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Social Capital Factors Affecting Access to Farm Inputs by Small Scale Farmers in North Central Nigeria

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Abstract
The study was conducted in the North Central Nigeria to analyze factors affecting access to farm inputs by small scale farmers. A multi stage random sampling technique was employed in collecting data from two hundred and seventy one (271) respondents using structured questionnaire. The binary probit regression coefficients revealed that sex (1.409311), age (-0.016945), household size (0.037118), marital status (0.719878), farming experience (0.030670), Meeting attendance of households in association (0.010455), decision making index (0.019647), membership density (1.529884), cash contribution index (-0.014804) and heterogeneity index (0.011316) were the critical and significant social capital variables that influenced access to farm inputs in the study area. The study recommended a strong general case for applying social capital thinking to a wide range of agricultural policy areas, this will go a long way to establish good relationship and reduce conflict among farmer members as well as improve their productivity level. Also, distribution of farm inputs to farmers by government financial institutions, NGOs and others should be done using social capital as a collateral security. This will improve farmers' access to farm inputs for improved productivity and enhanced income which could improve their standard of living.
Keywords: *Social capital, Farm inputs, Local institutions, Farm households, Social network*

Introduction

Agriculture in Nigeria is one of the major sectors of the economy and a major contributor to national Gross Domestic Product (GDP) (Rahji and Fakayode, 2009) contributing 25.49% to overall GDP in real terms in the fourth quarter of 2016, higher than its share of 24.18% in the corresponding quarter of 2015 but less than its share in the previous quarter of 28.65% (National Bureau of Statistics, 2016).

According to the World Bank (2012), social capital refers to the institutions, relationships and norms that shape the quality and quantity of a society's social interactions. Olomola, (2001) defines the concept as the aggregate or the actual or potential resources which are linked to the possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition. Intuitively, the basic idea of "social capital" is that one's family, friends and associates constitute an important asset, one that can be called upon in a crisis, enjoyed for its own sake, and/or leveraged for material gain (Woolcock and Naray an, 2002). Social capital, either through its function in social control or accumulation of mutual benefits is critical for successful operation of group and enables households that are constrained in agricultural production resources access to those resources (Isham, 2002).

According to Adesina (2013), the backbone of any agricultural revolution is access of farmers to farm inputs, especially fertilizers and seeds. FMARD (2012), reported that the volume of subsidized farm inputs especially agrochemicals and seeds distributed through various public sector channels in Nigeria during the decade preceding Growth Enhancement Scheme (2001-2010)

was 5,975,097 MT with total estimated cost of subsidy of N65.3 billion. Unfortunately, the operation of direct subsidy program policy by Federal Government became self-defeating as a result of a dependency mentality developed among farmers on government subsidy, thereby making it a permanent obligation of government and subsequently a huge fiscal burden the frequent exploitation of the program to serve the selfish motives and interests of civil servants, politicians and other elite groups, to the detriment of the ordinary farmer made it difficult for farmers in rural areas to have access to these farm inputs. In order to reduce these bottlenecks, the Federal Government in 2012 introduced the Growth Enhancement Support Scheme (GESS) as a component of its agricultural transformation agenda (ATA) as an alternative market friendly system for provision of farm inputs subsidy to farmers. The GESS was stalled in 2015, after three years, due to the national elections that led to change in government (Kehinde *et al.* 2009).

This grim trend unveils a need for innovative thinking through the promotion of social interaction and creation of social capital among rural farmers to develop coping strategies to deal with poor access to farm inputs. Kehinde *et al.* (2009) also corroborated that agricultural development efforts have identified creation of social capital among farmer members of local institutions such as religious organizations, non-governmental organizations, age grades, gender based groups, dance groups, village associations, fadama group, cooperatives, farmers' association among others in Nigeria as a vehicle for the development of agriculture. This is because it enables farmers to solve agricultural problems such as inadequate capital, inadequate access to farm inputs/agricultural production resources, and high level of illiteracy which still remain major agricultural development problems through interaction with other members of local institutions they belong. This study therefore was designed to assess the social relationships (cooperation) that help farmers to get along with each other and act more effectively than they could as isolated individuals. The social capital created and relationships through social interaction that affect farmers' access to farm inputs such as fertilizer, farm machines, herbicides, insecticides and seeds formed the basis for this study.

