DETERMINANTS OF SMALL SCALE HORTICULTURE FARMERS' DECISION TO JOIN FARMER BASED ORGANIZATIONS IN NANDI COUNTY, KENYA

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Abstract

The main objective of the study was to establish the determinants of Small Scale Horticulture Farmers' Decision to join farmer based organizations in Nandi County, Kenya. A descriptive research design was employed and a sample of 120 respondents was randomly selected. Awell-structured questionnaire was used as the main data collection tool. Chi-square test and logistic regression were used to establish relationships. The study found out that the level of horticultural FBO membership in Nandi County is very low at 23.27%. The findings showed that education level and marital status, gender and size of farm under horticultural cultivation were significant determinants of small scale horticultural farmer's decision to join farmer based organizations. The study recommended that there is need to sensitize farmers on the benefits of FBO membership. The government also needs to come up with programmes that would provide information and train farmers in forming successful FBO's.

Keywords: Farmer Based Organizations, Horticulture, Decision, Small Scale Farmers

INTRODUCTION

Farmer based organizations (FBOs) now increasingly voice the needs of their members in various fora on policy-making and orienting service provision. They are solicited by the private sector to enhance chain development, including those for new markets, and they play a role in local development planning. FBOs are now more than ever, actively involved in agricultural development, which requires institutional, organizational and technological innovation in order to be successful. Providing user-oriented research, extension and training services is therefore a prerequisite for technological innovation. Institutionalizing participatory methods, decentralizing services, creating multi-actor platforms, and multi-stakeholder driven funding mechanisms all enhance demand-driven agricultural services (Sefa and Sarpong, 2011),

Research findings have shown that small-scale farmers who produce fruits and vegetables earn more than those who produce cereals. Weinberger and Lumpkin 2007 found out that in Kenya net incomes of small-scale farmers of horticulture products for exports were five times higher than those of farmers that did not produce horticulture products. The potential to increase income, lies in the fact that horticultural production shifts resources from low value crops to high value ones, and hence increases the returns that small-scale farmers get. The dominance of small-scale farmers in non-traditional horticulture production presents an opportunity for making an impact on poverty reduction efforts, especially if smallholder farmers are themselves directly linked to high-value export markets. The potential for poverty reduction through horticulture production lies in the fact that it increases income (through high-value crops), and it also generates employment (through production and processing of crops and fruits) (Weinberger and Lumpkin, 2007).

Vertical coordination through contract farming and horizontal coordination through the formation of farmer groups often work best together, with farmer groups contracting with companies that supply them with a range of services, within a suitable framework such as an out-grower model. Contract farming involving farmer groups increases access to new market opportunities. When dealing with a purchasing company, the negotiating strength of a farmer group is greater than that of its constituent individual members. Companies prefer working with farmer groups because group liability for credit reduces lending risks, while economies of scale reduce transaction costs (FAO, 2008).

FAO (2008), observes that in order for a company to contract small-scale fruit and vegetable growers in a particular setting, extension agencies, NGOs, development agencies or the company itself should assist growers in forming a group if one does not exist or assist in improving the cohesiveness of existing groups (e.g. by training growers on group forming skills, formally registering the group and providing literacy and numeracy training). Small-scale

growers are better placed to deal with exporters, supermarkets and other larger companies when they coordinate among themselves within such a group. A group can better comply with contractual requirements of the company than its individual members, and serves as a convenient organizational unit around which the company can coordinate procurement of produce and provide inputs, credit and technical assistance to the growers.

