

## Social Capital and Access to Credit by Farmer Based Organizations in the Karaga District of Northern Ghana

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### Abstract

Farmer Based Organization (FBO) is one of the key support service actors in agricultural value chains in developing economies. The dimensions of the FBOs that constitute social capital and how they enhance access to credit are the concern of this study. Information was collected from 210 FBO members and non-members in the Karaga district of Northern Ghana, where FBO activities and agricultural credit services have increased in the last decade. The analytical methods used include principal component analysis-PCA and logistic regression analysis (logit model). The major finding was that the dimensions of social capital such as homogeneity, network connection, level of trust, collective action and the respect for contract had positive significant effect on access to credit. Given the positive effect of the FBOs' social capital on access to credit, it is recommended that FBO members should make conscious effort to strengthen their FBOs along the social capital dimensions. Officers of financial service organizations tasked to prime FBOs for agricultural credit programs should prime them based on these dimensions.

**Keywords:** social capital dimensions, FBOs, access to credit, social networks

### 1. Introduction

Social capital constitutes the collective action that members of group can take (in terms of members' labour and cash contribution), network characteristics (in terms of heterogeneity or homogeneity in members' demographic characteristics in terms of gender, occupation, tribe and religion) and network connections or linkages (in terms of inter-linkages and intra-linkages within and among social networks, meeting attendance). Social capital also includes members' respect for contract (in terms of members' adherence to FBO norms, bylaws and constitution), and trust in terms of reliance on members and in other social networks or formal organizations. Social capital serves as third parties between FBO members and financial service providers to collateralize members for improve access to credit.

In Ghana, farmers finance their agricultural activities through equity funds from on-farm and off-farm activities and credit from governmental and non-governmental financial institutions (Seini, 2002). Poor farmers depend largely on subsistence agriculture and their on-farm and off-farm activities are usually small scale and yield little income. As such, they are not able to invest in improved production technologies. They are also unable to access credit from financial institutions because they lack collateral. Financial institutions fear that farmers may default due to adverse selection and moral hazard because they have little or no full information on the farmers' credit history, true personal identity and location. This is exacerbated by the fact that farmers often lived in widely dispersed communities resulting in high transaction cost in terms of credit administration and data gathering on the nature of their enterprises.

The agricultural enterprises are beset with unfavourable factors which make financial service providers classify farmers as high risk clients who cannot use their farms as collateral for credit. These factors are low rainfall, poor soil fertility and inadequate infrastructure. Farmers' crops can also be destroyed by droughts, floods and insect pests. Herds of livestock can be devastated by disease and hunger. Unpredictable markets also threaten farm livelihoods and incomes. These factors make it difficult for farmers to produce for market. Such events also affect large groups of farmers at the same time and represent a high risk for financial institutions because many clients will have repayment problems. For this reason, financial service providers are reluctant to extend their credit services to farmers (de Klerk, 2008). The general trust level among people also seemed to have gone down and no individual is willing to guarantee another individual as collateral for credit. Such is the situation in which farmers in the Karaga district of Northern Ghana equally find themselves. Under such circumstances, it is proposed that agricultural activities be fundamentally based on composition of social networks such as farmer based organizations.

Membership in these social networks generates social capital that members can rely on as 'social collateral' for accessing credit and other productive resources (Udry and Conley, 2006). Social capital is also seen as a common form of insurance for poor farmers because friends, relatives and group members can help each other in emergencies (de Klerk, 2008). Several empirical evidences support these propositions. For instance, it is reported

that in Southern Ghana, farmers' access to land was tied to negotiation power, status and identity within corporate and farmer groups (Udry and Conley, 2006; de Klerk, 2008). Financial inflows of those farmers were mainly through well established social connections such as family members and long term friends (Udry and Conley, 2006). Again farmers' membership in farmer organizations improved their access to services such as input supply and credit in a sustainable rice project in Northern Ghana (Quaye, et al. 2010). In Osun State in Southwestern Nigeria, it is reported that aggregate social capital from cocoa farming households' membership in farmer associations influenced their access to credit (Lawal, et al. 2009). In a similar study in Ekiti State also in Southwestern Nigeria, social capital is reported to have positively affected the probability of members in social networks' access to micro credit (Ajani and Tijani, 2009).

