

# **DETERMINANTS OF USAGE OF SOCIAL NETWORK INFORMATION CHANNELS AMONG SMALL SCALE FARMERS IN UASIN GISHU COUNTY, KENYA**

**Rosebella J. Langat**

The Catholic University of Eastern Africa, Kenya

[chirirl@yahoo.co.uk](mailto:chirirl@yahoo.co.uk)

**Joseph Franklin Ntale** 

The Catholic University of Eastern Africa, School of Business, Kenya

[josefntale@yahoo.com](mailto:josefntale@yahoo.com)

**Kate O. Litondo**

University of Nairobi, School of Business, Kenya

[klitondo@yahoo.com](mailto:klitondo@yahoo.com)

## **Abstract**

*Social network is essential in enabling interaction and exchange of valuable information for economic development of small scale farmers. However, these farmers often lag behind due to limited information, capital, and credit, and this consequently reduces their profit margins. This paper investigated the determinants of usage of social network information channels among small scale farmers in Uasin Gishu County of Kenya. Cost and availability of information as well as use of common channels are hypothesized to have a significant influence on farmers' social network. The study was guided by logical positivism philosophy and cross sectional survey research design. A multi stage sampling technique was used to arrive at the 30 wards of Uasin Gishu County from which respondents were picked. A questionnaire was used to collect data from 384 small scale farmers. Linear probability, logit and probit models were used to establish the determinants of usage of social network. The study established that availability of information, paying for information, age of the farmers, as well as size of the farm have a significant effect on the usage of social network for accessing valuable agricultural information.*

*The study recommends that the small scale farmers should be sensitized to join social network in order to access information necessary for their economic development. A policy should be formulated to facilitate the formation of more social networks especially in agricultural areas.*

*Keywords: Social Networks, Linear Probability, Logit and Probit Models, and Small Scale Farmers, Information Channels*

## **INTRODUCTION**

Agriculture is referred to as the backbone of economic development in Kenya, and an important source of income for the majority of Kenyans. It is estimated that 75 percent of Kenyans derive all or part of their livelihoods from the agricultural sector, and it accounts for 18 percent of the Gross Domestic Product (GDP), however, only 20 percent of the country's land is arable, and maximum yields have not been reached in some areas, leaving considerable potential for increases in productivity. Most farmers work without information on modern seeds and technology or adequate financial or extension services (USAID, 2016). Majority of these small scale farmers reside in the rural setup and they lack essential information and knowledge to better tools, equipment and implementation strategies that can improve their means of farming methods, marketing of their farm products and food storage all year round food sufficiency (Abosedo, Alabi & Oluyemisi, 2014).

There is an ever changing agricultural information explosion on farming methods, farm inputs and farm produce in form of seeds, seedlings, harvesting, marketing and storage among others (Ozcatalbas, 2010). According to Joel (2011), the need for agricultural information flow and sharing among the small scale farmers in order to update and improve their farm production, can better be carried out by policy makers, researchers and the farmers who are in this case must be well informed. Social network is one of the key information channels used by small scale farmers to access information to enhance and improve better agricultural produce, marketing and food storage to ensure food security. This paper therefore attempts to investigate the determinants of the usage of social network information channels among small scale farmers in Kenya. Small scale farmers need to keep abreast of necessary information that will enhance cultivation and be well aware of issues and developments surrounding any crop before every farming season. Therefore farmers need to be on top of information to meet investors need, and be aware of strategies to reduce spoilage, increase food production and marketing strategies in packaging and storage to enhance food security all year round (Abosedo, et. al,

2014). Thus there is a change from old way to modern technology method of sustaining best practices necessary for meeting production in the agricultural sector.