Problem Formulation

In recent times, governments of most developing countries have been promoting the formation and development of farmer based organizations as one of the keys to more rapid diffusion and cost effective extension delivery to farmers. This is premised on the assumption that small-scale farmers can have easy access to market information, credit and input for their production, processing, and marketing activities by joining farmer based organizations. However, Asante et al (2011), found out that despite such observed benefits, some farmers are not members of farmer based organizations. They observed further that some FBOs survive in only certain seasons hampering the efforts of the agents and export companies who suffer from fluctuating supplies. In Kenya a huge export potential for fruits and nuts remains untapped and production of horticultural crops of importance to the pharmaceutical, health, nutrition and confectionery industries remains largely unexploited. Increased membership in horticulture FBOs will result in sustainable production in the horticulture sector both for local consumption and for export. FBO as a strategy of creating income among small scale horticulture farmers has not been embraced in Nandi County. There is no existing literature explaining this situation. This study aimed to establish the level of membership and the determinants of farmers' decision to join an FBO among small scale horticulture farmers in Nandi County, Rift Valley province in Kenya.
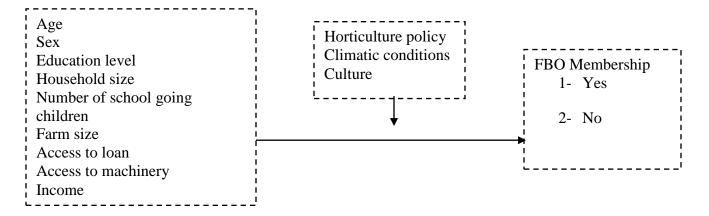
THEORETICAL FRAMEWORK

The Cooperative Theory

Helmberger and Hoos (1962) use the neo-classical theory of the firm to develop short run and long run models of a cooperative (including behavioural relations and positions of equilibrium for a cooperative and its members under different sets of assumptions) using traditional marginal analysis. In their model, the cooperative's optimization objective is to maximize benefits to members by maximizing "the per unit value or average price by distributing all earnings back to members in proportion to their patronage volume or use". Sexton (1988) regards this "landmark" paper so highly because (1) the (correct) analysis of cooperative and member behaviour is based on a clear set of assumptions; (2) the model clearly distinguishes between short and long-run behaviour in a cooperative; and (3) based on these characteristics, the model set the

stage for further advances in cooperative theory in the 1970s and 1980s. Torgerson et al. (1998) contend that Emelianoff (1942) made a major contribution to understanding the internal economics of cooperatives with his conception of the cooperative as a form of vertical integration, and his focus on the structural and functional relationships of members (the principals) to their cooperative marketing organization (the agent). His model was later refined by Robotka (1947), Phillips (1953) and Aresvik (1955).There have been various debates on whether a cooperative enterprise should be treated as a firm (a decision-making entity), as Helmberger and Hoos (1962) did, or as an organization (aggregation) of economic units (members).

Figure 1: Conceptual Framework

EMPIRICAL REVIEW

Several research works have found a negative relationship between age and decision to join or adopt (Gockowski and Ndoumbe, 2004; McBride and Daberkow, 2003; and Gamba et al., 2002). The hypothesis here is that the use of farm information sources decreases with increase in age of farmers, which means that young farmers are more alert to obtaining information from sources that discuss several ways of improving their vocation than older farmers which they believe will have access to such varying sources by joining FBOs. In addition, past experiences of older farmers could make them complacent thus discouraging them from joining the FBOs.

Many researchers have found a positive relationship between decision to join farmer groups and access to credit (Nzomoi et al.2007; Mussei et al., 2001; Grigoryan et al., 2002; Negatu and Parikh, 1999). The hypothesis is that credit enables farmers, even those in low-income groups, to overcome their financial constraint and adopt innovations involving some cost. Most financial institutions do not lend to farmers because of the risky nature of farming, and even those who do, will demand for collaterals which the farmers cannot afford individually.

Financial institutions however prefer to lend to farmers in groups. Hence, access to credit is expected to have a positive effect on farmers' decision to join FBOs. Access to farm machinery has a positive effect on farmers' decision to join FBOs (Sabates-Wheeler, 2002; Grigoryan et al.2002*).* The implication is that, the cost of agricultural machinery especially tractor and other implement is so high that the small scale farmer cannot afford to purchase outright. However, as a group, farmers can acquire these equipment since suppliers ofthese equipment will be more willing to give to a group rather than an individual small holder farmer.

Farmers who take farming as their primary occupation may tend to concentrate most of their efforts into it hence are more likely to join FBOs (Asante & Sarpong 2011).