It can be inferred from the aforementioned benefits of social networks to farmers that though myriads of social networks such as community based associations, gender associations, religious and political groups may exist in farming communities, farmers are most likely to prefer FBOs to other social networks in their communities. However, important questions that must be asked are: what are the dimensions of FBOs' social capital in the district? And to what extent does social capital of FBOs determines farmers' access to credit? The objective of this study is to identify the dimensions of social capital of FBOs and measure the extent to which social capital of FBOs determines access to credit.

## 2. Conceptualization of Social Capital and Access to Credit

Social capital is a sociological concept that has been applied to variety of issues in political science, anthropology and economics. The concept of social capital and its relationship with farmers' access to credit in the context of this study is illustrated in Figure 1. All smallholder farmers need credit as a capital input for production. Also each farmer either belongs to a farmer based organization (FBO) or does not (NFBO). Whether a farmer is a member of FBO or not he needs some collateral in order to have access to credit, especially from formal financial institutions. When a farmer is NFBO member his main source of collateral is from his own physical capital assets such as building, land, savings, machinery and guarantor among others. This type of collateral (physical collateral) is often difficult to produce by smallholder farmers. On the other hand, when a farmer becomes a member of a social network (FBO) s/he acquires a (meso) level social capital.

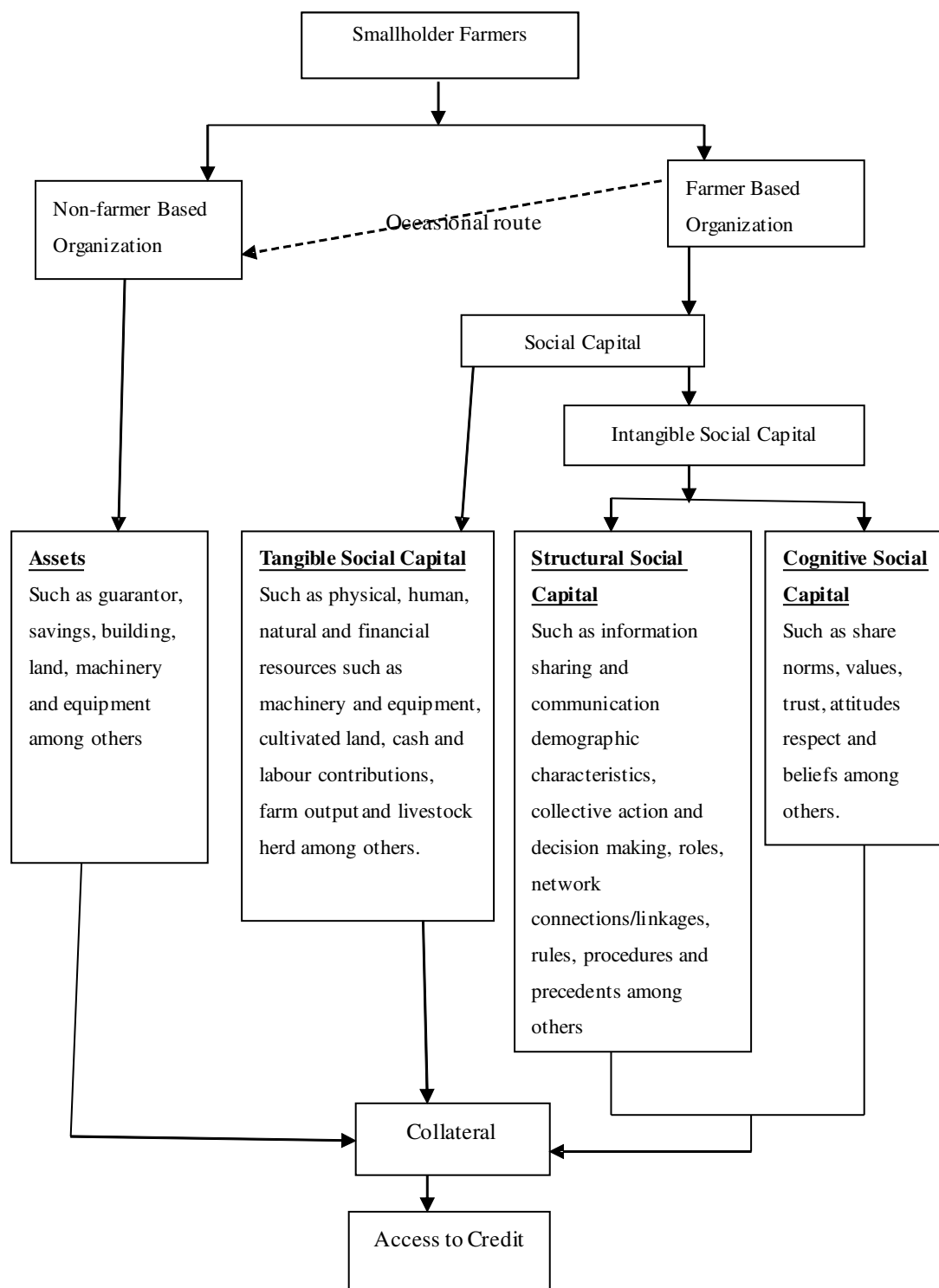
This social capital is greatly influenced and controlled by the tangible resources of the FBO and the state or community level (macro) social capital such as socio-cultural norms, bylaws/constitution and rule of law, policies and governance. When the FBO's social capital becomes strong and effective, then smallholder farmers who are members can rely on it as 'social collateral' to obtain access to credit from formal financial institutions. However, in some occasions farmers who are members of FBOs and can raised their own physical collateral may also access credit from formal financial institutions as NFBO members do without relying on the FBO's 'social collateral'.