### **Social Network Channels**

Mbura (2014) described social network as a set of actors and their structural and content relations where each regularly and for a sustained period interacts for the purpose of gaining economic advantages in accessing information and other resources. Solano, Leon, Perez and Herrero (2003) explained that social network is an informal interaction and information exchange with family members, other farmers, technical advisors, farm staff, commercial agents, neighbours, friends, farmers' association meetings and religious organizations. Mitchell (1969) argues that what matters in networks is both intensity (structure) and interconnectedness (content) of the members of the network. Aldrich and Zimmer (1986) observe that characteristics of networks have different potential to the access of information resource, and a need to determine which of these characteristics as pointed out in the Social Network Theory results in higher benefits of market information to the network actors.

Social networking enables one to take advantage of opportunities and facilitates exchange of resources including market information (Jack, Dodd & Anderson 2008; Rutashobya, Alan & Nilsson, 2009; Yan, 2013; Aldrich & Zimmer, 1986). Social Exchange Theory advocates for the need for interaction and therefore creating networks with others. Williamson (1975) in his Transaction Cost Theory supports the idea that networks are cheaper source to access Information. Morris (1998) underscores the importance of Market Information for business survival by enabling effective market decisions. Kizito (2011) argues that market information is vital to enable farmers make informed decisions about what to grow, to which markets produce should be sent, what price to sell and whether to store it or not with the main objective of profitability.

### **Small Scale Farming in Kenya**

Agricultural sector in Kenya is characterized by the existence of both large scale and small scale farmers. There are currently more than 5 million smallholder farmers who account for about 75% of the total agricultural production in the country (Republic of Kenya, 2010). Small scale agricultural production is largely characterized by growing of staple food like maize and beans, which are primarily targeted for own consumption with little marketable surplus. In Kenya, land holdings have become smaller due to population pressure, hence farmers have transformed from staple crop production to highly market-oriented crops. This agricultural transformation has been a vital development tool for achieving the Millennium Development

Goals (MDGs) that calls for reducing of the share of people suffering from extreme poverty and hunger by 50% (Cervantes-Godoy & Dewbre, 2010).

Lipton, (2005) defined smallholders or small scale farmers as those with a low asset base, operating less than 2 hectares of cropland. These farmers tend to practice a mix commercial and subsistence production or either the family of the farmer provides the majority of labour and the farm provides the principal source of income (Narayanan & Gulati, 2002). International Fund for Agricultural Development (IFAD) (2013) defined a small scale farm as a farm of two hectares or less of land will be adopted. Small-scale farmers play different and often multifunctional roles. They are the key drivers of economy providing sources of employment, food security, poverty reduction and ecosystem services (Deininger & Squire, 1998). Munyua and Stilwell, (2009) established that of the farmers in Kenya, 80% are small holders, who produce for subsistence and for sale. These farmers face many barriers to attain full agricultural production including poor access to agricultural information, low output and productivity, weak institutional capacity and coordination, inadequate markets and market information. (Kalusopa, 2005) observed that most small-scale agricultural producers in the developing countries are now influenced by global economic, environmental and political trends which place small-scale farmers squarely in the middle of global market realities (Richardson, 1997).

Singh (2009) indicated that small-scale farmers are often marginalized by their lack of access to capital, credit and information about both growing conditions and markets which together they limit the farmers' ability to take risks, and reduce the scope for realizing a profit. A recent literature review on marginal farmers commissioned by the NGO Concern International included the statement: 'to define marginal farmers as those who are 'farming yet hungry'. These are people, for whom farming is a major source of livelihood, yet they have insufficient assets to produce a surplus from their agricultural activities and whose non-farm activities are unreliable for them to rely on market purchases for adequate food intake (Kent & Poulton, 2008). Ballantyne (2009) asserts that more than ever, the developing world needs reliable information and knowledge on agricultural issues. It needs this knowledge to be accessible and well communicated. On its own, more information is not enough: access is needed and this is where market information channels come in. However, farmers as agricultural entrepreneurs must receive the information on time, and in a manner and format best suited to their needs and their ability to understand.