Several researchers have found a positive relationship between farm size and decision to join or adopt (Adimado, 2001; Kheralla et al., 2001; Langyintuo and Mekuria, 2005). The hypothesis here is that farmers with larger cultivated areas mostly cultivate for commercial purposes and will tend to be interested in issues that concerns their farming activities and will lead to increased yield and income. In addition, by joining FBOs, itwill enable them to receive some support such as access to credit, extension services market information, etc. Other studies such as Mussei et al. (2001), and Gockowski and Ndoumbe (2004) found a negative relationship between farm size and decision to join or adopt. The coefficient of this variable can be either positive or negative.

Some researchers have found a negative relationship between non farm income and decision to join a farmer group or adopt a given technology (Feder et al., 1985; Mussei et al., 2001; Krishnaand Qaim, 2006). The hypothesis is that farmers with higher nonfarm incomes tend to concentrate less of their time and efforts in farming activities and thus, will be less likely to join farmer groups but rather, other groups that are not farmer based. Thus the coefficient of non-farm income was found to be negative.

As farmers' age increases the benefit obtained from joining an FBO also increases. However, farmers with age above 51 years showed a negative relationship according to a research by Asante and Sarpong (2011). The implication here is that at age above 51, as farmers' age increases, the benefit obtained from joining decreases. The implication here is that as age increases, the benefit obtained by joining and the likelihood of joining increases until age group 5 (51 to 61) where the benefit and the likelihood of becoming a member of an FBO begins to decrease. These findings are also quite consistent with those of McBride and Daberkow (2003), who found that increasing operator age decreases the likelihood of implementing precision farming technologies in the United Statesof America. Ayamga (2006) also found that as age increases, the probability of a farmer to participate in microcredit programmes in Northern Ghana, decrease.

According to him, the chances of older people being considered for credit are low, and are due to the low probability of success, coupled with the high risk of default. Again, their experiences sometimes make them feel complacent and thus impinge on their decision to participate in microcredit programmes. Gockowski andNdoumbe (2004) in their study of the decision to implement intensive mono-crop horticulture in Southern Cameroon also found that the age of the household head had a significant negative and elastic effect on adoption decisions Gamba et al. (2002) also confirmed these findings when they studied wheat farmers' seed management and varietal adoption in Kenya.

Farmers' past negative experiences with an FBO or complacent of whatever knowledge they would obtain from becoming members of the FBO could account for this finding. It is therefore important for policies that seek to foster farmer group formation to be targeted at young farmers who are at least below the age of 51 years because, such farmers are very active and are highly interested in group formation than those beyond 51 years.

Farm size of the respondents had the expected positive sign, was significant and elastic (Table 5). Increasing a farmer's farm size by one acre increases the likelihood of joining an FBO by 40.4%. Most researchers have found a positive relationship between farm size and decision to join FBOs (Adimado, 2001; and Kheralla et al., 2001).The implication here is that farmers with larger farm sizes will tend to require more support in terms of marketing, pricing, and inputs, than their counterparts with smaller farm sizes hence, will want to join FBO or other associations which provide social capital.

According to Asante and Sarpong (2011), access to loans/credit had the expected positive sign and was highly significant. Access to credit relaxes the financial constraint and this helps farmers to diversify their portfolio. Thus, in the absence of non-farm income, farmers with access to credit can equally engage in farming activities that require financial expenditure.

Getting access to credit increases a farmer's likelihood of joining an FBO by 99.1%. This compares well with Nzomoi et al. (2007) who found a positive relationship between access to credit and the decision to adopt a given technology in horticultural export produce in Kenya and also with Mussei et al. (2001), who found out that access to credit, had a positive influence on small-scale farmers' decision to adopt improved wheat technologies in Tanzania. The implication is that farmers are financially empowered if they have access to credit or loan and they are able to improve their productivity levels as well as their income via access to credit through the FBO which tends to increase the likelihood of becoming a member of an FBO. This is very important because it implies that when formulating policies that promotes group formation to ensure a cost effective extension delivery, The Ministry of Food and Agriculture and other relevant stakeholder should incorporate credit facilities as part of the package (Asante &

Sarpong 2011). This will increase small scale farmers' access to certain production inputs which they were not able to afford, which will in turn, result in increased production, yield, and incomes of resource poor farmers.

