

Influence of Social Capital on Producer Groups' Performance and Market Access Amongst Smallholder French beans Farmers in Kirinyaga County, Kenya

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Abstract

Market access is a major constraint facing agricultural commercialization in Kenya. The pressure on arable land and market changes are mainly felt by the smallholder farmers who are faced with high transaction costs. In addition, these farmers face a number of institutional and technical factors putting their market survival at stake. To curb these challenges, formation of farmer groups and organizations has become important in bringing about collective action whose basis is social capital. However, this capital must be mobilized through group membership and other social dimensions to achieve collective action. This paper therefore, sought determine influence of the social capital dimensions, socio-economic and institutional factors on group's performance. The study was conducted in Mwea sub-county, Kirinyaga County and a multistage sampling method was used to obtain a sample of 174 farmers (95 group members and 79 non-group members) who were interviewed using structured questionnaires. Descriptive statistics was utilized in characterizing socio-economic attributes of the smallholder French beans farmers. Tobit model was used to determine influence of the social capital dimensions and institutional factors on group's performance. The results showed that gender, age, education level, French beans yield, farming experience, transport cost, off-farm income, initial social capital endowment, trust index and meeting attendance significantly influenced the extent of commercialization. The results of this study enhanced a better understanding of social capital dimensions in farmer group performance.

Key words: Social capital, commercialization, Tobit model, French beans

1.0 Introduction

Developing the agriculture sector remains an important factor in the achievement of sustainable food production and thus, the global food security. However, there are increased challenges of population pressure, land degradation and declining agricultural productivity, and thus farming in sub-Saharan Africa is increasingly knowledge intensive (Katungi *et al.*, 2008). In Kenya, arable land holding have become smaller due to population pressure and land sub-divisions, hence farmers have transformed from staple crop production to highly market-oriented crops, especially horticulture. Horticultural crops are gaining popularity among smallholder farmers in Kenya. French bean (*Phaseolus vulgaris*) is among these crops adopted by farmers due to its income generating ability. Apart from international demand, there has been an increasing domestic demand especially in urban areas. In 2011, French beans accounted for 29 per cent (KES 4 billion; 1USD=KES 85) of the total fresh vegetable export earnings in Kenya.

Market access being a major constraint in commercialization of agriculture (Poulton *et al.*, 2007; Wambugu *et al.*, 2009); recent studies have identified strategies for overcoming high transaction costs faced by farmers. One of such strategies is collective action in the form of farmer groups. The success of a farmer organizations and collective action in reducing transaction costs depends on social capital (the level of cooperation or networking between its members) among other factors. Social capital is a set of formal values and norms shared among members of a group that permits them to cooperate with one another. Members of a group have an opportunity to exchange experiences, organize trainings and marketing campaigns for their produce. Therefore, smallholder farmers overcome market failures and maintain their market access through the formation of farmer or producer groups (Katungi *et al.*, 2007) and the expectation is that farmers' participation in these producer groups will influence their access to the market. Therefore, social capital through farmer groups help to bridge this gap by enhancing cooperation, coordination and collective action making market exchange easier. Membership to social networks generates social capital that members can rely on to access the market (Udry and Conley, 2006).

Narayan and Pritchett (1997) highlighted different social capital dimensions and aspects including group heterogeneity, membership density, labour contribution, meeting attendance and participation in group decision making. Studies have shown that human beings often exchange information with individuals they trust. Trust is therefore an important component of social capital (Coleman, 1990; Halkos and Jones, 2012). In the case of French beans' exporter-farmer relationship, an exporter tends to trust a contract entered with a group than an individual farmer (Ondieki-Mwaura *et al.*, 2013). There is however, limited information about how the various binding interrelationships among the farmers affect groups' performance and hence market accessibility locally, regionally and internationally. The effectiveness of the social capital dimensions depends on the enabling environment, which includes the relationships among individual farmers, between farmer groups and the market. Groups also face challenges like coordination of the members and their success in accessing the market relies heavily on the social capital, in which its benefits to farmers is little known. This study therefore sought to fill the knowledge gap in identifying the role that social capital play in influencing the participation in producer groups and their performance in enhancing market access among smallholder French beans farmers in Kirinyaga County.