### **Small Scale Farming in Uasin Gishu County**

Uasin-Gishu County of Kenya is the food basket of the country and covers a total area of 3327.8 km<sup>2</sup> and the county has a projected population is about 771,536 people. It has a population

density of 232 per km<sup>2</sup> and approximately 2603.2 km<sup>2</sup> of arable land. 218 km<sup>2</sup> of its land is under water, swamps, rocks and hills. Urban areas cover about 196 km<sup>2</sup> and current total land under agricultural production is approximately 134,490 hectares (Baraza, Chepkwony & Githae, 2008). The total number of farmers is about 166,635 and the types of farming practices include mixed farming (food crops and livestock) and formal/casual employment. Agro-ecological zones were established in Kenya by the Food and Agriculture Organization (FAO) in 1978. It defines seven zones on the basis of combinations of soil, landform and climatic characteristics (FAO 1996).

The country is divided into three main production zones when rainfall is used as a basis. The high-potential zone (with high rainfall above 1800 mm annually), the medium potential zone (with 750 to 1800 mm rainfall) and the low potential zone (mostly semi-arid and arid zones with 200-750 mm rainfall). Uasin Gishu County is located in the high potential (>1,800 mm) and low potential (<1,800 mm) agro-ecological zones. The high potential zone generally receives more rainfall over a longer period of time than the low potential zone. Rainfall ranges from 500 to 1,000mm in low potential zones and 1,200 to 1,800 mm in high potential zones. The average annual rainfall is between 900 to 1,200 mm per year. Rainfall is spread across the year with distinct peaks in April and August. The nature of Agro-ecological of Uasin Gishu County makes it a good choice for this research because it has a mix of both high and low rainfall zones.

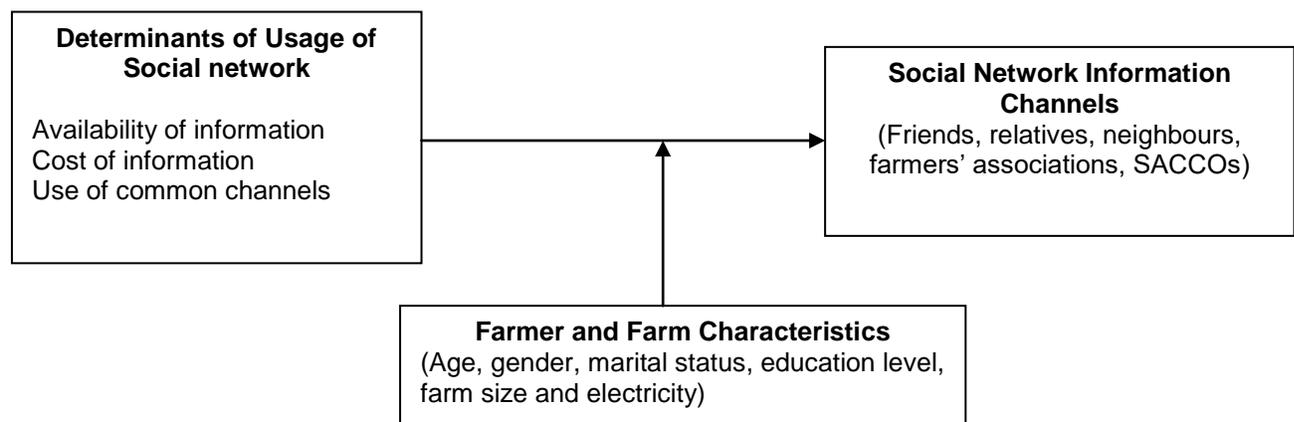
About 80% of the farmers in Uasin-Gishu County are small-scale owning less than 2 hectares of land and depend mainly on agriculture as source of livelihood (Jayne, Yamao, Nyoro & Awuor, 2001). However, to improve the low farm incomes, the farmers have gradually diversified their farming activities by adopting new farm enterprises perceived to be high yielding with high market value. Currently, the farmers are adopting high value and high yielding horticultural crops that include: passion fruit, chillies, French beans among others. According to Anderson (2003) and Gockowski and Michel (2004) horticultural crops have high market value and yield more and regularly and hence suit the needs of smallholder farmers who face resource constraint and have no marketable surplus. The argument behind this is that, farmers are constrained in terms of resources and hence cannot produce all crops at the same time (Jones & Jayne, 2003). On the other hand agricultural diversification and trade-off arises from the notion that benefits from different agricultural enterprises do not fall simultaneously, so that incase income from one enterprise falls, it will be compensated by the rising income of the other enterprise(s). It is therefore, a risk management strategy farmers employ to increase and stabilize farm incomes. Market information is critical for make the farmers take the risk of diversification.