Access to machinery services has a significantly positive inelastic effect on farmers' decision to join (Asante & Sarpong, 2011). Increasing the farmers' access to machinery services increases the likelihood of joining farmer based organizations by 96.7 percent. Farmers are more likely to join an FBO when they have access to machinery services for their farming activities. This is because most of the small scale farmers in the municipality cannot afford the cost of farm machinery and other implements such as tractors, ploughs and harrows. Lack of access to farm machinery and its timely supply has a major influence on the yields of farmers and their ability to increase production. Dealers in this equipment will however be more comfortable selling it to organizations (farmer based organizations) than individuals. In order to raise the incomes of small scale farmers and since they cannot individually afford to out rightly purchase this equipment, it is therefore imperative for policy makers, NGOs and other stakeholders to encourage group formation among farmers in order to enable them access this farm equipment.

Farmers' income has an expected positive sign and is highly significant. Asante and Sarpong (2011) observed that increasing farmers' income by one Ghana cedi increases the likelihood of joining FBOs by0.026%. This means that farmers with higher incomes are more likely to join farmer based organizations than their counterparts with lower incomes. Joining FBO's comes with some financial commitments in the form of payment of dues and making of some contributions. Fulfilling these commitments is sometimes difficult for some small scale farmers because they cannot afford it. As a result, only those with higher incomes and can afford, tend to join the FBOs.

Despite the fact that extensive literature has observed that small scale horticulture farmers are constrained financially and that availability of such facilities through FBOs in accessing credit would increase productivity, there are cases where other factors play a role in farmers' FBO membership decision. This study sought to establish determinants of Small Scale Horticulture Farmers' decision to join Farmer Based Organizations in Nandi County, Rift Valley County in Kenya.

RESEARCH METHOD

The study employed a descriptive survey design. According to Kothari (2004), a survey is a systematic method which involves collecting relevant data and subsequently describing the behavior of a subject without manipulating it in any way or arranging for events to happen. This

study was conducted in the Nandi County of Rift Valley Province in Kenya. There were about600 farmers engaged in horticultural production in the county who were mainly into production, marketing and processing of their produce. Some of the farmers were distributed in 23 FBO's operating in the county. The Fisher's formula was used in the calculation of the sample size of 120 farmers. A well-structured questionnaire was used as the main data collection tool. An interview schedule was also used to collect information from the key informants with regard to the study subject. It consisted of variables like respondents' age, level of education, household size, primary occupation, access to credit, machinery services, farm income, and non-farm income and number of school going children.

The study adopted the probit model partly because of its ability to constrain the utility value of the decision to join variable to lie within 0 and 1, and its ability to resolve the problem of heteroscedasticity. Socio-economic attributes were identified and hypothesis constructed regarding the individual's decision to join an FBO. The socio-economic factors either had a bearing on the individual (farmer), or on the FBO, or hence, associated policies. The variables included age, gender (sex), level of education, access to loans/credit, access to machinery services, household size, farming as a major occupation, access to extension services, experience, and farm size. Following from Madala (2005), the Logistic regression model adopted for the study is specified as:

$Y_i = \beta_0 + \beta_1(AGE_1) + \beta_2(AGE_2) + \beta_3(SEX) + \beta_4(OCCU) + \beta_5(HHSIZE) + \beta_6(FRMSZE) + \beta_7(LOAN) + \beta_8(MACHN) + \beta_9(EDUC) + \beta_{10}(NONFINC) + \beta_{11}(FINCM) + \varepsilon$

Where:

β_0: The intercept of equation

β_i: Coefficients of Xi variables i= 1, 2…………………..,10

AGE; age, SEX; gender (sex), EDUC; level of education, LOAN; access to loans/credit

MACHN; access to machinery services, HHSIZE; household size, OCCU; farming as a major occupation, NONFIN; access to extension services, INCOME ε: The error term

The dependent variable was the farmers' decision to join an FBO or otherwise, and taking the value of 1 if the farmer joined the FBO and 0 if he/she did not.