2.0 Conceptual framework

This study is built on the idea that joining a farmer group and active participation in it, leads to improved market access. The decision to join a farmer group or not is assumed to be determined by the household demographic factors, farm attributes and the institutional factors. When a farmer becomes a member of a social network, s/he acquires a (meso) level of social capital. The level of performance of a group is influenced additionally by the social capital dimensions. It is assumed that when the group's social capital becomes strong and effective, then the smallholder farmers will rely on it to access the market and thus improve their household incomes. The group's activities which include collective action will make the households have a higher bargaining power and greater access to markets.

3.0 Methodology

3.1 Study area and sampling technique

The study was conducted in Mwea Sub- County, Kirinyaga County. It is located in the central region of Kenya, sitting at the foothills of Mount Kenya, 112km from Nairobi. The County occupies a total area of 1479.09 km². It lies in the mid-altitude range of 1489 to 2000 metres above the sea level. The county has an estimated population of 528,054 persons with a density of 357 per square kilometers (GoK, 2009). Mwea is divided into three agro-ecological zones depending on the rainfall levels and soil types (red soils, black cotton soils, loam soils and sandy soils). Most of the area is covered by the black cotton soils suitable for rice production which is the main economic activity in the area. The annual temperature is between 12°C and 26°C, averaging 20°C. The annual precipitation is about 1250mm with two rainy seasons- long rains (March to May) and short rains (October to December). Most prevalent crops in the county are tea, coffee, rice, maize, beans, bananas and various types of fruits and vegetables. The scheme is also well known for its horticultural potential. The main horticulture crop in the County is French beans.

3.2 Methods of data analysis

STATA version 12 and SPSS were used to process the data. Descriptive statistics together with the Tobit Model were used to analyze the data. The t-test and chi-square were used to investigate the difference in main descriptive indicators between group and non group farmers. The Tobit model was used to determine the influence of socioeconomic, institutional and social capital indicators on commercialization. The market access variable, commercialization was used as a dependent variable in the Tobit model which denotes the mean level of commercialization. The group's mean level of commercialization was calculated as the mean value of produce sold by group members, divided by the mean value of crops produced by the group members. The commercialization level helped to show the extent of market access. Tobit model is based on the maximum likelihood technique (Gujarati, 2004).

The structure of the Tobit model is given as;

$$Y_i^* = \beta' X_i + \varepsilon_i \dots \dots \dots (1)$$

Where; Y_i^* is a vector of the latent variable that is not observed for values less than zero and greater than one, X_i , represent vector of the independent variables, β is vector of the unknown parameters, ε_i is vector of the error terms that are distribute normally with mean 0 and variance σ^2 and $i=1, 2, 3, \dots, n$ represents the number of observations.

If Y_i is the observed variable representing the proportion of produce commercialized, its value is censored from below at $L=0$ and from above at $U=1$. Thus, giving rise to equation (2)

$$\left\{ \begin{array}{l} Y_i = 0 \text{ if } Y_i^* \leq L \\ = Y_i^* \text{ if } L \leq Y_i^* \leq U \\ = 1 \text{ if } Y_i^* > U \end{array} \right\} \dots\dots\dots (2)$$

The expected value of the latent variable Y_i^* is given by equation (3)

$$E\left(\frac{Y_i^*}{X}\right) = \beta'X \dots\dots\dots (3)$$

The change in probability of accessing the market and proportion of crop commercialized through the group as an explanatory variable changes by a unit is given by equation (4)

$$\frac{\partial E(Y_i^*/X)}{\partial X_i} = \beta_i \dots\dots\dots (4)$$

As the values of the proportion of commercialized crop Y is truncated from below at 0 and from above at 1, its conditional expected value is given by equation (5)

$$E\left(\frac{Y}{X}, L < Y^* < U\right) = \beta X + \sigma \frac{\phi(Z_L) - \phi(Z_U)}{\Phi(Z_U) - \Phi(Z_L)} \dots\dots\dots (5)$$

Where, $Z_L = (L - \beta X)/\sigma$ and $Z_U = (U - \beta X)/\sigma$, $\phi(\cdot)$ and $\Phi(\cdot)$ are the density function and cumulative distribution of a standard normal variable respectively.

The Tobit coefficients however, do not directly give the marginal effects of the independent variables on the dependent variable. But their signs show the direction of change in probability and intensity of commercialization as the respective explanatory variable change (Amemiya, 1984; Maddala, 1985). The access to the market and groups' performance of a household could be affected by its socio-economic, social capital and institutional characteristics. The variables are hypothesized to affect the marketing performance of the households and the groups.