### 2.1 Theoretical Analysis of Credit Supply

The theoretical analysis of the credit market outcome of De Janvry, McIntosh and Sadoulet (2009) has been adopted as the basis for this analysis. They argued that without moral hazard, a potential borrower's behaviour would strictly depend on his characteristics and the terms of the loan contract. Under moral hazard on the part of the borrower, his behaviour also depends on the information that the lenders have on him, or more precisely his knowing the information that the lenders have on him. Hence, if  $f$  is a credit market outcome (loan sizes, repayment rates, probability of becoming a long-term client) defined on all potential borrowers,  $Z$  represents characteristics of the potential borrower that are observable as of the time of application,  $X$  represents information over borrower quality that becomes observable as the lender has increasing experience with a given borrower,  $W$  represents characteristics that are private information to the potential borrowers,  $\alpha$  is the information observed in a credit bureau, and  $\alpha B$  is what the borrower believes the lender to see (which may be equal to  $\alpha$ ). Then the observed credit market outcome can be written as:

$$f = f(Z, X, W, \alpha, \alpha B). \quad (1)$$

However, characteristics that are private information to the potential borrowers cannot be known by lenders and rural financial markets also lack credit bureau. Lenders therefore attempt to use the information that they can observe (i.e.  $Z$ , and potentially  $X$ ) to proxy for  $W$ . Re-stating the observed outcome as:  $f = f(Z, X)$  (De Janvry et al. 2009).



From the applicant pool, a lender will select a borrower if the expected return (utility) from extending the borrower a loan is positive. The utility from extending the borrower a loan essentially depends on the borrower's characteristics or behaviour. That is:

$$U = U_i(Z, X) \quad (2)$$

where  $U$  is the utility the lender derived for extending loan to the borrower. This implies a borrower's application will be selected if  $U_i(Z, X) \geq 1$  or be rejected if  $U_i(Z, X) \leq 0$ . The dichotomous nature of the decision confronting the financial institutions lends the study to binary choice models. Examples of such models are the logit and the probit models. For mathematical simplicity this study used the logit model to analyze the probability of farmers' access to credit.

### 2.2 Theoretical Analysis of the Logit Model

The logit model is binary choice model used to determine qualitative responses in which the dependent or the response variable is an indicator of a discrete choice such as a 'yes' or 'no' decision. Binary models are analyzed in the general framework of probability models (Greene, 2003 and Gujarati, 2004). Fakayode and Rahji (2006) and Akudugu et al. (2009) have applied the logit model and its extensions in credit studies. Hence, this study employed the logit model to analyze the determinants of access to credit.

The logit model has a logistic distribution function for the stochastic error term ( $e$ ) and is also predicted base on the random utility models (Greene, 2003). Given that the utility derived from the decision to supply credit to farmers is  $U_{i1}$  and the decision not to supply is  $U_{i0}$ , then, the utilities are:

$$U_{i1}(X) = \beta_1 X_i + e_{i1} \text{ for the decision to supply credit} \quad (3)$$

$$U_{i0}(X) = \beta_0 X_i + e_{i0} \text{ for the decision not supply credit} \quad (4)$$

Assuming that the utilities are random, then, the  $i$ th farmer will have access to credit if the utility from the decision to supply credit is equal to (1), that is,  $U_{i1} > U_{i0}$ , and no access if the utility is equal to (0), that is,  $U_{i1} \leq U_{i0}$ .

