

Full Length Research Paper

Determinants of access to credit in Nigerian agriculture

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This study was carried out in Oyo and Ondo States of South – Western Nigeria to investigate the determinants of households' access to agricultural production credit under the National Special Programme for Food Security (NSPFS). A multi-stage sampling technique was used to select 600 farmers from 4 'local government areas'. Descriptive statistics and probit regression model were used to analyse the primary data obtained from the survey conducted. The findings of the study showed that majority (53.3%) of the farmers have access to NSPFS credit while the rest (46.7%) did not have access to credit under the programme. The result of the probit analysis showed that farmers' age, access to other credit, access to extension services, financial contribution in his or her group, farm location, size of landholding and membership of registered farming group are the most important variables that significantly influenced access of households to NSPFS credit in the study area. The results further revealed that majority of the beneficiaries are old and those farmers whose farms are located outside the project catchment or NSPFS participating 'local government areas' did not have access to the credit. Most of the non-beneficiaries had no formal education and did not have access to extension services. Therefore, this study recommends that youth and younger population should have greater access to credit under the NSPFS. It was also recommended that relevant policies to address the constraints and limitations to formal education and extension services should be designed by stakeholders in agricultural development to increase households' awareness and access to NSPFS credit. The scope of implementation of the programme should be expanded to cover more 'local government areas' to extend the benefit of the programme to reach majority of the poor farm households.

Key words: National special programme for food security (NSPFS), credit access, probit regression model.

INTRODUCTION

The National Special Programme for Food Security (NSPFS) was a nation-wide five-year Federal Government of Nigeria programme jointly implemented by the Federal Ministry of Agriculture and Water Resources and Food and Agriculture Organisation of the United Nations. The pilot phase, which was implemented between 2001 and 2007, cost the Federal Government of Nigeria a sum of US\$45.24 million and an additional \$22.25 million expended on South-South Cooperation

component of the programme. The programme was organised at the National, State and Local Government levels. The main implementation strategy of NSPFS was to empower small farming communities with timely provision of credit, agricultural inputs and technical support services to achieving the NSPFS objective of increasing farmers output, productivity and income on sustainable basis. The participating farmers are formed into groups for ease of coordination and management of credit and inputs received on behalf of the farmers. The NSPFS places the farmers at the driver's seat meaning that the farmers are in charge of their own development agenda by giving them the opportunity to determine the

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agricultural production enterprises of their choice through participatory and community/demand driven development approach.

The pilot phase was implemented in 3 sites/LGAs across the 3 senatorial districts in each State of the Nigerian Federation and one site in the Federal Capital Territory making a total of 109 sites in Nigeria.

Problem statement

Farm households in rural areas do not usually have adequate access to formal sources of credit, which provide funds through formal financial institutions such as commercial banks. This is mainly due to the inability of the rural households to provide the required personal collaterals to guarantee the loans and the general lack of information by the lending institutions on the credit worthiness of the borrowers (Bastelaer, 2000). This is apart from the high cost of transaction involved in administering small – sized credit to highly dispersed small farmers. This situation contributes to a virtual exclusion of the smallholder farmers from formal credit markets. The high cost of obtaining loans from informal sources has also not placed them as better alternatives; however, several classes of institutional arrangements offer to these borrowers' valid substitutes for individual collateral, and to the lenders low cost alternatives to imperfect creditworthiness information (Stiglitz and Weiss, 1981).

Many credit programmes of Nigerian Government aimed at tackling the menace of insufficient capital to increase agricultural productivity performed below expectation and the problems of accessibility and sustainability of most of these initiatives remain unresolved. In recognition of the problem of inadequate access of smallholder farmers to most of the available formal credits, the Federal Government of Nigeria in 2001 introduced the National Special Programme for Food Security (NSPFS) with provision of credit as the main strategy for stimulating improved agricultural production and enhances farmers' income and standard of living. The NSPFS programme is specifically targeted at the resource poor small-scale producers and employed group approach as the mechanism for delivery of credit to farmers under the programme. Under the programme, credits are provided to the poor farm households on the basis of "social collateral", through which borrowers' reputation, or the social networks to which they belong take the place of traditional, physical or financial collateral. Elsewhere, studies have been carried out on access to credit for agricultural production (Okurut et al., 2004; Brata, 2004; Foltz, 2003). In Nigeria, studies have been carried out to investigate the impact of credit on agricultural enterprises (Agom, 2001), credit markets in Northern Nigeria (Udry, 1990) and role of groups and social capital in accessing credit by the poor rural

households and on improvement in their welfare given access to credit (Okunmadewa et al., 2005; Yusuf, 2006). However, these studies have not investigated the determinants of access to credit by smallholder farming households. This study, therefore, would complement existing literature on targeted credit by using farm households under NSPFS in Oyo and Ondo States, Nigeria.