Specifically, the study was designed to determine the effects of social capital factors on access to farm inputs by rural farming households in the study area.

Methodology

The study was carried out in North Central Nigeria. The region has a land area of 296, 898 km^2 representing nearly 32 percent of the country's total land area (National Bureau of Statistics, 2008). The region is made up of six states namely: Benue, Kogi, Kwara, Nasarawa, Niger and Plateau as well as the Federal Capital Territory, Abuja.

Multi-stage random sampling technique was used to select a sample size of 283 respondent for the study. In the first stage, a random selection of Nasarawa and Niger States was carried out. Secondly, a local government area was randomly selected from each of the three (3) agricultural zone of the states selected. This gave a total of six local government areas. In the third stage, three farming communities were randomly selected from each local government area making a total of eighteen farming communities. A list of farmers were obtained from both Nasarawa and Niger states ADPs. A total of 2, 280 and 3, 405 farm households were obtained for the various communities in both Nasarawa and Niger states respectively. Lastly, 5% farming households were randomly selected from each community, giving a sample size of 283 for the study. Questionnaires returned after the data collection were 271 and used for data analysis.

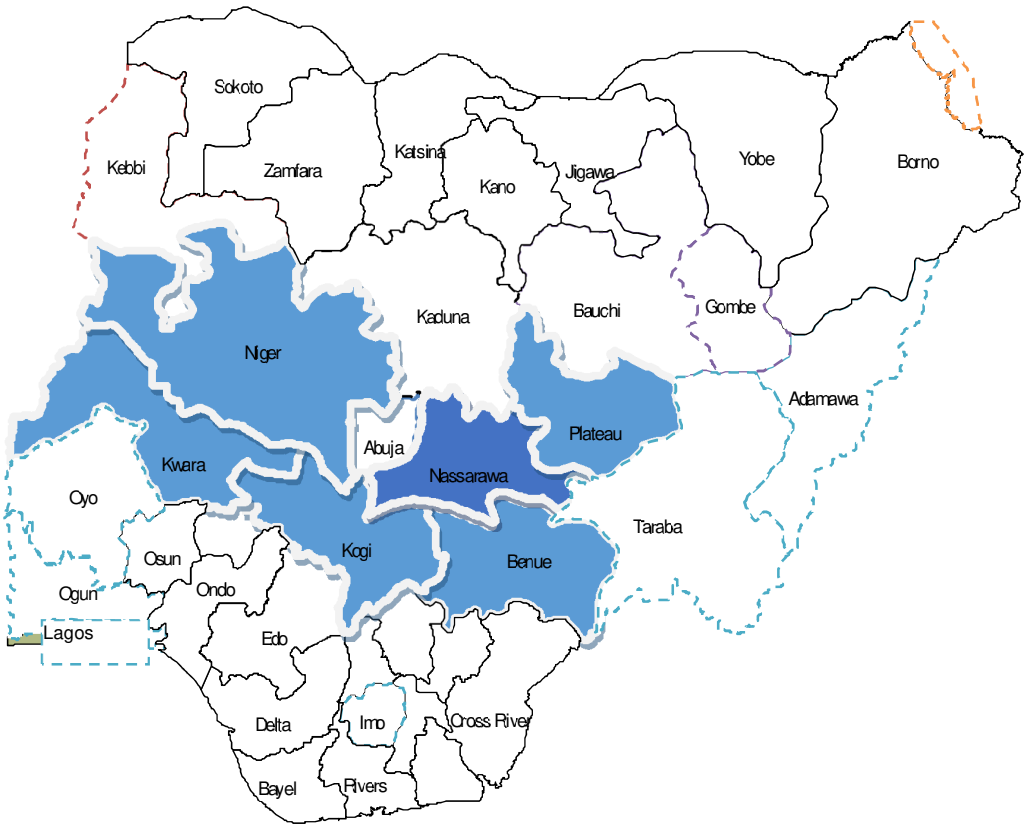

Fig.1: Map of the study area

Model Specification

Probit regression model was used for the study. It is appropriate when the response takes one of only two possible values representing access or no access to farm input. The model was adopted as used by Gujarati (2003) and Ajani and Tijani (2009) presented as follows:

$Y_i=\alpha+\beta_{1log}X_1+\beta_{2log}X_2+\beta_{3log}X_3+\beta_{4log}X_4+\beta_{5log}X_5+\beta_{6log}X_6+\beta_{7log}S_1+\beta_{8log}S_2+\beta_{9log}S_3+\beta_{10log}S_4+\beta_{11log}S_5+\beta_{12log}S_6+\beta_{13log}S_{7+}e$

Y_i = households' access to farm input i (Dichotomous variable 1= if a farm household had access to farm input; otherwise = 0)

X_1 = Sex (1=Male; 0=Female)

X_2 = Age of household head (Years)

X_3 = Household size (number)

X_4 = Educational status (Formal education=1, Informal education=0)

X_5 = Marital status (Yes =1 if Married, 0=Otherwise)

X_6 = Farming experience (Years)

S_1 = Meeting attendance of households to associations (number/year)

S_2 = Decision-making index (%)

S_3 = Membership density of households in association (%)

S_4 = Cash contributions of households to associations (naira)

S_5 = Labour contributions of households to associations (man hours/year)

S_6 = Heterogeneity index of associations (%)

S_7 = Community orientation (%)

i = Farm input (fertilizer, Seed, loan/credit, Farm machines, Herbicides and insecticides)
β =Coefficient of exogenous variables
e=error term

Measurement of Social capital indices

This study focused on seven of the social capital indices adopted by Okunmadewa et al., (2005) and Yusuf, (2008). The measurement of each is as described below.