ANALYSIS AND FINDINGS

Among the 120 small scale farmers studied, 92(76.7%) were male and 57(47.5%) were aged between 31-40 years. Majority 87(72.5%) were married and slightly more than half 63(52.5%) had primary level of education (table 4.1). Hundred and ten (94%) reported farming as their primary occupation and the mean household size, farm size and size of farm under horticulture cultivation (hectares) were 6.4(2, 22), 1.9(0.2, 8) and 0.2(0.03, 1).
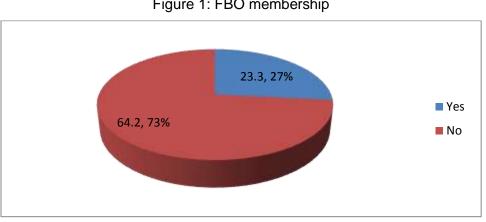
Table 1: Socio-demographic characteristics

Characteristics	n (%)
Gender	
Male	92(76.7)
Female	28(23.3)
Age	
<20	2(1.7)
20-30	26(21.7)
31-40	57(47.5)
41-50	24(20)
51-60	6(5)
>60	5(4.2)
Marital status	
Single	19(15.8)
Married	87(72.5)
Divorced	3(2.5)
Widowed	11(9.2)
Education level	
None	6(5)
Primary	63(52.5)
Secondary	40(33.3)
Diploma	11(9.2)
Gender of h/hold head	
Male	105(87.5)
Female	15(12.5)

FBO Membership

The level of horticultural FBO membership in Nandi County is very low at 23.27%. Many small scale farmers are still left out of reach of benefits from support that requires mandatory FBO membership.
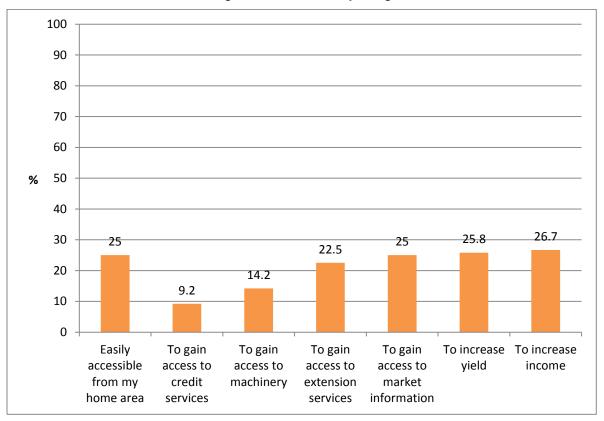
Figure 1: FBO membership

Reasons for joining FBOs

The respondents were requested to give reasons as to why they prefer or intend to join FBOs. As indicated in figure 4.1.2, 11(9.2%) reported joing FBO to access credit services, 27(22.5%) to gain access to extension services while 30(25%) to gain access to market information.26% of the respondents reported that the intended to increase income.

Figure 2: Reason for joining FBO

Logistic regression of determinants of belonging to a farmer based organization

As indicated in table 3, taking into account education level and marital status, gender and size of farm under horticultural cultivation were significant determinants of small scale horticultural farmer's decision to join farmer based organizations (P=0.020 and P<0.001) respectively. Male were almost 15 times more likely to belong to farmer based organization compared to females (OR: 95%CI; 14.697: 1.527-141.497). A unit increase in the farm size under horticultural cultivation increase chances of belonging to a farmer based organization (OR: 95% CI; 85.315: 9.243-787.504).