## Theoretical Foundation

This paper based on the theory of reasoned action, social networks theory, and social exchange theory. The theory of reasoned action indicates that the success of any system is contingent on the user's beliefs and attitudes holding other factors constant. The success in use of social network channels to access information on agricultural activities is when it leads to an improvement of farmers' livelihoods. The choice of social network information channels will depend on the small scale farmer's attitudes and beliefs of the channel and therefore the speed at which they adapt and use will be determined by their beliefs and attitudes. Social network theory contains a set of objects and a mapping or description of relations between the objects or nodes. The nature of the relationships can either be weak or strong ties in relation to the entire network. For instance, acquaintances can be referred to as "weak ties" and tend to less likely be socially involved with one another as compared to close friends "strong ties" such as family members. The more spread the network of small scale farmers, the more diversified the information they receive. Furthermore, social exchange theory proposes that social behavior is the result of an exchange process. The purpose of this exchange is to maximize benefits and minimize costs. This is whereby people tend to weigh the potential benefits and risks of social relationships. In this case, small scale farmers will choose the channels of information that they trust and use the information therein for their regular farming practices. Then the trust is build over time in the social exchanges within neighbours, friends, family and business partners.

## Conceptual Framework

Figure 1. Conceptual Framework



The above figure suggests that if the cost of getting information from a particular social network is high, farmers are likely not use. Farmers are likely to use a social network if valuable

information is available. Literature shows that farmer characteristics such as gender, age, education level, and marital status influence social network information channels. Similarly, farm characteristics like farm size and electricity also have an influence on social network information channels

## METHODOLOGY

The study was based on the philosophy of logical positivism. The population of interest for this study was small scale farmers. Cross sectional survey research design was followed to collect primary data on determinants of usage of social network information channels from a sample of 384 small scale farmers from Uasin Gishu County. This county was suitable for study because of its engagement in diverse agricultural activities and due to the fact that it is considered as one of the food baskets of Kenya. Data was collected using multistage sampling technique. The first stage was the Uasin Gishu County, the second stage was sub-county/constituencies, and the third stage was the selection of the 30 wards. Systematic random sampling technique was used to identify the respondents. Data collection was done by use of a questionnaire and the study used descriptive statistics, Linear Probability Model (LPM), Logit and Probit models to estimate the determinants that influence farmers to use social network information channels. LPM was estimated by ordinary least squares (OLS) method and logit & probit models were estimated by maximum likelihood (ML) method. The three models were used together for the purpose of testing the robustness of the estimated model parameters. The R<sup>2</sup> in LPM and pseudo R<sup>2</sup> in logit and probit models represented coefficient of determination or goodness of fit of the models.

The estimating equations are:

$$SN = f(DM, PC)$$

$$SNI = \beta_0 + \beta_1 DM + \beta_2 PC + \varepsilon$$

$$ZSN = \beta_0 + \beta_1 DM + \beta_2 PC + \varepsilon$$

Where: SN represents social networks like farmers' organization, group associations, SACCOs, neighbours, friends, and relatives. SNI<sub>i</sub> is a dummy variable that takes a value of one if a small scale farmer *i* is using a social network information channel and a value of zero if otherwise. DM represents the determinant of social network information channel like availability of information, paying for information, and use of same channels; PC represents farmer's characteristics such as education level, gender, age and marital status, and  $\varepsilon$  is the error term. In the logit and probit models, ZSN is the index of perceived benefits if a small scale farmer *i* uses social network channel to access information on his/her agricultural activities, while  $\beta_0$ ,  $\beta_1$ , and  $\beta_2$ , are the coefficients of estimation in the models.