Tobit model specification

The Tobit model was used to determine the influence of social capital and institutional factors on the group's performance in enhancing market access. The Tobit model is specified as,

$$Y_i^* = \alpha + \beta_0 X_1 + \beta_1 X_2 + \beta_2 X_3 + \beta_3 X_4 + \dots\dots\dots + \beta_n X_n + \varepsilon \dots\dots\dots (6)$$

$$\text{Commercialization}(Y_i^*) = \alpha + \beta_1 \text{age} + \beta_2 \text{agesq} + \beta_3 \text{gender} + \beta_4 \text{Educ} + \beta_5 \text{H/Hsize} + \beta_6 \text{Exprnc} + \beta_7 \text{Yield} + \beta_8 \text{Dstncn} + \beta_9 \text{Trn sptcost} + \beta_{10} \text{Sellngprc} + \beta_{11} \text{Offincm} + \beta_{12} \text{Previncm} + \beta_{13} \text{Fqcymtngs} + \beta_{14} \text{GrpHetgnty} + \beta_{15} \text{Trust} + \beta_{16} \text{Grpdcnsn} + \beta_{17} \text{Grpsiz e} + \beta_{18} \text{Initialsocialk} + \beta_{18} \text{Dnstyofmrshp} + \varepsilon \dots\dots\dots (7)$$

3.3 Dimensions of social capital and measurements

The social capital dimensions used in this study include: heterogeneity index, membership density, meeting attendance index, decision making index and level of trust index.

Heterogeneity index: This variable is a dimension of structural social capital and was used to measure the degree of diversity in the group. The internal diversity of the groups was measured using several criteria, including; diversity in age group, income group, occupation, level of education, gender, and neighborhood connection. A weighted average score extracted and standardized as a factor score was used as the heterogeneity index. For each factor a Yes response was coded 0 while No response was coded 1. A minimum score of 0 represent the highest level of homogeneity, while a maximum of 6 represent the highest level of heterogeneity. The scores were divided by the maximum score of 6 and the multiplied by hundred to get the index.

Meeting attendance: Membership to an organization is of little value if one does not attend the group meetings (Grootaert, 1999). The frequency of meetings attendance index was measured by the average number of times a member of a household attend group meetings.

Decision making index (DMI): This index was measured by asking the members of the group to state how the decisions are made in their groups. Previous studies have shown that organizations that follow a democratic decision making pattern are more effective than those that do not. The members were also be asked to evaluate their level of participation in decision making, whether they are "very active" or "somewhat active" or "not

active”. The response was scaled from 3 to 1 respectively. Each response value was divided by the maximum score of 3 and then multiplied by 100 for each household to get the index

Density of membership index: It was measured by the number of organizations that each household belongs to. The households were asked to indicate the groups which had active membership.

Level of trust index: Trust is a cognitive social capital dimension and the index was used as a proxy to measure its existence and level in the group. The respondent was asked to rate (on a scale of 0 to 4) their trust on the farmer group, leaders, members, other groups and the export agents or contractors. A maximum score of 20 meant the highest level of trust, while a minimum of 0 represent the lowest trust level. The score was divided by the maximum score of 20 to get the index and then multiplied by 100. The index was expected to be positively (+) related to the performance of the group in terms of the members’ income level and the commercialization level.

Table 1: Variables used in the Tobit model

Variable Code	Variable	Measurement of the variable	Sign
Cmerclztn	Commercialization performance	Percentage (continuous)	+
Age	Age of the household head	Years (continuous)	+
Agesq	Age squared	Years (continuous)	-
Gender	Gender of the household head	1 =Male, 0= Female (Dummy)	-
Educ	Education level	Number of years in formal education (continuous)	+
H/Hsize	Household size	Number of members (continuous)	-
Dstnce	Distance to the collection point	Distance to the collection point or market (Km)	-
Transprtcost	Transport cost	Cost of transporting the produce in KES (continuous)	-
Yield	Yield of the crop	French bean output on kg (continuous)	+
Exprnce	Experience of the household	Numbers of years in French bean production and marketing (continuous)	+
Sellngpric	Selling price	Selling price of the output	+
Offincm	Off farm income	Proportion of off-farm income to the total household income (continuous)	-
Previncom	Previous income	Income from previous French bean sale(KES)	+
Fqcyntngs	Frequency of meetings	Number of meeting per month (discrete)	+
GrpHetgnty	Heterogeneity of groups	Differences within groups (Dummy 1=Heterogeneous, 0=Homogenous)	+
Descnmakngindx	Decision making in a group	Activeness in group decision making (Dummy)	+
Grpsize	Group size	Number of members in a group (continuous)	-
Dnstyofmrshp	Density of Group membership	Number of groups one is a member (continuous)	+/-
Initialsocialk	Initial social capital endowment	Number of people in the group the household member knew before joining the group(continuous)	+
Trstindx	Trust index of the members	Level of trusts among group members	+