If  $Y = 1$  denotes the  $i$ th farmer's access to credit, then the probability that the  $i$ th farmer accessed credit will be given by:

$$\begin{aligned} \text{Prob}[Y = 1/x] &= \text{Prob}[U_{i1} > U_{i0}] & (5) \\ &= \text{Prob}[\beta_1 X_i + e_{i1} > \beta_0 X_i + e_{i0}] \\ &= \text{Prob}[e_{i0} - e_{i1} < \beta_1 X_i - \beta_0 X_i] \\ &= \text{Prob}[e_i - \beta X_i] \\ &= \phi[\beta X_i] \end{aligned}$$

where ( $\phi$ ) is the cumulative distribution function of the stochastic or error term ( $e_i$ ). Also  $[\beta X_i]$  is equal to the regressor vector ( $\beta'X$ ) where  $\text{Prob}(Y = 1/x) = 1$  as  $\beta'X \rightarrow +\infty$  and  $\text{Prob}(Y = 0/x) = 0$  as  $\beta'X \rightarrow -\infty$

This implies that:

$$\text{Prob}(Y = 1/x) = \phi(\beta'X) \quad (6)$$

In logit model, the cumulative distribution function ( $\phi$ ) is a logistic distribution specified as:

$$\text{Prob}(Y = 1/x) = e^{\beta' X} / (1 + e^{\beta' X}) = \Lambda(\beta'X) \quad (7)$$

where  $\Lambda(\cdot)$  is the cumulative logistic distribution function.

Considering the above, the expectation therefore is:

$$E[Y = 1/x] = 0[1-F(\beta'X)] + 1[F(\beta'X)] = F(\beta'X) \quad (8)$$

To estimate this model, the maximum likelihood estimator (MLE) is usually used and is specified as:

$$\ln L = [y_i \ln F(\beta'X_i) + (1-y_i) \ln (1-F(\beta'X_i))] \quad (9)$$

However the parameters of the binary choice models, like those of any nonlinear regression model, are not necessarily the marginal effects (Greene, 2003). Thus in the logit model, the marginal effects are obtained as:

$$dE[y/x]/dx = \Lambda(\beta X_i) [1 - (\beta X_i)] \beta \quad (10)$$

The marginal effects are used to predict the percentage change in the variables included in the model given a unit change in the regressor.

## 3. Data Analysis

### 3.1 Identifying the dimensions of social capital of FBOs

The principal component analysis (PCA) was employed in the dimensions identification. PCA is a factor analysis technique used in multivariate analysis when variable reduction is required to construct indices which can be used for further analysis (Hair et al, 2006). A five-point likert scale (1 = agreed strongly, 2 = agreed somewhat, 3 = neither agreed nor disagreed, 4 = disagreed somewhat and 5 = disagreed strongly) was used to measure the extent of agreement or disagreement with statements on indicators of social capital. The indicators selected were based on the FBO performance characteristics and the social capital indicators recommended by the World Bank's working paper "integrated tool for measuring social capital" (Grootaert et al, 2004). The indicators selected for analysis were network characteristics (homogeneity or heterogeneity), network connection and communication, respect for rules and regulations (denoted as respect for contract) and collective action,

representing indicators for structural social capital dimension and level of trust representing indicators for cognitive social capital dimension. Factor loadings (eigen values) of the extent of agreement or disagreement with the statements on the indicators determine the dimensional indices of social capital extracted by the PCA.

### 3.2 Measuring the extent to which social capital determines access to credit

The logit model was used to identify factors that determine farmers' access to credit from financial institutions. The model included variables that measured access to credit by FBO farmers and NFBO farmers. This made it possible to determine the role that FBO membership played in the farmers' access to credit. The variables were classified as personal and occupational characteristics of farmers as well as social capital dimensions of FBOs that have been determined by the PCA. The indicators were selected based on literature reviewed (Akudugu et al., 2009, Ajani and Tijani, 2009, Lawal et al. 2009, Nguyen, 2006, Grootaert et al. 2004 and Duong and Izumida, 2002). The dimensional indices of social capital constructed by the PCA technique were used in the logit model to predict the effect of social capital on the farmers' access to credit. The logit model employed by the study is empirically specified as follows:

$$\ln(Y = 1/x) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \beta_{16} X_{16} + \beta_{17} X_{17} + \beta_{18} X_{18}$$