## ANALYSIS AND RESULTS

### Descriptive Statistics

The study provided the results on farmer characteristics that included the gender of the small scale farmers, their respective age, education level and marital status as shown in table 1. The findings revealed that 78% of the respondents were male and 22% were women. The small scale farmers who participated in this research had an average age of 40 years, the youngest having 20 years of age while the oldest had 95 years. Most of the small scale farmers in Uasin Gishu County were found to be literate with average years of schooling being 11 which represented high school education level. 82% of the small scale farmers in area under study were found to be married. 81% of the respondents were found to use information channels to access agricultural information. Where 27% accessed agricultural information through farmers' organization, group association and SACCOs, while 65% of the small scale farmers relied either on neighbors, friends or relatives to access information they required for their agricultural activities.

Availability of information played a vital role in determining the usage of social network channel. This was displayed through the finding of this study where 90% of small scale farmers were of the opinion that availability of information in their area was a major reason of their usage of the channels. The study found out that 86% of the small scale farmers interviewed used these channels because they can afford them, this is in line with transaction cost theory which stipulates that human beings are rational and will opt for the most effective alternative that will give value for money. 73% felt that they only use a channel if it contains the required information. 70% stated that their usage was determined by the availability of a channel. 41% of the respondents were found to use a particular social network channel because their neighbours and friends use it.

Table 1: Descriptive Statistics

Variable	Number of Observation	Mean	Std. Dev.	Min	Max
Gender (1 = Male)	383	.7832898	.4125424	0	1
Age (In years)	381	40.34908	13.49118	20	95
Size of farm (in acres)	382	4.861649	4.209501	0.2	15
Education level (In years)	384	11.22396	2.407961	8	14
Marital status (1 = married)	384	.828125	.377764	0	1

Variable	Number of Observation	Mean	Std. Dev.	Min	Max
Information channels usage (1 = Farmer using channels for market decision)	379	.8126649	.45338	0	1
Farmers' organization / Group Association /SACCOs (1=Farmer access information via social group)	384	.2708333	.44497	0	1
Neighbors/friends/relatives (1 = Farmer accessing information through Neighbors/friends/relatives)	384	.65625	.4755785	0	1
NGOs (1 = Farmer access information via NGOs)	380	.0368421	.1886224	0	1
Affordability of channel (1 = affordability determines the usage)	384	.8619792	.3453718	0	1
Availability of channel (1 = availability determines the usage)	384	.703125	.457477	0	1
Channel being used by everyone (1 = commonality determines the usage)	383	.3707572	.4836393	0	1
Availability of information (1 = Availability determines the usage)	384	.734375	.4422416	0	1
Trusting channels (1 = trusting channel determines the usage)	383	.3942559	.4893295	0	1
Paying for information (1 = Farmer pays to get information)	384	.0651042	.2470314	0	1
Payment per month (In Ksh.)	15	1028.667	895.9661	30	3000
Use of same channels (1 = Using same channels)	382	.4109948	.4926596	0	1

39% of the respondents were of the opinion that they were able to use a specific social network channel only if they trust and like it. Those who were using a social network channel just because of it being used by everyone in their area were represented by 37%. Paying for information had less contribution in determining the usage of a particular channel to send and receive information.

### Correlations of Social Network Channels with Selected Variables

The correlations results given in table 2 indicate the correlation results of social network channels against the selected variables. From the results given, 10% increase in the farmers joining social networks is associated with 49% increase in availability of information. Likewise, 10% increase in availability of information in the nearby area of a farmer is associated with 49% increase in chances of a farmer joining a social network. The results further reveal that a 10% increase in number of years of a farmer is associated with 19% increase in the probability of a farmer joining a social network. A 10% increase in the acreage of farm land is associated with 14% increase in the probability of a farmer being a member of a social network.