Based on the identified problems and strategies to access credit under the NSPFS, this study intends to answer the following research questions to be able to identify factors determining access of farming households to production credit under the programme.

- i) What are the socio-economic characteristics of the farming households?
- ii) What are the factors that influence access of households to NSPFS credit in the study area?

This study will provide relevant data that highlight the socio-economic characteristics of the households and factors that determine their access to NSPFS credit.

Objectives of the study

The general objective of this study is to empirically investigate the determinants of farming households' access to credit for agricultural production under the NSPFS in South West, Nigeria. The specific objectives are to:

- 1) Analyse the socio-economic characteristics of the farming households in the study area.
- 2) Identify factors that influence farming households' access to NSPFS credit in the study area.

Research hypotheses

The following hypothesis was constructed and tested in this study:

Ho₁: Human capital, financial capital, physical capital, natural capital, household characteristics, institutional, enterprise and location variables do not influence access of households to credit under the National Special Programme for Food Security (NSPFS).

Justification and policy relevance of the study

Credit is an important instrument for improving the welfare of the poor (Okurut et al., 2004). Inadequate availability of formal credit to support production activities of majority of the resource poor farm households, who constitute the bulk of agricultural producers in Nigeria,

has constrained agricultural growth and development. Formal financial institutions by virtue of their location, design, procedure and preference do not favour illiterate, poor smallholder rural farmers. Informal lenders have traditionally provided credit to the rural people but, because of their excessive interest rates, are considered inefficient for improving productivity and growth. Therefore, improved financial intermediation was considered necessary for agricultural growth (Khandker et al., 1995). In the late-1970s, efforts based on the idea of collateral-free formal finance, notably that of the Grameen Bank pioneered by Professor Muhammad Yunus, emerged as alternative poverty alleviation measures. These ventures were based on the idea that targeted credit disbursed to organized groups might improve the rural poor's productive means on a sustained basis (Yunus, 1993). The emergence of the Grameen Bank in the 1980s as a model targeted credit program strengthened the rationale and momentum for such an approach. The idea of lending to the poor without collateral, and its apparent success, also challenged the established view of collateral-based formal finance (Khandker, 1995).

The Federal Government of Nigeria has therefore established the NSPFS to assist the smallholder farmers' access credit. If the programme is to remain viable and sustainable, information on how the farmers can access NSPFS credit should be at the disposal of existing and prospective participants of the scheme. This study is important in this area. The choice of NSPFS targeted credit for smallholder farmers for this study is considered appropriate considering the fact that a huge amount of national resources is committed to the project. In addition, all member countries of ECOWAS have adopted the NSPFS as a regional food security strategy to achieve their commitments for halving the number of hungry people by 2015. Therefore, from the policy perspective, this study can provide knowledge about the relative importance of the various socio-economic factors within or beyond the control of policy that determine whether or not some households will benefit from access to NSPFS credit. This information can guide the design of institutional arrangements and the choice of financial services to be offered to different target groups. Apart from the adoption, by member countries of ECOWAS of the NSPFS credit policy strategy to stimulate growth in agriculture, the project fits the overall national development policy of Nigeria as enunciated in National Economic and Empowerment Development Strategy (NEEDS) which stresses the role of agriculture as the engine for integrated development. This study is therefore of tremendous policy relevance to these stakeholders who are committing enormous human and financial resources to provision of credit for the poor smallholder farmers.

Studies on access to credit and its impact of welfare (Diagne and Zeller, 2001); credit markets in Northern

Nigeria (Udry, 1990), impact of micro-credit on agricultural enterprises (Agom, 2001), social capital and household welfare (Yusuf et al., 1999; Omonona, 2000; Okunmadewa et al., 2005; Yusuf, 2006) and credit constraint condition and welfare (Omonona et al., 2008) have been carried out in Nigeria and other countries. However, these studies did not empirically investigate the determinants of access to credit. This study also differs from the past ones in terms of its objectives, methodology, study area and the scope of the study. Therefore, there is a need to provide information on factors determining households' access to credit in Oyo and Ondo States, Nigeria.

Conceptual framework

The conceptual basis of this study considers credit as a financial capital resource of the smallholder farming households which serves as a necessary input for agricultural production. Zeller et al. (1997) noted that access to credit affects household welfare outcomes through three channels. The first channel is through the alleviation of the capital constraints on agricultural households, and thus can significantly increase the ability of poor households with little or no savings to acquire necessary agricultural inputs, and encourage the adoption of labor-saving, higher-yielding technologies and therefore increasing land and labor productivity, a crucial factor in encouraging development, in particular in many African countries. The second channel through which access to credit affects household welfare is by increasing a household's risk-bearing ability and by altering its risk coping strategy. The third pathway is that access to credit enables households to smoothen their consumption.