(11)

where: Y = Applied and received credit, X<sub>1</sub> = Age of farmer, X<sub>2</sub> = Household size, X<sub>3</sub> = Savings, X<sub>4</sub> = Crop output, X<sub>5</sub> = Ownership of livestock, X<sub>6</sub> = Enterprise type, X<sub>7</sub> = Gender (sex), X<sub>8</sub> = Years in occupation, X<sub>9</sub> = Years in formal education, X<sub>10</sub> = Farm size, X<sub>11</sub> = Know someone in financial institutions, X<sub>12</sub> = Age of FBO, X<sub>13</sub> = FBO size, X<sub>14</sub> = Collective action index, X<sub>15</sub> = Homogeneity index, X<sub>16</sub> = Level of trust index, X<sub>17</sub> = Network connection index and X<sub>18</sub> = respect for contract index, (see Table 1).

Table 1, List of variables, measurement and *a priori* expectation

Variable	Measurement	<i>A priori</i> expectations (β <sub>i</sub> )
Age of farmer	Number of years (no.yrs)	+
Household size	Number of people per household	+
Savings	Dummy (savings account =1, otherwise =0)	+
Crop output	Kilogram per hectare (kg/ha)	+
Livestock	Dummy (owns livestock =1, otherwise = 0)	+
Enterprise type	Dummy (non-farming =1, otherwise = 0)	+
Gender	Dummy (male = 1, female = 0)	+
Years in occupation	Number of years	+
Years of formal education	Number of years	+
Farm size	Number of hectares cultivated to all crops (ha)	+
Knowledge of someone in a financial institution	Dummy (yes =1, otherwise = 0)	+
Age of FBO	Number of years FBO existed	+
Size of FBO	Total membership of FBO	+
Collective action Index	Factor score*	+
Homogeneity Index	Factor score	+
Network connection Index	Factor score	+
Level of trust Index	Factor score	+
Respect for contract Index	Factor score	+

Note: \* means factor score retained by the analytical software SPSS

### 3.3 Description of variables

**Dependent variable (Y):** The dependent variable (Y) is defined as application and receipt of credit. This is measured as a probability between (0 and 1). The probability that a farmer's application is selected by a financial institution and s/he received credit is (1) and the probability that a farmer did not receive credit is (0).

**Independent variables:**

**Age of Farmer:** This variable was measured in years. Financial institutions request for age of applicant for lending because of legal enforcement. It was expected that the older the farmer the more mature and responsible he is and, therefore, positively (+) related to access to credit.

**Household size:** This variable was measured as the total number of people in the farmer's household who are 18 years or above and able to work. It was used as a proxy to measure the labour force that could be available as

farm hand to farmers. It was expected to be positively (+) related to access to credit since more labour means more area/land will be cultivated.

*Savings:* This variable was measured as a dummy, where (1) was assigned to respondents who have savings with the financial organization and (0) otherwise, where respondents have no savings with the financial organization. This is used as a proxy to measure the networth of respondents. It was expected to be positively (+) related to access to credit because the more savings made by a respondent, the more stable his/her income is likely to be and hence the ability to repay when given credit. Savings is also a requirement for recovering credit by many financial institutions.

*Crop output:* This variable measured the total crop output or yield of major crops (in kilograms per hectare) cultivated by the farmer. In Karaga, these crops include maize, groundnut, rice, soya bean, yam and sorghum. Total crop output obtained by each respondent the previous year is measured in number of bags harvested per hectare and standardized in kilograms (Kg) for the purpose of this analysis. This variable was used as a proxy to measure the farm income of a respondent and was expected to influence positively (+) the respondent's access to credit from formal financial organizations because s/he will be able to repay the credit. Yam was later dropped in the analysis due to standardization problem regarding the different sizes and the quantity of tubers produced per hectare.

*Ownership of livestock:* This variable was measured as dummy where (1) means yes, the respondent owns livestock and (0) means no, the respondent does not own livestock. Four economically important livestock species were taken into consideration. These were cattle, sheep, goat, and poultry. This was a proxy to measure off-farm income of respondents and is expected to be positive (+). However, Nguyen (2006) and Duong and Izumida (2002) measured total livestock numbers or herd size using one species of livestock. This could not be applied in this study due to standardization problem involving many species of livestock. Even though livestock rearing is a farming activity on its own, this research treated it as an off-farm income source because the FBO members were mainly into either crop production or agro-processing.

