



RICE FARMER AND CAPITAL FORMATION: A CASE STUDY OF RICE FARMER'S CREDIT COOPERATIVE IN ITOIKIN, IKOSI-EJIRIN LCDA, LAGOS STATE

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ABSTRACT

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This study set out to examine capital formation among rice farmers who belong to rice farmers' credit cooperative and to isolate factors that determined why some farmer accumulate capital more than others using Itoikin rice farmers' cooperative society. The study draws on two sources of data namely household level surveys and secondary data to get insight about the size and composition of capital formation among rice farmers. The results showed that on average, farmers were 50 years with about 4 years of education, 6 persons in household size and about ₦73,004.37 as mean income. Capital Formation takes the form of agricultural land, rice, agricultural machinery and equipment. The results further showed that about one-quarter of the net addition to fixed capital come from household savings and the rest three-quarter are borrowed from Cooperative and other sources. Regression results indicate that the most important factors determining the level of capital formation are age, the income from rice, Loan from cooperative and other sources and farm holdings. We also found that an increase in the average education of the farmers increases agricultural capital significantly. Education of farmers/rural dwellers should be at the front burner of all rural transformation agenda.

Contribution/ Originality: The study documents that capital formation took the form of agricultural land, rice agricultural machinery and equipment. One-quarter of the net addition to fixed capital comes majorly from farmer's savings and borrowing from cooperative. Age, Rice income, Cooperative borrowing and education are important determinant of level of capital formation.

1. INTRODUCTION

Agriculture occupies the central position of the Nigerian economy. It contributes about 19 percent to the Gross Domestic Product (GDP) and provides sources of jobs to over 70 percent of the total working population. The state of Nigerian economy presently and the requirement for advanced technological changes in the agricultural sector necessitated the requirement of more working capital. Among other significant inputs which ensures adequate working capital as well as infrastructural development, Credit or loan stand out. When credit or loan are provided

in required size and as at when needed by farmers, it will lead to vital increases in agricultural output which in turn accelerate economic development of the cultivators and people attached to cultivation.

The emphasis on agricultural credit is on continuing institutionalization for providing auspicious and sufficient credit to farmers for increasing agricultural output and productivity. It also aims at better access to corporate credit for small and minor farmers and other fledging sections to ease adoption of modern technology and improved agricultural practices. Agricultural credit has been distributed through a multi-staged network consisting of Commercial Banks, Agricultural Banks and Credit Co-operatives. Cooperatives commenced in Nigeria in 1934 and since then each succeeding government has bestowed on them financial, legal, educational and administrative privileges, in view of the objectives set out for them. Since inception, cooperatives have been located not in one but different ministries such as Agriculture, Rural Development, Community Development and Trade. Government policy guiding cooperatives is typified by the Eastern Nigeria Policy Paper of 1955 on cooperation: The Government acknowledges the value of cooperative societies in the national life. That they are valuable because in cooperative societies people organize themselves for active participation for measures to promote their own welfare and economic development (Ijere, 1983).

In Nigerian agriculture today, a fast-moving technological revolution is now underway due to the dwindled income from oil occasioned by the combined forces of global economic downturn and the activities of Niger-Delta militants. This aims at the mechanization of major farm production activities on a huge scale and the creation of a vast volume of low-cost standardized food products for the markets. This is a highly capital-intensive development which is likely to drive traditional or local farmers/producers out of business. The implication of this is farmers have to compete harder to survive. Competing also means adopting cutting-edge technology, and expansive spending on the new wave of bio-technological production, which can be expensive business. Some school of thought regard capital as the vulnerable point of cooperatives. According to them, the current challenge facing farmers and their cooperatives is to mobilize enough funds to meet the growing demands of capital-intensive investment in cutting-edge technology. Hence, it is pertinent farmers generate enough funds to acquire and use this technology or they are simply forced out of business. Capital formation can be defined as the transfer of savings from households and governments to the business sector, resulting in increased capacity, output and economic expansion (Wikipedia). It is important to stress that cooperative capital has an important quality dimension and that higher proportions of member capital (including indivisible reserves, share capital, loan-deposit ratios, etc.) are positively correlated with higher levels of member commitment, participation and control and with improved cooperative business performance and growth. The concern is why some rice farmers are more in agricultural capital than others for the same level of total asset and socioeconomic conditions. The focus of researchers has been on studying the sources of productivity growth and productivity differences in agriculture among farmers and regions over time while the issues pertaining to the impact of Membership of farmers in credit Cooperatives on accumulation of capital stock in agriculture in rural areas have not received adequate attention. The gap which this study seeks to fill.