4. Results and Discussion

4.1 Socio-economic characteristics of group and non group farmers

The results of gender and occupation of farmers are presented in Table 2. A large proportion of non group farmers (72%) were males while females constituted 28%. However, females were 37%, while males were 63% among group farmers. The chi square test indicates that gender was statistically significant at 5% implying that male headed households participate in French bean marketing. This is in line with Doss (2001) who observed that men are responsible for providing household income and as a result grow and export cash crops.

The land tenure system comprised of titled and untitled ownership. The result shows that 87% of group members had titles while 13% were untitled. Among the non group members, 73% had titles while 27% were without. Land ownership right plays an important role in joining farmer organizations and therefore influences the level of productivity and sales amongst the farmers. The chi square results confirmed that the difference between group and non group farmers in terms title deed ownership was significant 5% level.

Table 2: Household characteristics by farmer type (dummy variables)

Variables		Group		Non group		Chi ²
		Freq	%	Freq	%	
Gender	Female	35	36.84	22	27.84	5.590**
	Male	60	63.16	57	72.15	
Land tenure	With title	83	87.37	58	73.42	5.462**
	Without title	12	12.63	21	26.58	
Education level	Tertiary education	12	12.63	7	8.86	1.618
	High school	47	49.47	39	49.37	
	Primary school	33	34.74	32	40.51	
	No formal education	3	3.16	1	1.27	

** : significant at 5% level.

The result reveals that majority of the farmers had primary and secondary education, with 40% of non group farmers having completed primary school and 49% had completed secondary school. Similarly, 35% and 49% had completed primary and secondary education respectively among the group members. The number of group farmers who had tertiary education was higher (12%) than non group farmers (7%). The chi square results revealed that there was no significant difference between group and non group member in terms of education level. According to Makhura *et al.* (2001), human capital signified by formal education level of the household head improves their understanding of the market.

The results of household characteristics by farmer type are presented in Table 3. The aggregated mean age was 43 years, while the mean age of farmers in groups was 45 years and non group farmers 41 years. The t-test result show that age was significant at 5% revealing that farmers in groups had statistically higher mean age than the non group farmers. The farming households in the county can therefore be regarded as young and who according to Martey *et al.* (2012) belong to economically active group. The aggregate mean household size was 4 persons. However, the mean household size of non group farmers and group farmers was 4 and 5 persons respectively. The t-test results indicate that there was no significant difference between group and non group members in terms of the mean household size. Years of experience shows that the aggregate in French bean marketing was 9 years. Farmers in groups had more years of experience at 9.4 years while the non group farmers had experience of 8.6 years. The numbers of years the farmers have been living in Mwea sub-county was however found to be statistically significant at 5% level. Group and non group farmers were found to have lived in the area for an average of 32 years and 28 years respectively.

The distance to the market or the nearest collection point shows that farmers in groups covered an average of 0.85 kilometers, and non group farmers covered 0.48 kilometers. This explains why farmers who are further from collection points or market join groups. The t-test result indicates that there was a significant difference between non group and group members at 1% level in terms if distance to market. This implies that as distance to the market increases, the cost of transport increases and the tendency for collective action among the farmers improves.

The result of the selling price shows that the aggregate French beans' selling price was KES 47. There were differences in prices because group members sold their produce at a higher price of KES 49, while the non group farmers sold at KES 43. The t-test result at 1% level confirmed that there was strong significant difference between group and non group members' selling price. Higher selling price among farmer group members reveals the importance of collective action through farmer groups which increases the bargaining power of farmers in terms of output price.