*Type of enterprise:* This was measured as a dummy, where (1) was non-farming occupation and (0) was farming as an occupation. The non-farming occupations considered for this study were marketing and agro-processing. This was expected to be positive (+). It was to clarify the growing perception that formal financial organizations prefer lending to non-farming enterprises to farming enterprises. Also, farmers engaged in cash crop enterprises are reported to have access to formal credit than non-cash crop enterprises (Akudugu et al, 2009).

*Gender of respondent:* This is captured in the model as the sex of respondent and measured as a dummy, where a male respondent is (1) and female respondent is (0). This was to account for the role gender plays in farmers' access to credit from financial organizations. It was expected to be positive (+).

*Years in occupation:* This was measured as the number of years a respondent has been working in his/her occupation. This is used as a proxy to measure the experience a respondent has on the occupation so as to be able to succeed and make profit to repay credit. This was expected to be positive (+) since experienced people are more likely to succeed than less experienced ones.

*Level of formal education:* This was measured as the number of years a respondent spent in formal education. It was used as a proxy to measure respondent's familiarity with loan application processes or procedures in formal financial institutions. It was expected to be positively (+) related to respondent's access to credit because people who are less familiar with application procedures may not even apply and perceive the process to be difficult.

*Farm size:* The farm size, measured in hectares, was used as proxy to measure the potential income of respondents. It is reported to be positively related to the likelihood of borrowers with large farm sizes getting access to credit as compared to borrowers with small farm sizes (Akudugu et al, 2009; Nguyen, 2006; and Duong and Izumida, 2002). Therefore, it was expected to be positively (+) related to access to credit in this study.

*Knowledge of someone in a financial institution:* This was measured as a dummy, where (1) means respondent was related to or knew someone at the financial organization, and (0) otherwise means respondent was not related to or did not know someone in the financial organization. It was expected to be positively (+) related to access to credit because it is generally believed that when one is related or known to someone in a financial organization s/he can easily get credit from that organization through the influence of the known person.

*Age of farmer-based organization (FBO):* This was measured as the number of years an FBO, to which a respondent belongs, has been in existence. The variable was used as a proxy to measure the strength and cohesion in the FBO. This in turn measures the trust that can be placed on its members. It was expected to be positively (+) related to access to credit because the older the FBO is, the more its members can be trusted or relied on.

*Size of farmer-based organization:* This variable was measured as the total membership of the FBO. It was expected to be positively (+) related to access to credit because large groups may be able to contribute more resources to repay when a member is defaulting and so will be able to have more social capital than smaller



groups.

*Collective action index (PCA):* This is a dimension of structural social capital used as a proxy to measure the level of collective action. It was measured as a weighted average scale score extracted and standardized by the PCA as a factor score on that index by respondents (Hair et al., 2006). The variable was expected to be positively (+) related to access to credit by respondents who are members of FBOs. This is because the higher the level of collective action in an FBO the more likely they are able to mobilize to repay for a member when s/he has problem of repayment or default.

*Homogeneity index:* This variable is a dimension of structural social capital used as a proxy to measure the degree of diversity in economic activities and income of FBO members. It was measured as a weighted average scale score extracted and standardized by the PCA as a factor score on that index by respondents (Hair et al., Ibid). It was expected to be positively (+) related to access to credit by respondents who are members of FBOs. This is because a more homogeneous FBO is likely to have high cohesion to maintain the FBO for a long time. On the other hand, a more heterogeneous FBO is likely to have members with high degree of diversity in economic activities and income. This gives members low risk level such that they will be able to repay when given credit (Lawal et al., 2009).

*Level of trust index:* This variable is a dimension of cognitive social capital used as a proxy to measure the availability or usage of financial products. It was expected to be positively (+) related to access to credit by respondents who are members of FBOs because there is higher correlation between trust and the availability or usage of financial products (Guiso, Sapienza, and Zingales, 2004). It was measured as a weighted average scale score extracted and standardized by the PCA as a factor score on that index by respondents (Ibid).

*Network connection index:* This is a dimension of structural social capital used as a proxy to measure the number of contacts with financial organizations or influential people. It was expected to be positively (+) related to access to credit by respondents who are members of FBOs. This is because the more extensive a respondent's network is, the likelihood of having contacts with financial organizations or influential people who can easily guarantee him/her for credit. This variable is measured as a weighted average scale score extracted and standardized by the PCA as a factor score on that index by respondents (Ibid).