Participation in borrowing is a function of the household's or individual's demand for credit and access to credit market. As a sequential decision process, the household or its members should have access to the source of credit before deciding on whether or not to apply for credit. Households' access to credit will be determined by a number of factors. This study aims at investigating the determinants of access to credit. Therefore, this framework proves relevant to this study.

METHODOLOGY

Study area

This study was carried out in two randomly selected States (Oyo and Ondo States) of the South West, Nigeria where NSPFS credit beneficiaries were located. Majority of the people in these States were engaged in farming, trading and artisans. Major food crops grown include maize, cassava, yam, cowpea, sorghum, millet while the tree crops include cocoa, oil-palm, Kolanut, coffee, cashew etc. Ondo and Oyo States present an appropriate representation of the diverse vegetations, agricultural practices and types of crops,

fisheries and livestock found in any part of the South West. The NSPFS was implemented in all the senatorial districts in the six States of the South – West, Nigeria. The NSPFS sites in Oyo and Ondo States were used for this study. The 3 sites in Oyo State are Akufo Farm Settlement in Ido Local Government Area of Oyo South Senatorial District, Ilora Farm Settlement in AFJIO Local Government Area of Oyo Central Senatorial District and Ogbomoso Farm Settlement in Ogbomoso South Local Government Area of Oyo North Senatorial District.

The sites in Ondo State where NSPFS was implemented were Oba-Akoko in Akoko South West Local Government Area of Ondo North Senatorial District, Ogbese in Akure North Local Government Area of Ondo Central Senatorial District and Okitipupa in Okitipupa Local Government Area of Ondo South Senatorial District.

Sources and types of data

Primary data were collected from respondents through a structured questionnaire administered by personal interview. Multi-stage sampling method was adopted in selecting 600 farmers for collection of data for this study based on probability proportionate to size. The data collected were analysed with descriptive and probit regression model. The sampling frame used for the study was the list of farming households (NSPFS and non – NSPFS participants) collected from Oyo and Ondo States Agricultural Development Programmes which are the implementing agencies of NSPFS in the two selected States. The questionnaire was designed to capture information on socio-economic and demographic data like age, gender, household size, size of landholding, years of formal schooling, household income, types of agricultural enterprises, household composition, occupational statistics, average monthly income of each member of the household; and level of household access to credit. Some of the questions requiring recollection from memory were carefully designed with due consideration for the shortest length of time possible for effective recall.

The questionnaire was pre – tested to remove the possibility of any ambiguity in its interpretation and validate its effectiveness and relevance to the study objectives. Household level data were collected from the cross – sectional survey of households in Oyo and Ondo States of the South – Western Zone of Nigeria. All data were collected in the two States using the same instrument and similar data collection methods. The period of interview lasted for a 12 - week period between October and December, 2007.

Sampling procedure and sample size

Multi-stage sampling method was adopted in selecting sample for collection of data for this study to be able to capture the heterogeneity nature of the study area and the NSPFS implementation arrangement. The sampling frame was the list of NSPFS and non-NSPFS participating households involved in the production of maize/cassava, poultry and fishes. This was obtained from Oyo and Ondo States Agricultural Development Programmes. The sampling unit was the household. The first stage of sampling was the random selection of Oyo and Ondo States out of the six States (Oyo, Ogun, Ekiti, Ondo, Lagos and Osun States) that constitute the South West, Nigeria. By implementation arrangement, the NSPFS was implemented on the basis of senatorial districts and equality of States. Each State has three Senatorial Districts with one NSPFS Local Government Area (LGA) per senatorial district. The second stage was the random selection of one senatorial district in each of the two States for the study. Oyo Central and Ondo North Senatorial Districts were selected. The third stage was the stratification of each of the two selected senatorial districts into two strata: i) NSPFS participating LGAs, and ii) non – NSPFS participating LGAs. The fourth stage was the selection of the one

NSPFS LGA and random selection of one non – NSPFS LGA in each of the two selected senatorial districts in the two States. The selection of respondents (beneficiaries and non – beneficiaries) were randomly drawn from these two LGAs in each of the two selected States. The fifth stage was the random selection of 620 households (based on probability proportionate to size of households involved in the different agricultural enterprises) out of which 322 were NSPFS credit - benefiting households and 298 were non – NSPFS credit benefiting households from two selected NSPFS LGAs and two selected non - NSPFS LGAs.

In all, 310 respondents were sampled in each of the two selected States resulting in a total of 620 respondents for the study. However, 608 questionnaires were finally returned from the field. During data processing and analysis, 600 questionnaires (320 NSPFS credit beneficiaries and 280 non - credit beneficiaries) at an average of 300 per State were finally used while 8 questionnaires were discarded due to inconsistency, inadequate information and bias in response to information.