a) **Density of membership (S1)**: This was measured by the number of active household membership in existing associations. A complete inventory of all associations was made at local level institutions; each household will be given that inventory and asked which associations they are members. In other words, the proportion of membership of associations by individuals was found and rescaled to 100.

b) **Heterogeneity index (S2)**: Three most important associations for each household were identified. For those associations, a number of supplementary questions were asked including about the internal homogeneity of the group. This was rated according to nine criteria: same level of education, same neighborhood, kin group, same occupation, same economic status, same religion/belief, same gender, same age, and same cultural practices. Hence, for each of the factors a yes response was coded 2 while no was coded 1 (Lawal *et al*., 2009). A maximum score of 18 for each association represented the highest level of heterogeneity. The score of the three associations was averaged for each household by dividing by maximum score 54 to obtain the index. The resulting index was then multiplied by 100 (whereby a zero value represents complete homogeneity and 100 correspond to the highest heterogeneity).

c) **Decision-making index (S3** Was measured by the respondents evaluating subjectively whether they were "very active" "somewhat active" or "not very active" in the group's decision-making. These responses were scaled from 3 to 1, respectively and averaged across the three most important groups in each household. The summation was calculated from subjective responses and averaged across the three associations and multiplied by 100 for each household.

d) **Cash contributions' index (S4)**: This was achieved by taking records of the payment of membership dues and other contributions. The summation of the total cash contributed to the various associations, which the household belong was calculated. The actual contribution for each household was rescaled by dividing the amount by the maximum fee in the data and multiplying the resultant fraction by 100.

e) **Labour contributions' index (S5)**: This is the number of days that individual members belonging to institution claimed to have worked for their institutions. This represents the total numbers of manhour's days worked by household members. This was also rescaled to 100 using the same method of cash contributions.

f) **Meeting attendance index (S6)**: This index was measured by finding the number of times members of association actually met as a group over a period of time This was obtained by summing up of attendance of the household members at meeting and relating it to the number of scheduled meetings of the associations. The value was multiplied by 100.

g) **Community Orientation (S7)**: This will be obtained from response on the type of associations whether they are voluntary or those forced on the community. The degree of community involvement in setting up organizations will be obtained.

