family), followed by public extension services. That is, farmers preferred interpersonal channels of communication. Radio was most accessible among the mass media sources. Print media emerged as the least preferred channels. Thus rural farmers depend more on interpersonal sources than media except for radio (Jain et al., 2011).

This affirms that radios and fellow farmers are the two most preferred forms of communication. Extension officers also plays a critical role in accessing market information and therefore challenges that hinder extension officers visibility in the field should be addressed.

### Frequency of use of Communication Channels

The farmer were asked to state the frequency of use of various communication channels where: Always meant at least once a week, sometimes meant at least once a month, rarely once in a production season while never meant none. This was necessary in assessing the habit of farmers in accessing market information from the most commonly used channels. The result of the analysis was as shown in table 4.

Table 4 Frequency of Communication Channel

Channels of communication	Always	Sometimes	Rarely	Never
Fellow farmers	16(11.9%)	51(37.8%)	48(35.6%)	18(13.3%)
Agricultural extension officers	2(1.5%)	49(36.3%)	53(39.3%)	31(23%)
Farmer groups	1(0.7%)	13(9.6%)	13(9.6%)	108(80%)
Mobile phones	2(1.5%)	13(9.6%)	24(17.8%)	96(71.1%)
Newspapers and magazines	4(3%)	9(6.7%)	13(9.6%)	108(80%)
Radios	27(20%)	59(43.7%)	39(28.9%)	10(7.4%)
Televisions	22(16.3%)	43(31.9%)	36(26.7%)	34(25.2%)
Internets	9(6.7%)	7(5.2%)	8(5.9%)	111(82.2%)
Agricultural workshops/seminars	2(1.5%)	9(6.7%)	26(19.3%)	98(72.6)
Field days and exhibitions	11(8.1%)	19(14.5%)	20(15%)	85(63%)
Local market survey	4(3%)	25(18.5%)	53(39.3%)	53(39.3%)

Radios, fellow farmers and agricultural extension remained the most frequently used channels of communication in accessing, market information. Farmer groups, mobile phones,

newspapers/magazines, internets, workshops/seminars and field days and exhibitions were the least popular channels of communication. At least 80% of the respondents had never used farmer groups, newspapers/magazines and or internet as a communication channels for accessing market information. This thus indicates that more marketing content be relayed through radios and fellow farmers by enhancing farmer to farmer extension and use of extension personnel.

From the personal interviews with agricultural extension officers, they indicated that they prefer group approach to deliver information to farmers. However, much of the market information is likely to be found in the internet or published (newspapers/magazines) which were the least preferred means of communication by farmers. It is therefore paramount that the information is made available through the commonly used and preferred channels to the farmers.

The result agrees to the finding by Oto Jacob Okwu and shimayohol Daudu on Extension communication channels' usage and preferences by farmers in Benue state; Nigeria (Okwu & Daudu, 2011). In the study, the frequency of interpersonal use was higher at 41.14% and extension agents at 37.02%. However, in the same findings, only 10.44% of the 66.77% radio users utilized them on regular basis. That was contrary to the finding of this research which showed that over 86% of the radio user regularly used it (either used it always at 27% or sometimes at 59%).

### Influence of Communication Channels

In the objective, the researcher intended to determine the influence of communication channels for accessing market information on production of high value crops among smallholder tree tomato farmers in Olkalou sub-County. The following null hypothesis was tested:

**H<sub>01</sub>:** There is no statistically significant influence of channels of communication for accessing market information on the production of high-value crops among smallholder tree tomato farmers in Ol'kalou Sub County.

Tables 5, 6 and 7 shows the results of regression analysis.

Table 5 ANOVA Outcome From Regression Analysis

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	703503784.285	6	117250630.714	2.232	.044 <sup>b</sup>
	Residual	6723324304.707	128	52525971.131		
	Total	7426828088.993	134			



The ANOVA table indicates  $F(6, 128) = 2.232$ ,  $P = 0.044$ . The model was significant at  $p = 0.044$ . The factors thus successfully predicated the outcome variable (production of tree tomato).

Table 6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Df
1	.308 <sup>a</sup>	.095	.052	7247.48033	.095	2.232	6

From table 6, communication channels explained a small proportion of variance in production of tree tomatoes.  $R^2 = 0.052$ ,  $F(6,128) = 2.232$ . Hence only 5.2% of the total production could be explained by use of communication channels. That meant that 94.8% of total production was determined by other factors a part from communication channels.