In addition, 10 percent increase in the probability of a farmer becoming a member of a particular social network is associated with 10% increase in the proportion of a farmer using same channels as their neighbours, friends and relatives. Social theory postulates that social behavior is the result of an exchange process and the purpose of this exchange is to maximize benefits and minimize costs all based on trust (Dirks & Ferrin, 2002).

On contrary, it was discovered that a 10% in the proportion of joining a social network is associated with a 0.59% decrease in the probability of a farmer having electricity on his farm. The results also tell us that a 10% increase in the probability of a farmer paying for information gotten through social network channels is associated with 0.62% decrease in chances of him/her becoming a member of social networks.

Table 2: Correlations of Social Network Channels with Selected Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Social Networks channels	1.0000									
2. Availability of information	0.4903	1.0000								
3. Paying for information	-0.0623	0.0345	1.0000							
4. Use of same channels	0.1004	0.0466	-0.0176	1.0000						
5. Gender	0.0067	0.0098	0.0032	-0.0710	1.0000					
6. (1 = Male)						1.0000				
7. Age	0.1926	0.0943	-0.0108	-0.0860	0.0402	1.0000				
8. (In Years)							1.0000			
9. Farm size	0.1403	0.1164	0.0101	-0.0485	0.0767	0.1912	1.0000			
10. (Acres)								1.0000		
11. Electricity	-0.0596	-0.0528	0.0388	-0.1128	-0.1035	0.0257	0.0674	1.0000		
12. Education (In Years)	0.0007	0.1236	0.0953	0.1332	-0.0466	-0.4556	-0.1459	0.1943	1.0000	
13. Marital status	0.0122	0.0150	-0.0551	-0.0849	0.0406	0.3418	0.0770	0.0617	-0.2561	1.0000

### LPM, Logit and Probit Models

The results on determinants for usage of social network channels among the small scale farmers in Uasin Gishu County are given in table 3. It is important to note that social network channels used in this study were farmers' organization, group association, SACCOs, neighbours, friends, and relatives.

OLS results show that availability of information increases the probability of using social network channels for market information by 48.8% ( $t = 10.90$ ). The marginal effect for logit model is 49.6% ( $z = 9.39$ ) and that of the probit model is 43.6% ( $z = 9.00$ ). Paying for information was also found to have a significant effect on the usage of social network channels for market information.

The table shows that LPM and probit models were 17.4% ( $t = 2.17$ ) and 61.4% ( $z = 2.18$ ) respectively.  $R^2$  in the LPM is 0.2513 meaning that 25.1% of the variation in the probability of using social network channels for agricultural information can be explained by all the variables used in the model. The pseudo  $R^2$  presented in the logit model is 20.6% and probit model gave a pseudo  $R^2$  of 20.65%. The  $p$ -values of the  $F$ -statistic and  $\chi^2$  statistics for all the models are zero, for that reason, we reject the null hypothesis that all the variables used in the model, jointly have no effect on the usage of social network channels for market information.

When controlled for other covariates, availability of information in the locality of farmers, age of a farmer, and size of farm were found to be strong determinants of usage of social network for market information. The LPM estimates indicate that availability of information in the farmer's surrounding increases the probability of using social network for market information by 46.3% ( $t = 10.04$ ).

While in the logit and the probit models, the chance increases by 46.3% ( $z = 7.86$ ) and 39% ( $z = 8.16$ ) respectively. A one year increase in the age of a farmer increases the probability of a farmer joining social network to get market information by 0.56% ( $t = 3.19$ ) in the OLS model and 0.7% ( $z = 3.03$ ) in the logit model and 2.5% ( $z = 3.03$ ) in the probit model. These findings indicate that people who are advanced in years tend to join social networks in order to get information as compared to young adults who tend to use alternative channels other than social network.