Results and Discussion

Effects of Social Capital and other Demographic Variables on Access to Farm Inputs

The result of binary probit regression coefficients of social capital factors that affect access

to farm inputs is presented in the Table1 below. In the model, ten out of thirteen explanatory variables were statistically significant at given levels of probability and these were sex, age, household size, marital status, farming experience, meeting attendance, decision making index, membership density, cash contribution index and heterogeneity index.

The coefficient of sex (1.409311) was significant at 5% level of significance. This implies that the probability of the farm households that belong to rural associations in accessing farm inputs increase with sex. This indicates that the male farm households had more access to farm inputs than the female farm households. This result is expected because it easier for male farmers to access farm inputs than female farmers in the study area. One of the reasons is because married women were not expected to leave their homes without proper permission from the men and also male dominance of most of farming activities in most rural Nigeria (Attah and Ejembi (2015). This is further collaborated by Okwu and Iorkaa (2011) who also reported in their work, assessing farmers' use of new information and communication technologies as sources of agricultural information in Ushongo local government area, Benue state, Nigeria, that majority of their respondents were males.

Specifically, results in table 1 show that the coefficient of age (-0.016945) was negative and statistically significant at 10% level of significance. The sign is in tandem with *a priori* expectation. It implies that the probability of the rural farm households that belong to rural associations in accessing farm inputs decrease with increasing age. This indicates that the younger farm households had more access to micro credit than the older farmers. This result is in agrees with Alexander and Mellor (2005) that younger farmers have more access to fertilizer than older farmers because they have a longer planning horizon than older farmers. Access to farm inputs increased with age for younger farmers as they gain experience and increase their stock of human capital but declines with age for those farmers closer to retirement.

However, Onyenucheya (2005) opined that older farmers are considered better credit risks in the sense that they are rational decision-makers and have established reputation in the community in the proper use of credit. Incidentally, micro credit institutions in Nigeria give no much emphasis on age as compared to possession of collateral (Ibrahim and Aliero, 2012).

Results in table 1 show that household size (0.037118) is positive and significantly related to the probability of having access to farm inputs in the study area at 5% level of significance. This suggests that farmers' access to farm inputs becomes better as their household size increases. This is because increase in household size implies availability of family labour, which could serve as a driving force to seek for farm inputs for the purpose of expanding farm production. It has been shown in some adoption studies that household size had an inverse relationship with access to some agricultural inputs. Asogwa, Abu and Ochoche (2014) reported that household size has a significant and positive influence on peasant farmers' access to agricultural credit in Benue state.

The coefficient of marital status (0.719878) was statistically significant at 5% level of significance. This implies that the probability of the farm households that belong to rural associations in accessing farm inputs increase with married households. This result implies that, farmers can cultivate a larger farm size if all other resources are available and affordable.

The coefficient of farming experience (0.030670) was statistically significant at 5% level of significance. It implies that the probability of the rural farm households that belong to rural associations in accessing farm inputs increase with increasing years of farming experience. This indicates that farm households with more farming experience had more access to farm inputs than the less experienced farmer households.

This results agree with Essein (2009) who reported that the number of years an individual

has been involved in farming may give an indication of the practical knowledge he/she has gained on how to overcome the problems associated with access to farm inputs. Such practical knowledge would help him to handle farm inputs better and give him an edge over other farmers.

Results in table 1 show that the coefficient (0.010455) of Meeting attendance of households in association was positive and highly significant at 1% level of significance. This implies that an increase in meeting attendance by farm households will lead to an increase in probability of having access to farm inputs. That is the more the number of meetings attended by a household associations they belong to, the more they have access to information that will lead to accessing farm inputs in the study area. Regular meeting attendance of farm households in associations increases the probability of access to information available at local level institutions that will lead to access to farm input (Yusuf, 2006).