*Respect for contract index:* This is a dimension of structural social capital used as a proxy for measuring the level of respect and adherence to rules and regulations by FBOs. It is measured as a weighted average scale score extracted and standardized by the PCA as a factor score on that index by respondents (Ibid). It was expected to be positively (+) related to access to credit by respondents who are members of FBOs. This is because the more FBO members respect and adhere to their own rules and regulations seen as the first contract between the FBO and members, the higher the likelihood of respect for financial contract signed by FBO members and financial organizations. This can increase the likelihood of getting credit because they will not default. The variables used as proxies for social capital in this model are devoid of the problems of econometrics such as multicollinearity, autocorrelation among others because the PCA tool used to construct the indices eliminates these problems (Koutsoyiannis, 1973 and Hair et al., 2006).

## 4. Results

### 4.1 Dimensions of FBOs' social capital

The dimensions of FBOs' social capital were extracted as indices from a principal component analysis (PCA). See Table 2 below.

The extraction results showed all the dimensional indices extracted jointly explain 67% of the variation in measuring social capital. This means that the extraction procedure was accurate and produces results with very high integrity because the dimensions extracted explained more than fifty percent of the total variation of the FBOs' social capital. The dimensions extracted were homogeneity, network connection, level of trust, respect for contract and collective action. Among the dimensions extracted the level of homogeneity in the FBOs was 3.108 or 311% eigenvalue and accounted for about 17% of the total variation of FBOs' social capital explained (see Table 2). This suggests that homogenous characteristics such as ethnicity, occupation, religion and neighbourhood among FBO members can be a capital asset to the FBOs because the bond ties between members will be strengthened to generate cohesion in the FBO. Network connection also accounted for 13% of the total explained variation of FBOs' social capital with 2.498 or 250% eigenvalue. The implication is that the ability of FBOs to develop and maintain linkages with external bodies such as other FBOs in outside communities, formal organizations and other FBOs in diverse productive enterprises can generate a huge capital asset to the FBOs. This finding is supported by Al-Hassan et al. (2007) in their assertion that linkages improve smallholder farmers' access to credit, input, training and information about a reliable demand source for final product. The results also showed that level of trust, respect for contract and collective action contributed almost the same weight to total explained variation of FBOs' social capital.

Table 2, Dimensional indices of FBOs' social capital

Dimensions	Factor Loadings	Eigen values	Variance Explained (%)	Commonalities
<i>Homogeneity Index</i>				
Same religion	0.885	3.108	16.942	0.808
Same ethnic group/tribe	0.838			0.726
Same occupation	0.806			0.743
Same neighbourhood	0.562			0.585
<i>Network Connection Index</i>				
Links with FBOs outside own community	0.871	2.498	13.272	0.763
Links with official bodies/organizations	0.699			0.550
Links with FBOs in different activities	0.657			0.621
<i>Level of Trust Index</i>				
Trust people from other communities	0.887	1.603	11.923	0.807
Trust people from different FBOs	0.808			0.742
Trust people in own community	0.539			0.751
<i>Respect for Contract Index</i>				
FBOs in same activity	0.789	1.471	11.563	0.707
Evicted from FBO	0.726			0.647
Suspension from FBO	0.513			0.556
<i>Collective Action Index</i>				
Meeting attendance	0.666	1.989	12.985	0.582
Cash contribution	0.795			0.660
Prompt payment of dues	0.757			0.720

Sources: Field Survey, January, 2011

#### 4.2 Determinants of access to credit

The logit regression results showed that social capital factors that were significant are homogeneity, network connection, level of trust and collective action (see Table 3). As expected, all the social capital factors had positive effects on the farmers' probability of access to credit from formal financial institutions. The results of the marginal effects of the logit regression model are interpreted in line with Greene (2003) and Cameron and Trivedi (2005). The marginal effect of homogeneity is 0.52, implies a unit increase in the homogeneity of FBOs will lead to farmers' probability of access to credit from financial institutions being increased by 52%. In contrast to this finding, Lawal *et al.*, (2009) found that farmer associations with 56.30% heterogeneity level positively affected farmers' access to credit. Also, network connection has a marginal effect of 0.94, meaning a unit extension in FBOs network connection will lead to the probability of farmers' access to credit increased by 94%. In addition to that, trust level and collective action of FBOs have marginal effects of 0.42 and 1.15 respectively. This implies a unit increase in trust level and collective action of FBOs will result in a corresponding increment of 42% and 115% respectively on probability of farmers who are members of FBOs access to credit. Though respect for contract is not significant yet it has met the *a priori* expectation with a marginal effect of 0.43. This means that a unit increase in FBOs respect for contracts signed will increase the probability of members' access to credit from financial institutions by 43%. However, Ajani and Tijani (2009) and Lawal *et al.*, (2009) found factors such as heterogeneity, meeting attendance, cash and labour contributions and decision making indices as the social capital factors that positively influenced the probability of farmers' access to credit from financial institutions in Nigeria.