Method of data analysis

The methods of data analysis for this study were based on the set objectives. Descriptive statistics such as frequency, percentage, means and standard deviation were used to analyse important variables like the households' socio-economic characteristics, credit behaviour and agricultural economic interest using SSPS 15.0 package. The probit regression model was used to analyse the determinants of households' access to NSPFS credit.

Analytical model for the determinants of households' access to NSPFS credit

Probit regression model was used to identify determinants of households' access to NSPFS credit because households heads interviewed have two alternatives which are mutually exclusive (access or no access to NSPFS credit). However, for the purpose of this study, those that benefited from the NSPFS credit are regarded as those that have access to NSPFS credit. In this case, the basic principle of discrete choice model for these two mutually exclusive alternatives was applied in modelling of the probit regression and the sample was dichotomised into two categories. A dummy variable representing the household access to NSPFS credit is thus obtained as having access = 1, otherwise = 0. Here, the aim was to determine the marginal contributions and elasticities of some hypothesised variables on the status of households' access to NSPFS credit. The probit model identifies the important variables that best characterise access of households to NSPFS credit.

Model specification

The probit model adopted in this study was used to identify those variables that best characterise the status of household access to NSPFS credit in the areas under study. The basic probit model is given by:

$$Y = \beta_0 + \beta_i X_i + \varepsilon_i; \quad (1)$$

$$X_i = f(D_i, H_i, F_i, I_i, P_i, N_i, E_i, L_i) \quad (2)$$

Where $Y = 1$, if the household head had access to NSPFS credit and 0 otherwise. β_0 = intercept, β_i = regression coefficient, ε_i = error term. D_i = household characteristics, D_1 = age in years, D_2 = household size in number, D_3 = gender, 1 if male and 0 otherwise.

Table 1. Description of explanatory variables.

Variables	Type	Description
Age	Continuous	Age of household head/respondent.
Gender	Binary	Sex of respondent, 1 if male and 0 otherwise.
Household size	Continuous	Household size.
Landholding	Continuous	Hectares of land owned.
Value of other assets	Continuous	Amount of other non – land assets owned by the household.
Years of formal education	Continuous	Years of formal schooling.
Membership of registered farming group	Binary	Belonging to registered farming group, 1 if respondent belongs to and 0 otherwise.
Access to extension services	Binary	1 if respondent has access to extension services and 0 otherwise.
Financial contribution of household head in his/her group	Binary	1 if respondent contributes in his / her group and 0 otherwise.
Access to other sources of credit	Binary	1 if respondent has access to other sources of the credit and 0 otherwise.
Livestock (poultry) enterprise	Binary	1 if respondent major enterprise is poultry and 0 otherwise.
Crop (cassava/maize) enterprise	Binary	1 if respondent major enterprise is cassava/maize production and 0 otherwise.
Fishery enterprise	Binary	1 if respondent major enterprise is fishery production and 0 otherwise
Farm location	Binary	1 if respondent farm is located within NSPFS participating local government/catchment area and 0 otherwise.

H_i = human capital variable, H_1 = years of formal education (years of formal schooling). F_i = financial capital variables, F_1 = access to other credit, 1 = access and otherwise = 0, F_2 = financial contribution in the group, 1 if contributed, otherwise = 0. I_i = institutional factors, I_1 = access to extension services, 1 = access and otherwise = 0, I_2 = membership of registered farming group if yes = 1, otherwise = 0. P_i = physical capital variable, P_1 = value of other non land assets in Naira. N_i = natural capital variable, N_1 = landholding (hectares of land owned). E_i = enterprise factors, E_1 = poultry enterprise, 1 if poultry and 0 otherwise. E_2 = maize/cassava enterprise, 1 if maize/cassava and 0 otherwise. E_3 = fisheries enterprise, 1 if fisheries enterprise and 0 otherwise (reference enterprise). L_i = location factor, L_1 = farm location, 1 if farm located within NSPFS LGA and 0 otherwise.

These variables were selected based on a priori expectation, economic theory, literature search on related previous studies, NSPFS implementation manual and evaluation study on NSPFS. The explanatory variables comprising both the continuous and binary variables are as shown in Table 1.

EMPIRICAL RESULTS AND DISCUSSION

Socio – economic and other assets of the farming households

Socio – economic or household characteristics, financial capital, human capital, natural capital, physical capital, institutional, farm enterprise, welfare and location variables are important variables that influence access of households to credit. The study examined these variables in the study area.

Household demographic characteristics

The three main household characteristics considered in the study were age of the household head, household size and gender composition of the household. The mean age of NSPFS credit beneficiaries was about 52 years,

non-beneficiaries (45 years), credit-constraint-beneficiaries (50 years) and non-credit-constraint-beneficiaries (51 years). The average household size for NSPFS credit beneficiaries was 6 and 7 for non-credit beneficiaries. The mean household size for credit constraint beneficiaries was 7 as against 6 for the non-credit-constraint-beneficiaries. The analysis of household composition revealed that majority of the household members of NSPFS credit beneficiaries (70.31%), non-beneficiaries (66.07%), credit-constraint-beneficiaries (71.95%) and non-credit-constraint-beneficiaries (87.84%) are non – working or dependants (Table 3).