Decision making index of households to associations was positive and statistically significant at 5% level of significance, with a coefficient of 0.019647. This result implies that those households with higher decision-making index have higher access to farm inputs than those households with lower index for decision-making. This result disagrees with the findings of Yusuf (2008), who reported a negative coefficient (-0.9685) of decision making index of the farm households in a similar study.

The coefficient (1.529884) of Membership density of households in association was positive and highly statistically significant at 1% confidence level. This showed that an increase in membership of association by farm households will lead to an increase in probability of obtaining farm inputs.

Results in table 1 show that the coefficient (-0.014804) was negative and significantly affected access to farm in at 5% level of probability contrary to *a priori* expectations. This implies that cash contributions made by rural farming households to associations decreased the probability of access to farm input. It is likely that the farm households in local level institutions in the study area have not made adequate financial contributions to their institutions due to endemic poverty, hence reduced their access to farm input. This result does not agree with the findings of Akinyemi *et al* (2012) that obtained a positive relationship between cash contributions and access to micro credit among grain sellers in Ibadan, Oyo State, Nigeria.

Households' cash contributions to associations is presumably a sign of greater interest in the associations and serves as a collateral effect for households wanting to borrow money or have access to valuable items e.g. farm inputs for farm activities.

Heterogeneity index of households to associations was negative and statistically significant at 1.0% level of significance, with a coefficient of -0.011316. The implication is that access to farm input is higher for those households that have lower level of diversity of membership of associations than those households with high heterogeneity index. Heterogeneity of association can be a source of information for improved for farm input availability. This agrees with Okunmadewa *et al*., (2005) who also obtained a negative effect of heterogeneity index on access to agricultural resources of households in local level institutions in Nigeria.

Conclusion and Recommendations

The critical and significant social capital factors that influenced access to farm inputs were meeting attendance in associations, decision making index, membership density, cash contributions index and heterogeneity index of households to associations. Socioeconomic factors such as Sex, age, household size, marital status and farming experience also have significantly improved the farmers' access farm input in north central Nigeria.

Based on the findings of this research, the following recommendations were made: Distribution of farm inputs to farmers by government financial institutions, NGOs and others should be done using social capital as a collateral security. This will improve farmers' access to farm inputs for improved productivity and enhanced income which could improve their standard of living.

Since social capital is strongly related to farm input access, the farming households in the study area should improve their social capital status by belonging to associations. They should also ensure that their cash contributions in associations where they belong is enhanced as it drives access to farm inputs positively.

Table 1: Binary Probit Regression Coefficients of Social Capital Factors That Affect Access to Farm inputs in North Central Nigeria

Variable	Coefficient	Standard. Errors	z-ratios	P>/z/
Sex	1.409311	0.560683	2.513560**	0.0120
Age	-0.016945	0.010213	-1.659055*	0.0971
Household size	0.037118	0.018741	1.980540**	0.0476
Literacy Level	0.281500	0.238594	1.179833	0.2381
Marital status	0.719878	0.248931	2.891881**	0.0038
Farming experience	0.030670	0.012333	2.486887**	0.0129
Meeting attendance index	0.010455	0.005642	1.853003***	0.0639
Decision making index	0.019647	0.008543	2.299892**	0.0215
Membership density index	1.529884	0.860128	1.778670***	0.0753
Cash contribution index	-0.014804	0.007438	-1.990361**	0.0466
Labour contribution index	0.000446	0.004247	0.104950	0.9164
Heterogeneity index	-0.011316	0.006430	-1.759795**	0.0784
Community orientation index	0.138420	0.263814	0.524688	0.5998

N=271 *** Significant at 1.0% level; ** Significant at 5.0% level; * Significant at 10.0% level.

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