Table 3: Household characteristics by farmer type (continuous variables)

Variable	Group		Non group		Aggregate Mean	T-test
	Mean	Std dev	Mean	Std dev		
Age	43.91	10.02	40.39	9.80	42.31	-2.327**
Household size	4.54	1.62	3.76	1.60	4.18	-3.120
Years in Mwea	32.38	13.87	28.19	13.11	30.48	-2.033**
Experience(years)	9.36	7.45	8.56	6.68	8.96	-0.747
Distance to market(Km)	0.84	0.82	0.48	0.88	0.68	-3.192***
Selling Price (KES)	49.46	6.53	43.34	16.56	46.68	-4.170***
Farm Income	144342.1	126355.8	136006.30	115406.10	140557.50	-0.462
Off-farm Income	70671.58	57110.37	78,465.82	66892.32	70721.84	0.855
Quantity harvested(Kg)	1359.00	1191.35	1382.73	1347.41	1370.87	0.225
Quantity sold(Kg)	1203.7	1125.79	1174.66	1158.96	1189.23	-0.168

*, **, ***: significant at 10%, 5% and 1% level respectively

The results of household incomes indicate that the aggregated mean annual farm income was KES 140,672. However, the non group farmers had a lower mean annual farm income of KES 136,006 compared to KES 144,552 obtained by farmers in groups. Though not significant, the result shows that farmers in groups had more incomes from their production than the non group members. However, the non group farmers had more off-farm income at KES 78,465 than the farmers in groups who had a mean annual off-farm income of KES 70,671. Off-farm income comprised of annual average income from business, employment and other incomes apart from the farm income. The result reveals the importance of off-farm income in influencing participation in farmer groups which is consistent with (Mathenge and Tschirley, 2007). The ratio between quantity sold and the quantity harvested are important in measuring the level of commercialization. The results indicate that the aggregate amount of French beans produced and sold were 1371kg and 1189kg respectively. Group farmers harvested 1359kg and sold 1204kg of their produce. Non group farmers on the other hand, had more quantity harvested (1383kg) but sold a smaller quantity (1175kg).

4.2 Social capital dimensions

The result of social capital dimensions among farmer group members is presented in Table 4. The level of heterogeneity shows a high level of diversity among the group members with a mean heterogeneity index of 93.33 percent. The farmer groups' members were heterogeneous in terms age, gender, wealth, education level, occupation and neighbourliness. The level of trust among the group members was measured in terms of how much they trust the group, leaders, marketing agents and contractors, fellow farmers and members of other groups. The trust level index was high at 68.95 percent indicating a higher level of trust in the groups.

Table 4: Summary statistics of social capital dimensions

Social capital dimensions	N	Min	Max	Mean	Std Dev.
Heterogeneity index	95	0.5	1	0.874	0.143
Meeting attendance index	95	0	1	0.795	0.287
Trust level index	95	0.15	1	0.689	0.223
Density of membership	95	1	3	1.35	0.56
Decision making index	95	0	1	0.674	0.42

Source: Survey data (2014)

The meeting attendance index shows that on average, group members attended scheduled group meetings per month with a 79.47 percent attendance index. According to Grootaert (1999) several activities occur during group meetings, including, training on group operations, farming and marketing skills, importance of group solidarity and the sharing of other important information. The density of membership results show that each household belonged to an average of one (1) farmer group with a maximum membership being three (3) groups and associations. Lastly, the decision making index shows that members' participation in group decision making was above average at 67.36 percent indicating a high level of activity among group members.

4.3 Factors influencing farmer groups' performance in French bean commercialization.

Tobit regression analysis in Table 5 was utilized to determine the factors that influence groups' performance in accessing the market, measured in terms of commercialization level. The marginal effects (presented in the table as $\delta y/\delta x$) of the variables were used to interpret and discuss the results. The marginal effects outcome reveals that the extent of commercialization of French beans by smallholder farmers is significantly determined by gender, age of household head, education level, experience of the household head, quantity of the output, transport cost, off-farm income, previous French bean income, trust index and meeting attendance index.

As hypothesized, gender of the household head was significant but influenced the commercialization level negatively at 10% level. The result implies that change from male headed to female-headed household decreases the probability of a higher commercialization rate in the French beans market by 28%, all other factors held constant. This finding suggest that male-headed households are more market oriented than female and thus participate more in cash crop production and marketing like French beans. The finding agree with the observation by Sigei *et al.*, (2013) that men are usually more mobile and have networks that enhances market information sharing while women are more engaged in household chores and production subsistence crops.

Age as expected had a positive influence on the commercialization level. However, the regression result indicates that age squared is negatively significant. The quadratic term, age squared which captures the nonlinearity between the age and commercialization was significant at 1% level, implying that French bean commercialization increases with an increase in age of the household head up to a point where a further increase in age by one year reduces the household commercialization 2%. This implies that older household heads are less likely to increase the sales for French beans. This result agrees with the findings of Arega *et al.*, (2007); Anete *et al.*, (2009) and Sigei *et al.*, (2013) who stated that market participation increases with age up to a point at which it starts declining with increase in age of the household head. Akinlade *et al.*, (2013) argues that at intermediate ages, market participation increases with age but declines as the age of the household head advances.