Human capital/assets of households

Level of education and years of farming experience of the household heads were the

Table 2. Determinants of households access to NSPFS credit (Probit model).

Independent variable	Coefficient	Standard error (S.E.)	t-value	Marginal effect (M.E.)
Household characteristics				
Age	0.1469	0.0695	2.12**	0.177
Household size	0.0298	0.2479	0.12	0.167
Gender	0.0150	6.3506	0.00	0.042
Human capital				
Years of formal education	0.1141	0.1718	0.66	0.098
Financial capital				
Access to other credit	-2.4853	1.0829	-2.30**	0.033
Financial contribution	8.2091	1.7243	4.76***	0.002
Institutional factors				
Access to extension services	7.3045	3.6743	1.99**	0.008
Membership of registered farming group	2.4557	1.2467	1.97**	0.003
Physical capital				
Value of other assets	-2.5814	3.8885	-0.69	0.092
Natural capital				
Landholding	-0.2419	0.1244	-1.94*	0.234
Enterprise factors				
Cassava/maize enterprise	-1.0387	1.0045	-1.03	0.057
Poultry enterprise	0.0528	0.1354	0.39	0.005
Location factors				
Farm Location	0.0007	0.0004	1.65*	0.006
Constant	8.5643	7.9113	1.08	
Log likelihood	-19.6007***			
Chi square	129.52***			
Pseudo R ²	0.768			
No of observation (pooled)	600			
No of observation (beneficiaries)	320			
No of observation (non-beneficiaries)	280			

Source: Result of data analysis 2007/2008. ***, significant at 1%, **, significant at 5%, and *, significant at 10%.

Table 3. Household characteristics of the farming households heads (%).

Household characteristic	Pooled data	Beneficiary	Non-beneficiary	Credit constraint	Non-credit constraint
Age (years)*					
Mean	50	52	45	50	51
Min.	32	32	32	34	32
Max.	71	71	62	66	63
S. D.	7.791	8.262	6.769	8.079	8.765
Household size*					
Mean	6	6	7	7	6
Min.	1	1	2	2	2

Table 3. contd.

Max.	16	13	16	16	16
S. D.	2.682	2.634	2.695	2.419	3.478
Gender					
Male	94.67	94.69	94.64	95.53	91.89
Female	5.33	5.31	5.36	4.47	8.11
Dependency ratio					
0.1 – 0.5	31.83	29.69	33.93	28.05	12.16
0.6 – 1.0	68.17	70.31	66.07	71.95	87.84
No of observation	600	320	280	246	74

Source: Result of data analysis 2007/2008. *Actual figures and not measured in percentage.

Table 4. Human capital assets of the farming households (%).

Human capital	Pooled data	Beneficiary	Non-beneficiary	Credit constraint	Non-credit constraint
Level of education (years of schooling)*					
Mean	9.26	9.09	9.44	9.27	8.49
Min.	0	0	0	0	6
Max.	17	17	16	17	17
S. D.	3.594	3.258	3.94	3.339	2.915
Education (type)					
No formal education	52	48	56	49	54
Primary School Education	31	36	25	30	33
Secondary School Education	13	13	14	16	9
Tertiary School Education	4	3	5	5	4
Farming experience (years)*					
Mean	15.14	15.62	14.59	16.02	14.30
Min.	2	3	2	3	3
Max.	50	50	48	50	45
S. D.	11.125	10.794	11.486	10.299	12.28
No of observation	600	320	280	246	74

Source: Result of data analysis 2007/2008. *Actual figures and not measured in percentage.

major human capital variables examined. On education, most of the credit beneficiaries (48%) and non-beneficiaries (56%) had no formal education. However, 54% of the non-constraint beneficiaries of NSPFS credit and 49% of the credit-constraint-beneficiaries had no formal education. In terms of farming experience, the mean years of farming experience of NSPFS credit beneficiaries was 15.62 years, non-credit-beneficiaries (14.59 years), credit constraint beneficiaries (16.02 years) and non-credit-constraint-beneficiaries (14.3 years) (Table 4).

Financial capital/assets of the households

The analysis of financial capital variables shows that 53.33% of the sampled respondents had access to

NSPFS credit while only 30% had access to other sources of credit. The analysis of household head financial contribution to his or her NSPFS primary farming group revealed that majority of NSPFS credit beneficiaries (95.63%), credit-constraint-beneficiaries (94.31%) and non-credit-constraint-beneficiaries (100%) contributed financially to his or her group (Table 5).