Table 2: Logistic regression of determinants of belonging to a farmer based organization

Variable	B	S.E.	Wald	Sig.	OR	95.0% C.I for OR	
						Lower	Upper
Gender(Male)	2.688	1.155	5.411	.020	14.697	1.527	141.497
Education(<=Primary)	-.571	.550	1.081	.299	.565	.192	1.659
Farm size under hort	4.446	1.134	15.375	.000	85.315	9.243	787.504
Marital(Single)	.455	.645	.498	.480	1.577	.445	5.582
Constant	-4.931	1.373	12.894	.000	.007		

In African social setting, males as usually seen as heads of households and their influence on household decisions is very significant. In Nandi County, males (76.6%) were more likely to join FBOS as compared to females (23.3%). Culturally, land ownership is tied to social and economic responsibility which is expressed through marriage ,gender equity, despite the fact that gender sensitivity and women empowerment is gaining root at low level with 23.3% female land ownership in Nandi county.

Majority of the farmers in Nandi County, 94% rely on farming as their primary occupation. However, this over reliance on farming has resulted in small farms with a mean of 2 ha and by extension very small proportion of land reserved for horticultural farming (0.2 ha). This means that farmers in Nandi County utilize about 10% of their available land for horticultural production. Farmers who take farming as their primary occupation may tent to concentrate most of their efforts into it hence more likely to join FBOS. The level of education of the respondents had a significant positive influence on the decision to join an FBO. A person with formal education is expected to have adequate knowledge on the importance of belonging to an association and thus more likely to join FBOS. However in Nandi county Secondary, tertiary level farmers were 0.571 times unlikely to join FBO as they are more exposed to knowledge than those at primary level. The mean household number was 6 (six) among the respondents. Large households spend more on food and other needs (Asante et al, 2011). The higher expenditure associated with larger household sizes tend to make more resource constrained and hence the need for external support. Thus increase in household, increase the tendency of the household to join FBOS. The use of farm information sources decreases with increase in age of farmers which means that young farmers are more alert to obtaining information from sources that discusses several ways of improving their vocation than older farmers which they believe will have access to such varying sources by joining FBOS (Asante et al, 2011) In addition, past experiences of older farmers could make them reluctant, discouraging them from joining the FBOS.

CONCLUSION AND RECOMMENDATIONS

It's important to note that FBOs can fulfill several roles, provide services and enhance successful innovation in transforming agricultural sector. The study indicates that there are a number of factors influencing the decision of farmers to join FBO. Among these factors include, age, gender, farm size under horticulture cultivation, access to credit, access to machinery and income. Credit will enable farmers to increase production and output as well as income hence becoming better off than not joining FBOs. Machinery or technology will enable farmers to timely plant to coincide with onset of rains to increase produce yields, with high quality produce to enhance better returns and increased incomes. Hence policy makers in FBOS and stakeholders should place more emphasis on these factors when designing programmes geared towards getting more farmers to join farmer based organizations in Kenya and Nandi County in particular.

The concept of FBO membership among horticulture farmers in Nandi County is still low. There is need to sensitize farmers on the benefits of FBO membership. The government needs to come up with programmes that would provide information and train farmers in forming successful FBO's.

Farmers have different reasons for joining FBOs. Export companies which choose to work with farmers need to form groups solely for horticulture production. Going to groups that have already been formed for other reasons may not be able to achieve the objectives as expected.

FBO involvement in business should ensure that members are trained adequately in order to have a common objective and a collective effort towards achievement of the objectives. At this stage all members of the FBO are considered for trainings on basic understanding of FBO principles.

Majority of farmers in Nandi County are semi illiterate (Primary level of Education); this implies that formal trainings and seminars may not assist since they do not understand the formal languages used in these trainings. This means use of demonstrations and these demonstration areas used for trainings will prove more useful. This can also be modified with employing services of the local people who can interpret written material in their local language. Use of exchange programmes or tours to successful areas also may serve better in training of farmers into adopting a given system or new technology e.g. drip irrigation, water harvesting etc.

Farmers find it easy to join and participate in FBO activities if the FBO is closer to them as much as possible. For export companies wishing to work with FBOs it will be good to identify areas of concentration to start with, and the farmers should be as close to each other as possible.

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