The cost of transport was significant at 10% and carried a negative sign. As hypothesized, this result implies that the higher the cost of transport, the lower the commercialization level. A unit increase in the transport cost leads to a 0.5% decrease in commercialization level. High transportation costs imply increased transaction costs that limit households' involvement in French bean production, and promote them to give priority to subsistence crops, thus reducing commercialization (Pingali *et al.*, 2005).

Table 5: Tobit marginal effects ($\delta y/\delta x$) regression outcome on factors influencing French beans commercialization.

Variables	$\delta y/\delta x$	Std. Error	Z	P> z
Gender(*)	-0.281*	0.158	-1.78	0.074
Age	1.921**	0.798	2.41	0.016
Age squared	-0.022***	0.008	-2.62	0.009
Household size	-0.489	0.598	-0.82	0.414
Education level squared	0.049***	0.016	3.15	0.002
Experience	0.303**	0.140	2.16	0.031
Yield	0.043***	0.003	14.01	0.000
Ln Distance to market	-0.129	1.093	-0.12	0.906
Transport cost	-0.005*	0.003	-1.80	0.072
Selling price	0.192	0.155	1.24	0.215
Off-farm income	-0.263**	0.105	-2.55	0.011
Previous income	0.200***	0.055	3.66	0.000
Group size	-0.002	0.006	-0.28	0.782
Initial social capital	0.081**	0.033	2.44	0.015
Heterogeneity Index	0.044	0.060	0.74	0.460
Trust Index	0.082**	0.037	2.20	0.028
Meeting Attendance Index (MAI)	0.065**	0.032	2.03	0.042
Decision making Index (DMI)	0.015	0.020	0.72	0.473
Density of membership	-1.400	1.241	-1.13	0.259

(*) $\delta y/\delta x$ is for discrete change of dummy variable from 0 to 1

*, **, ***: significant at 10%, 5% and 1% level respectively.

Years of education positively influenced French beans commercialization. A unit increase in the year of education of the household heads leads to increased commercialization of their French bean produce by 4.9%. French beans being a high value export crop, education is important among farmers to understand the GlobalGap requirements in production and marketing. These findings confirm those of Gegremedhin and Jaleta (2010) who stated that education level increases human capital and their managerial skills which promote commercialization. Simonyan *et al.*, (2009) also found education to be significant in augmenting farmers' ability in making important decisions.

Households with higher proportion of off-farm income are less probable to increase the sale of French beans. The level of French bean commercialization decreases by 26% for each additional unit of off-farm income as a proportion of the total household income. The result implies that households that have higher off-farm income often diversify to other activities. This finding corroborates with the argument of Martey *et al.* (2012) who stated that income earned from off-farm engagement is not invested in farm technology and other farm developments but often diversified. The result is also consistent with the finding by Alene *et al.* (2008) and Omiti *et al.* (2009).

Experience of the household head in French bean production and marketing was positively significant at 5% level with the French bean sales. For each additional year of farming experience by the household head, the proportion of French bean sold increases by 30%. French bean production is labour intensive and requires a lot of technical skills; therefore, experience of the household head ensures better production and marketing decisions. This finding is in line with argument by Martey *et al.*, (2012) who argued that experienced household heads have greater contacts which allow trading opportunities to be discovered at a lower cost, thus reducing the transaction costs.

The regression results show that the quantity of French beans produced is associated with a higher extent of French bean sales. An additional kilogram of French beans produced leads to a 4% increase in the extent of commercialization. According to Martey *et al.*, (2012), household with surplus of crops produced sell a higher

proportion of the output. The findings of Barrett (2007) and Omiti *et al.* (2009) are also supported by these results. The findings of Tadesse (2011), that avocado and mango quantities had significant and positive effect on marketable supply in Gomma Woreda, Ethiopia also confirm these results.

Heterogeneity index, though not significant was positive as expected in influencing commercialization. This finding is in line with Grootaert (1999), Shiferaw *et al.* (2006), Wambugu (2009) and Akinlade *et al.* (2013) who found that more heterogeneous producer organizations perform better than the homogeneous ones. This is due to diversity in the group which helps in problem solving, ideas generation, sharing of skills and negotiation. Group diversity enhances collective action by creating a need to learn from one another. However, this finding is not consistent with Nagarayan *et al.* (1999) who found that homogenous organizations perform better.