Natural capital/assets of the households

Size of landholding was the natural capital variable examined in this study. The mean size of land owned by all categories of farmers was 4.29 ha. A further analysis of the result indicates that NSPFS credit beneficiaries had an average of 5.05 ha, non-beneficiaries (3.42 ha), credit constraint (5.26 ha) and credit unconstrained (4.34

Table 5. Analysis of financial capital assets/credit factors of the farming households.

Financial/credit factor	Pooled data (%)	Beneficiary (%)	Non-beneficiary (%)	Credit constraint (%)	Non-credit constraint (%)
Access to NSPFS credit					
Have access to NSPFS credit	53.33	100	0	100	100
Do not have access to NSPFS credit	46.67	0	100	0	0
Access to other credit					
Have access to other credit	30	14.38	47.86	15.85	9.46
Do not have access to other credit	70	85.62	52.14	84.15	90.54
Financial contribution					
Contribute financially to his/her group or local institution	52.33	95.63	2.86	94.31	100
Do not contribute to his/her group or local institution	47.67	4.37	97.14	5.69	0
No of observation	600	320	280	246	74

Source: Result of data analysis 2007/2008. *Actual figures and not measured in percentage.

Table 6. Analysis of natural capital/asset of the farming household.

Natural capital	Pooled data	Beneficiary	Non-beneficiary	Credit constraint	Non-credit constraint
Size of landholding (hectares of owned land)*					
Mean	4.29	5.05	3.42	5.26	4.34
Min.	0	0	0	0	1
Max.	20	20	13	20	20
S. D.	3.46	4.112	2.234	4.14	3.973
No of observation	600	320	280	246	74

Source: Result of data analysis 2007/2008. *Actual figures and not measured in percentage.

ha) (Table 6).

Physical capital/assets of the households

Household endowment of physical capital is an indicator of the asset endowment and livelihood strategy choice of the rural households. The physical capital examined in this study was the

quantity of other non land assets such as number of small animals, poultry birds, etc. estimated by the current market value of the asset equivalent. The mean value of other non land assets owned by the rural households was N38436.33. On the other hand, the mean value of other non-land assets of NSPFS credit beneficiaries was N34082.50, non – beneficiaries (N43,412.14),

credit constraint (N27,948.37) and unconstrained (N54,474.32) (Table 7).

Institutional factors of the households

Two institutional variables were examined and the result shows that all the NSPFS credit beneficiaries (100%) and only 32.5% of the

Table 7. Analysis of physical capital/asset of the farming household.

Physical capital	Pooled data	Beneficiary	Non-beneficiary	Credit constraint	Non-credit constraint
Value of other assets (N)*					
Mean	38436.33	34082.50	43412.14	27948.37	54474.32
Min.	1500	1500	1500	1500	11500
Max.	780000	250000	780000	250000	120000
S. D.	54756.47	30694.44	72892.64	27594.38	31830.58
No of observation	600	320	280	246	74

Source: Result of data analysis 2007/2008. *Actual figures and not measured in percentage.

Table 8. Analysis of institutional factors of the farming households.

Institutional factor	Pooled data (%)	Beneficiary (%)	Non-beneficiary (%)	Credit constraint (%)	Non-credit constraint (%)
Membership of registered farming groups/local institution					
Belong to a registered farming group	68.5	100	32.5	100	100
Do not belong to a registered farming group	31.5	0	67.5	0	0
Access to extension services					
Have access to extension services	71.17	100	38.21	100	100
Do not have access to extension services	28.83	0	61.79	0	0
No of observation*	600	320	280	246	74

Source: Result of data analysis 2007/2008. *Actual figures and not measured in percentage.

non-beneficiaries belonged to registered primary farming groups. The trend is not different for households access to extension services as all beneficiaries (100%) and 38.21% of the non-beneficiaries had access to extension services (Table 8).

Gross margin analysis of households farm production enterprises

The mean gross margin for all categories of farming households in the study area was N150,724.02. On category basis, the gross margin for livestock farmers shows that the mean gross margin of credit beneficiaries was N327,542.07 as against an average of N76,815.00 for non beneficiaries. A further dis-aggregation of the gross margin for credit beneficiaries shows that the non-credit constrained beneficiaries recorded a gross margin of N355,206.06 while that of the credit constraint beneficiaries was N293,731.85. On the other hand, the analysis of gross margin for crop farmers shows that the mean gross margin of credit beneficiaries was N119,395.98 while that of non-beneficiaries was N67,669.05. The gross margin of the non-credit con-strained beneficiaries was N144,966.67 while that of the credit constrained beneficiaries was N115,999.23. Analysis of gross margin for fish farmers indicates that NSPFS credit

beneficiaries recorded a gross margin of N224,467.86 while non – beneficiaries of NSPFS credit had a gross margin of N153,784.17. A further analysis of the gross margin of the credit constrained beneficiaries was N188,334.29 as against N236,512.38 for the unconstrained credit beneficiaries (Tables 9 to 12).