The non-social capital factors that were significant are gender, type of enterprise, knowing someone in financial institution, age of FBO and FBO size. Among these factors, only one factor i.e. (knowing someone in financial institutions) met the *a priori* expectation with a marginal effect of 0.27. This implies if the number of persons one knows in financial institutions increase by one person it will increased farmers' probability of access to credit from formal financial institutions by 27%.



Table 3, Logit regression results of factors affecting access to credit

Variables	Coefficients	Std. error	Marginal effects of variables
Constant	1.98364	1.39487	0.3923
Age of farmer	0.01539	0.02801	0.0030
Household size	0.05221	0.10253	0.0103
Savings	0.66854	0.48203	0.1322
Crop output	-0.00011	0.00012	-2.2346
Livestock	-0.74177	0.53140	-0.1467
Enterprise type	-1.30107	0.46936	-0.2572
Gender	-1.57792	0.50429	-0.3120
Years in occupation	0.00167	0.02509	0.0003
Years of formal education	-0.00317	0.05504	-0.0006
Farm size	-0.05382	0.07456	-0.0101
Know someone in financial institution	1.38656	0.53042	0.2742***
Age of FBO	-1.24014	0.44682	-0.2452
Size of FBO	-0.27911	0.09004	-0.0552
Collective action Index	5.78992	2.06994	1.1450***
Homogeneity Index	2.62230	1.14035	0.5186**
Network connection Index	2.11617	1.08978	0.4184**
Level of trust Index	4.77264	1.72182	0.9438***
Respect for contract Index	2.18824	1.37354	0.4327
Sample size (N) = 210, Number of access (1) = 153 and Otherwise (0) = 57			
<b>Measures of goodness of fit</b>			
LR=102.5296 (significant at 1%)			
Log likelihood = -71.5169			
Restr. Log likelihood = -122.7817			
McFadden R <sup>2</sup> = 0.4175			

Note: \*\*\* and \*\* mean 1% and 5% levels of significance respectively.

Sources: Field Survey, January, 2011

The logit model gave likelihood ratio (LR) statistic of approximately 103% and is significant at one percent meaning, all the variables included in the model jointly affect the probability of farmers' access to credit from formal financial institutions. The implication is that the null hypothesis is rejected in favour of the alternate hypothesis that the slope coefficients are not zero and all the variables included in the model explain or affect farmers' access to credit (Table 3). The model also gave a McFadden R-squared of about 0.42, implying that all the explanatory variables included in the model are able to explain about 42% of farmers' probability of access to credit from formal financial institutions.

## 5. Conclusions and Recommendations

The key dimensions of the FBOs' social capital lie in their homogeneity, network connections, level of trust, respect for contract and the level of collective actions the FBO members can undertake. The most important determinant of access to credit by farmers who are members of FBOs is the level of social capital their FBOs can generate. The members' chances of accessing credit from financial institutions therefore will increase as the level of the FBOs' social capital increases. It is recommended that initiators of FBOs should take the necessary steps to acquire the appropriate legal documentations from the appropriate authorities to legalize their operations. This will improve the eligibility and trust of the FBOs to conduct business with formal organizations or institutions. All the social capital dimensions positively influence the probability of FBO members' access to credit. Therefore, it is recommended that FBO members should develop and strengthen their FBOs along these dimensions by undertaking more collective actions by way of cash and labour contributions. Also loan officers of financial institutions tasked to prime FBOs for agricultural credit programs should prime them based on these dimensions. FBO members should also be transparent in their activities and intensify their respect for their own rules and regulations. It is also recommended that members of FBOs need to actively participate in decision making so as to ensure that good and honest leaders are elected to manage FBOs. They should also increase their

savings level so as to generate more internal funds to be able to hire the services of expert managers and consultants to manage the FBOs.

*Key policy implication:* conscious effort be made by the state to create a national FBO apex body and link FBOs formed at the grass root level through a hierarchy of local, district and regional FBOs to the national apex body to provide means of authentication by financial institutions as well create high bargaining power to FBO members.

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