The results also indicate that trust level index positively influence the mean level of commercialization. A unit increase in the level of trust level increased the commercialization by 8.2%. Pretty and Smith (2004) state that trust reduces transaction cost between actors and therefore releases resources (time and money). When farmers enter into contracts with export agents they trust, the cost of bargaining and risk factor are reduced and thus creating trustworthy arrangements. Increase in trust index therefore leads to increased market participation which in turn increases the commercialization level. This finding is however in contrast to those of Wambugu (2009) who found a negative relationship between organization's trust index and the commercialization level.

Results also reveal that the group's size affects performance. Though not significant, the negative sign imply that as the organization's size increase the commercialization level declines. This is in line with the findings of Leather *et al.*, (2001) who found that smaller groups perform better than large ones. According to the finding of Fisher and Quam (2011), group size negatively influences the quantity of sales because of the difficulties in monitoring and less social ties which becomes an incentive or side-selling. This is because they are able to deal with challenges faced easily without complexities.

Initial social capital endowment had a positive significant influence on the level of commercialization. The result indicates that an increase in the initial social capital endowment by one person leads to an increase in the level of commercialization by 8%. This variable was measured in terms the number of people who are in the farmer group that the household was interacting with before joining the group. According to Katungi *et al.* (2007), farmers' aversion to risk reduces as the number of friends and relatives and thus enhancing the household's willingness to participate in organizations. Initial social capital endowment therefore increases the chance of information access and trust among the group members.

5. Conclusion and recommendation

The findings of the study revealed that household socio-economic characteristics, institutional factors and the social capital dimensions influence the performance of farmer groups in terms of extent of French beans commercialization. Specifically, the findings indicated that age, years of education, farming experience, yield, previous French bean income, initial social capital, trust index and meeting attendance index had a positive influence on the level of commercialization among the French bean farming households. The positive influence of social capital indicators gives the importance of these variables in commercialization of French beans.

Based on the results of the study, social capital dimensions and group marketing were found to have a greater potential in increasing commercialization through collective action. The study therefore, recommends that the government and other policy makers should take a pro-active role in facilitating the formation of farmer groups and training them on marketing related activities in addition to good agricultural practices. The government and other stakeholders should increase the French bean farmers' marketing knowledge and skills through capacity building, extension services and mass media.

Further, the study recommends that for a holistic French bean commercialization to be realized, proper market infrastructure and well defined institutional issues must be put in place. To improve the French bean commercialization among farmers there is a need to focus on facilitating female head participation in the market since they are more willing to join and actively participate in groups. Provision of information regarding the market and training especially on GlobalGap standards enhances more productivity of farmers especially the less commercialized female farmers