Determinants of households access to NSPFS credit

Probit regression model was used to identify factors that influence households' access to NSPFS credit in the study area. Table 2 shows the maximum likelihood estimates of the Probit model. The significance of log – likelihood ratio and chi-square shows that the probit model is fit for the analysis. In this model, the coefficients of seven out of thirteen explanatory variables are significant, at least at the 10% level. It is evident from the table that age of the household head, size of landholding, location of the household head farm, access to other credit, financial contribution of the household head in his or her group, access to agricultural extension services and membership of registered local groups are significant that older farmers are more likely to access NSPFS credit. The marginal effect indicates that a year increase in the age of the farmer increases the probability of his variables that influence access of farming households'

Table 9. Analysis of gross margin realised by the farming households.

Gross margin	Pooled data	Beneficiary	Non-beneficiary	Credit constraint	Non-credit constraint
Mean gross margin (N)	150724.02	204392.43	89388.70	199526.49	220568.38
Sum gross margin (N)	90434413	88405577	250288.36	49083517	16322060
Min. gross margin (N)	2860	4100	2860	4100	40000
Max gross margin (N)	11395750	751500	1139750	751500	706000
SD gross margin (N)	142358.10	151384.38	101132.85	154330.23	140938.32
No of observation	600	320	280	246	74

Source: Result of data analysis 2007/2008. * Actual figures and not measured in percentage.

Table 10. Analysis of gross margin realised from crop (cassava/maize) enterprises by the farming households.

Gross margin	Pooled data	Beneficiary	Non-beneficiary	Credit constraint	Non-credit constraint
Average farm size (Ha)	1.47	1.85	1.09	1.83	2.0
Mean gross margin (N)	93532.51	119395.98	67669.05	115999.23	144966.67
Sum gross margin (N)	22447803	14327517	8120286	12527917	1799600
Min. gross margin (N)	2860	4100	2860	4100	103000
Max gross margin (N)	526950	526950	347850	526950	277600
SD gross margin (N)	90999.45	109450.53	57470.76	113210.652	61576.34
No of observation	240	120	120	108	12

Source: Result of data analysis 2007/2008. * Actual figures and not measured in percentage.

Table 11. Analysis of gross margin realised from livestock (poultry) enterprises by the farming households.

Gross margin	Pooled data	Beneficiary	Non-beneficiary	Credit constraint	Non-credit constraint
Average farm size (no of poultry birds)	331	586	179	614	552
Mean gross margin (N)	170837.88	327542.67	76815	355206.06	293731.85
Sum gross margin (N)	27334060	19652560	7681500	11721800	7930760
Min. gross margin (N)	8710	87000	8710	121600	87000
Max gross margin (N)	751000	751000	320500	751000	706000
SD gross margin (N)	181200.42	206572.27	59073.12	214204.76	195453.80
No of observation	160	60	100	33	27

Source: Result of data analysis 2007/2008. * Actual figures and not measured in percentage.

Table 12. Analysis of gross margin realised from fisheries enterprises by the farming households.

Gross margin	Pooled data	Beneficiary	Non-beneficiary	Credit constraint	Non-credit constraint
Average farm size (no of fishes)	2714	2785	2548	2497	3649
Mean gross margin (N)	203262.75	224467.86	153784.17	236512.38	188334.29
Sum gross margin (N)	40652550	31425500	9227050	24833800	6591700
Min. gross margin (N)	7200	40000	7200	55000	40000
Max gross margin (N)	1139750	751500	1139750	751500	250400
SD gross margin (N)	133332.81	105055.05	174367.05	111751.084	71613.52
No of observation	200	140	60	105	35

Source: Result of data analysis 2007/2008. * Actual figures and not measured in percentage.

heads to NSPFS credit. Age of the household head, a household characteristic, positively and significantly ($P < 0.05$) influences access to NSPFS credit. This implies

access to NSPFS credit by 0.177. This finding is consistent with the earlier results of Okurut et al. (2004), Swain (2002) and Zeller (1994) which resolved that age

is an important variable influencing access of households' heads to NSPFS credit.