Table 3: Determinants of Social Network Channels Usage  
(Absolute *t* Statistics in parentheses)

Variables	Model parameter estimates (marginal effects)					
	LPM		Logit		Probit	
<b>Social network information channels</b>						
Availability of information	.4879 (10.90)	.4629 (10.04)	.4956 (9.39)	.4632 (7.86)	.4356 (9.00)	.3903 (8.16)
Cost of information	-.1737 (2.17)	-.1430 (1.77)	-.2243 (1.95)	-.1960 (1.61)	-.6138 (2.18)	-.5868 (1.93)
Use of same channels	.0636 (1.58)	.0762 (1.86)	.0756 (1.63)	.0856 (1.90)	.2652 (1.69)	.3338 (1.99)
<b>Farmer and farm characteristics</b>						
Gender (1 = Male)		-.0046 (0.09)		-.0141 (0.26)		-.0635 (0.31)
Age (In Years)		.0056 (3.19)		.0070 (3.03)		.0249 (3.03)
Farm size (Acres)		.0034 (1.49)		.0110 (2.08)		.0422 (2.13)
Electricity		-.0298 (0.71)		-.0338 (0.68)		-.1119 (0.66)
Education (In Years)		.0039 (0.39)		.0054 (0.46)		.0156 (0.39)
Marital status		-.0559 (0.99)		-.0567 (1.04)		-.2135 (0.96)
Constant	.3580 (8.71)	.1438 (0.90)				
$R^2$	0.2513	0.2832				
Pseudo $R^2$			0.2057	0.2509	0.2065	0.2541
<i>F</i> -Statistics ( <i>p</i> -value)	42.28 (0.0000)	16.03 (0.0000)				
$\chi^2$ -Statistics ( <i>p</i> -value)			91.62 (0.0000)	109.63 (0.0000)	91.94 (0.0000)	111.02 (0.0000)
Observations	382	375	382	375	382	375

The  $R^2$  of the LPM model is 0.2832, which means that 28.3% of the changes in the probability of using social network channels for market information can be explained by the variables incorporated in this model. The logit model has a pseudo  $R^2$  of 0.2509, while the  $R^2$  of the probit model is 0.2541. The *p* - value for the *F*-statistic in the three models is zero. An indication that we reject that null hypothesis that all the variables namely; availability of information, paying for information, use of same channels, gender of a farmer, age of a farmer, size of farm, electricity, education level, and marital status have no effect on usage of social channels for market information.

## CONCLUSION AND RECOMMENDATIONS

Restorative of the agricultural sector in Kenya, especially small scale farming, is a requirement for gaining higher and sustainable growth, thus, reducing the level of poverty and enhancing food security across the country. Small scale farmers have the capacity of playing an essential role in rural settings of Kenya if resources such as information, technology, and knowledge are improved to assist them increase their agricultural productivity. The findings given in this paper are simply a glimpse into the potential role that social network information channels could play in improving agricultural production and accessibility to valuable information. This paper highlighted the critical role that social network information channels can play in improving efficiency for small scale farmers in rural setting of Uasin Gishu County. The findings of this research disclosed that agricultural information is gradually more accessible to small scale farmers in this county through social networks. The availability of information, age of a farmer, and the farm size are key determinants of use of social network channels for market information.

It is therefore recommended that small scale farmers should embrace togetherness through participatory approaches which can be enhanced by social networking. Social network were found to play a vital role in sending and receiving agricultural information. The government should be encouraged to use social network to pass information. Therefore, the study recommends that a social network analysis method should be generated to ensure that farmers are committed to getting valuable common information at the same time. This can help in providing a way of accessing the diversity of information gotten through social network channels and hence, can help stakeholders to understand the needs of small scale farmers. A policy can also be formulated to ensure and control the formation of more social networks especially in agricultural areas. This will help the stakeholders in passing valuable agricultural information to farmers easily.

As a scope further research, the study recommends a national survey to be carried out on the determinants of usage of social network information channels among small scale farmers in Kenya in order to take care of the national geographical diversity.

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