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7. References

- Agwu, N., Anyanwu, C. and Mendie, E. (2012). Determinants of Commercialization among Small Holder Farmers in Abia State, Nigeria. *Greener Journal of Agricultural Sciences*, 2(8): 392-397.
- Akinlade, R., Balogun, O. and Obisesan, A. (2013). Commercialization of urban farming: the case of vegetable farmers in southwest Nigeria. *Paper presented at the 4th International Conference of the African Association of Agricultural Economists, September 22-25, 2013, Hammamet, Tunisia.*
- Alene, A., Manyong, V., Omany, G., Mignouna, H., Bokanga, M. and Odhiambo G. (2008). Smallholder market participation under transactions costs: Maize supply and fertilizer demand in Kenya. *Food Policy*, 33(4): 318-328.
- Amemiya, T. (1984). Tobit model: a survey. *Journal of Econometrics*, 24: 3-63.
- Anete, A., & Igbokwe, E. (2009). Cassava Market Participation Decision of Households in Africa. *Tropicultura*, 27(3), 129-136.
- Barrett, C. (2007). Smallholder market participation: Concepts and evidence from eastern and southern Africa. *Food Policy*, 33(4), 299-317.
- Coleman, J. S. (1990). *Foundations of Social Theory*. Harvard University press.
- Fisher, E. and Qaim, M. (2011). Linking Smallholders to Markets: Determinants and Impacts of Farmer Collective Action in Kenya. *World Development Journal*, 40(6): 1255-1268.
- Gebremedhin, G., & Jaleta, M. (2010). *Commercialization of smallholders: Does market orientation translate into market participation?* (No. 22). ILRI (aka ILCA and ILRAD).
- Government of Kenya (GoK) (2009). *Population and Housing Census*. Kenya National Bureau of Statistics, 2009.
- Grootaert, C. (1999). Social Capital, Household Welfare and Poverty in Indonesia. *World Bank Policy Research Working Paper*, (2148).
- Gujarati, N. (2004). *Basic Econometrics* (4th Edition). New York: Mc-Graw Hill Publishing Company.
- Halkos, G. E. and Jones, N. (2012). Modeling the effect of social factors on improving biodiversity protection. *Ecological Economics*, 78: 90-99.
- Katungi, E., Machethe, C. and Smale, M. (2007). Determinants of Social Capital formation in Rural Uganda: Implications for group-based agricultural extension approaches. *African Journal of Agricultural and Resource Economics*, 1(2): 167-190.
- Katungi, E., Edmeades, S. and Smale, M. (2008). Gender, Social Capital and Information Exchange in Rural Uganda. *Journal of International Development*, 20(1): 35-52.
- Leathers, H., Bastelaer, T., Bell, S. and Musona, D. (2001). Determinants of Success in Farmer Groups: Evidence from Seed Groups in Zambia's Southern Province. Mimeo. *College Park. Center for Institutional Reform and the Informal Sector (IRIS)*.
- Maddala, G. S. (1985). *Limited-Dependent and Qualitative Variables in Econometrics* (No. 3). Cambridge University Press.
- Martey, E., Al-Hassan, R. and Kuwornu, J. (2012). Commercialization of Smallholder Agriculture in Ghana: A Tobit regression analysis. *African Journal of Agricultural Research*, 7(14): 2131-2141.
- Mbithi, I. (2008). African experience with strategic export development: The success story of Kenya's horticultural industry. World Bank workshop. University of Pretoria.
- Minot, N. and Ngigi, M. (2004). *Are horticultural Exports a Replicable Success Story? Evidence from Kenya and Cote d'ivoire*. International Food Policy and Research Institute.
- Nagarajan, G., Meyer, L. and Graham, H. (1999). Does Membership Homogeneity Matter For Group Based Financial Services? Evidence from Gambia. *African Development Review*, 11(1): 87-102.
- Narayan, D. and Pritchett, L. (1999). Cents and Sociability: Household Income and Social Capital in Rural Tanzania. *Economic Development and Cultural Change*, 47(4): 871-897.
- Omiti, J., Otieno, D., Nyanamba, T. and McCullough, E. (2009). Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya. *African Journal of Agricultural and Resource Economics*, 3(1): 57-82.

Ondieki-Mwaura, F. N., Njoroge, L. M., Okello, J. J. and Bahemuka, J. M. (2013). Determinants of participation in identified institutional arrangements in Kenya's export French bean sector. In *A paper presented at the 4th International Conference of the African Association of Agricultural Economists, Hammamet, Tunisia*.

Pingali, P., Khwaja, Y. and Meijer, M. (2005). Commercializing small farmers: Reducing transaction costs. *The Future of Small Farms*, 61.

Poulton, C., Dorward, A. and Kydd, J. (2010). The future of small farms: New directions for services, institutions, and intermediation. *World Development*, 38(10): 1413–1428.

Pretty, J. and Smith, D. (2004). Social capital in biodiversity conservation and management. *Conservation Biology*, 18: 631-638.

Shiferaw, B., Obare, G. and Moricho, G. (2006). Rural institutions and producer organizations in imperfect markets: Experiences from producer marketing groups in semi-arid Eastern Kenya. *Journal of SAT Agricultural Research*, 2(1): 1-41.

Sigei, G., Bett, H., Kibet, K. and Mutai, C. (2013). Determinants of market participation among small-scale pineapple farmers in Kericho County, Kenya. *Journal of Economics and Sustainable Development*, 4(19): 59-66.

Simonyan, J., Olukosi, J. and Omolehin, R. (2010). Socio-economic determinants of farmer's participation in Fadama II project in Kaduna state, Nigeria. *Journal of food and Fiber Production*, 3(1): 592-601.

Tadesse, A. (2011). Market chain analysis of fruit for GommaWoreda, Jimma Zone, Oromia Regional State. *An msc. thesis presented to school of graduate studies of Haramaya University*.

Udry, C. and Conley, T. G. (2006). *Social Networks in Ghana*. University of Ghana. Legon: ISSER.

Wambugu, K., Okello, J. and Nyikal, A. (2009). Effect of social capital on performance of smallholder producer organizations: the case of groundnut growers in Western Kenya. In *A contributed paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, China*.

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