Two institutional variables – access to extension services and membership of registered farming groups positively and significantly influence households' access to NSPFS credit. Access to extension services and membership of registered farming groups have positive coefficients and significantly ($P < 0.05$) influence households' heads access to NSPFS credit. This shows that households' heads that have access to extension facilities or are members of registered farming groups have greater tendency to access NSPFS credit in the study area. The result implies that access to extension services and membership of farming groups increase the probability of awareness of the households on available credit facilities. This finding is consistent with the result of Omonona et al. (2008) which found that belonging to local level institutions and access to extension agents increases access to credit and reduced credit constraint condition of farmers. The two financial capital variables (access to other credit and financial contribution of households' heads in his or her local groups) examined in this study significantly influence access to NSPFS credit. The coefficient of access to other sources of credit is negative and significantly ($P < 0.05$) influences households heads access to NSPFS credit. This result shows that households' heads access to other sources of credit is likely to decrease the probability of access to NSPFS credit by 0.033. This might occur due to satisfaction of their credit needs from the other sources and hence demand less of NSPFS credit. This result agrees with the findings of Diagne and Zeller (2001) which found that access to formal credit programme is negatively related to access to informal credit in Malawi. Similarly, the coefficient of financial contribution of the household head in his or her group is positive and significantly ($P < 0.01$) influences his or her access to NSPFS credit.

Landholding (size of owned land), a natural capital variable, is significant ($P < 0.1$) and has a negative relationship with access to NSPFS credit. This implies that farmers with relatively small land asset have greater access to NSPFS credit than large land owners. The result further conforms to the focus of NSPFS credit which was targeted at the resource poor small scale farmers. This result is in line with the findings of Okurut et al. (2004) and deviated from Diagne and Zeller (2001) where landholding size has no effect on access to both formal and informal credit. Location of the households heads farm positively and significantly ($P < 0.1$) influences access to NSPFS credit. This result implies that beneficiaries within NSPFS catchment (local government) areas have high probability of accessing NSPFS credit than those outside the catchment area. This is in consonance with the NSPFS implementation arrangement in which credit beneficiaries are drawn from those whose farms are located within the NSPFS participating

local government areas.

POLICY IMPLICATIONS, CONCLUSION AND RECOMMENDATIONS

Summary of major findings

The results of the descriptive analysis indicated that the mean age of credit beneficiaries was 52 years, non-beneficiaries (45 years), credit constrained beneficiaries (50 years) and non credit constrained beneficiaries (51 years). Also, majority of credit beneficiaries (48%) and non-credit-beneficiaries (56%) had no formal education. However, 54% of the non-credit-constraint beneficiaries and 49% of the credit constraint beneficiaries had no formal education. The analysis of financial capital variables shows that 53.33% of the sampled respondents had access to NSPFS credit while only 30% had access to other sources of credit. Only 14.38% of the NSPFS credit beneficiaries, 47.86% of the non-beneficiaries, 15.85% of the credit constraint and 9.46% of non-credit constraint beneficiaries have access to other sources of credit.

The result of the probit analysis of households' heads access to NSPFS credit in the study area showed that age, size of owned land, location of the household head farm, access to other credit, financial contribution of the household head in his or her group, access to agricultural extension services and membership of registered farming groups are the significant variables that influence access of farming households heads to NSPFS credit.

Based on the findings of the study, a number of policy implications and recommendations are hereby made to ensure improved access of households to NSPFS credit and that this translates to positive improvement in agricultural production. The most important ones are:

- i) The mean age of 52 years for beneficiaries of NSPFS credit as opposed to 45 years of age for non-beneficiaries has serious implication for sustainable agricultural development.
- ii) Access to extension facilities is expected to induce households' awareness and access to NSPFS credit. However, majority (61.79%) of the non-beneficiaries did not have access to extension facilities. Educational level of the households is expected to complement the households' level of access to extension facilities in enhancing the level of awareness and access of households to NSPFS credit. However, majority (56%) of the non-credit beneficiaries had no formal education.
- iii) Farming households and farms located outside NSPFS participating local government areas (catchment area) are automatically excluded from the programme. The implication of the implementation of NSPFS for improved welfare and food security of the households suggests the need to reach majority of the farming population.

The study shows that access of households to credit under the National Special Programme for Food Security (NSPFS) is determined by farmers' age, size of land holding, location of the household head farm, access to other credit, financial contribution of the household head in his or her group, access to agricultural extension services and membership of registered farming groups. The result of this study is expected to serve as a pointer to NSPFS stakeholders and policy makers on ways of ensuring effective access and delivery of NSPFS credit to the smallholder resource poor farmers. Based on the analytical results obtained and their policy implications, the following recommendations are hereby made:

- i) Efforts to ensure sustainable agricultural production should be targeted at the active population who are relatively young to carry out the business of farming. There is therefore the need for policy support for improved credit access, empowerment and more active involvement of the youth and younger population in the NSPFS. This would also serve as a succession arrangement to ensure that there is no generational gap in agricultural production.
- ii) Specific policies addressing the constraints and limitations to formal education and agricultural extension services should be designed by the stakeholders in agricultural development to increase households' awareness, access to and effective use of NSPFS credit for agricultural production.
- iii) Given the limited scope of implementation of NSPFS in three LGAs per State and the significant influence of location on access to NSPFS credit, there is need to scale up and expand the scope of implementation of NSPFS to cover more 'local government areas' for a wider benefit of the programme to reach majority of the people.

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