Table 7 Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	-2464.244	2451.180	
	Radio	1246.637	685.284	.185
	Television	450.522	603.625	.077
	farmer group	1938.866	1051.694	.164
	mobile phone(SMS)	-1027.192	1167.727	-.086
	agricultural extension officers	-250.399	569.366	-.039
	agricultural related website/internet	109.851	675.187	.015

The unstandardized coefficients show radio, televisions, farmer groups and internet had a positive contributions on production of tree tomatoes at 1246.637, 450.522, 1938.866 and 109.851 respectively. However, Agricultural extension officers and use of mobile phones had a negative contribution of -250.39 and - 1027.192 respectively. That could be so because farmers did not commonly use of Agricultural extension officers and mobile phones in marketing of tree tomatoes. Extension officers were only limited to other crops and their field presence and farmer interactions in specifically marketing of tree tomatoes were minimal.

The regression model below explains the interaction of factors:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6$$

where

$Y =$  production of tree tomatoes in Kilograms;  $X_1 =$  Radio;  $X_2 =$  TV;  $X_3 =$  Farmer groups;  $X_4 =$  Mobile phone;  $X_5 =$  Agricultural extension Officers;  $X_6 =$  Internet.

Thus

$$Y = 1246.637X_1 + 450.522X_2 + 1938.866X_3 - 1027.192X_4 - 250.399X_5 + 109.851X_6 - 2464.244$$

The negative coefficient in the use of agricultural extension officers can be ascribed to low farmer - extension interaction and when that interaction happened, the subject was more of other crops other than tree tomato or livestock production Extension officers too acknowledged that they had little information on production and marketing of tree tomatoes. On the other hand, the negative coefficient on mobile phone can be attributed to that fact that different people gave conflicting information on production and marketing of tree tomatoes. That was so because little information on production and marketing of tree tomatoes was made available either in print or audiovisual for the farmers. This was also acknowledged as a problem by the farmers during the focus group discussions.

The standardized beta coefficients showed that radio was most influential followed by farmer groups at 0.185 and 0.164 standard deviation respectively. Farmer group was positively influencing despite the fact that there were few farmers who belonged to tree tomato marketing groups. From the focus group discussions farmers had registered some reservation to belonging to a farmer group. Their negative connotation of farmer group formation portrayed some underlying issues which can be subjected to further research. The constant indicates that, the factors do influence production. Without the factors, production reduces by over 2464 kg, which translates to over Ksh.123, 200/- loss of income. This is substantial for a smallholder farmer.

However, none of the factors was significant at  $p = 0.05$ . The null hypothesis was accepted, at  $p = 0.05$ . A study by (Mulbah, Ritho, & Mburu, 2020), found out that other factors such as transactional cost and social-economic factors, including access to credit, income, climate and others, do play vital role in marketing and subsequently production of high value crops. By accepting null hypothesis; it implies that there are other factors which may significantly influence production and marketing of tree tomatoes other than access to market information. Further research thus required to find out the other factors.

## CONCLUSIONS AND RECOMMENDATIONS

The commonly used communication channels included: Radios, fellow farmers, agricultural extension and Television. Radio was most popular followed by fellow farmers. The result too indicted that communication channels did not have significant influence on production of high value crops. Television as a channel of communication was described by farmers as being effective and real because they could hear and see pictures at the same time. However due to network connectivity and electricity supply, not all farmers could access it. Unlike the radio, the television was not portable and therefore they couldn't use it unless they were in the house. Contrary to the fact that majority of farmers shied off from belonging to farmer groups; still the channel had a positive influence on production

The most popular communication channels preferred by extension officers was group approach as indicated from personal interviews. On the hand, farmer groups were unpopular among the farmers and where they existed some were somehow amorphous. The study recommends that extension personnel encourage farmers to work in groups and assist them to dispel any fears founded on historical accounts especially mistrust that originated from the collapse of cooperatives and that they endeavor to reach farmers through some of the channels preferred to them.

The study adopted snowballing sampling technique because it was difficult to construct the sampling frame from the target population since there were no records of tree tomato farmers even at the county extension offices. That potentially affected randomness in sampling process. Being the only alternative available and to remove any biasness during sampling of participants, the researcher adopted non-discriminative snowballing method which involved recruiting the first subjects, who then gave multiple referrals. Most farmers moreover did not have written records on production and marketing of tree tomatoes. The information they gave largely depended on their memories and ability to recall past records. To ensure accuracy of the information; the study used researcher-administered questionnaires to facilitate cross examination and validation of information during the data collection process. The study therefore, can be generalized to all smallholder farmers in Nyandarua County and all other counties sharing similar ecological conditions in Kenya.

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