1.1. Objectives of the Study

The broad objective of this study is to assess how capital are accumulated and factors that determined capital formation among rice-based farmers' cooperative members in Itoikin, Ikosi-Ejirin local Council Development Area of Lagos State. Specific objectives are to:

- Profile the socio-economic characteristics of the cooperators in the study area;
- Identify the sources of capital formation among rice farmers cooperators;
- Isolate factors that determine capital formation among rice farmers cooperators.

2. CONCEPTUAL FRAMEWORK

The concept of capital is multidimensional and very complex. It generally means the productive resource of the economy as well as command over resources in financial sense. In this study, the focus is on non-financial capital only. Generally non-financial capital is defined as productive assets which are i) sturdy, ii) reproducible and iii) tangible. It is imperative to understand the classification of capital assets in order to conceptualize the notion and different components of capital in agricultural sector. The System of National Accounts (SNA) of the United Nations classifies the non-financial asset as follows.

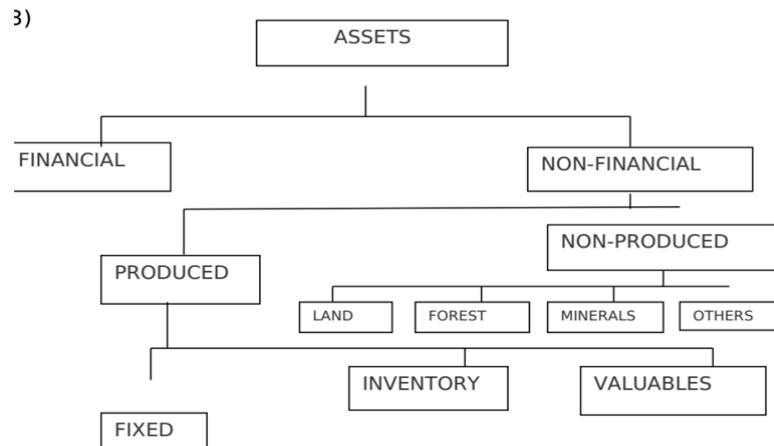


Figure-1. Classification of Assets

Source: The System of National Accounts (SNA) of the United Nations

From policy point of view, it is crucial to distinguish between capital formation for agriculture and capital formation in agriculture. While the latter is the endogenous response of household or firm about how much capital to accumulate, the former hinges mostly on exogenous intervention by the public sector. Conceptually, the latter can be the outcome of the former. Basically, the study would concentrate on the latter. Therefore, in order to promote capital base in agriculture, taking stock of agricultural markets, rural infrastructures, research and development (R & D) in agriculture, agricultural credit, etc. are also as important as studying the factors of production and technology of the production process.

It has been said that, in estimating the Gross Farm Capital Formation (GFCF) for agriculture, Agriculture, Forestry and Fishing, Manufacturing, Electricity, Gas and Water supply, Construction, Trade, Railways, Transport by other means, Storage, Communication, Banking and insurance, Real estate and Ownership of dwelling, Public Administration and Defense, Agricultural Education and Research must be considered. It is a daunting task to estimate the contribution of the above sectors in agriculture. Generally capital in manufacturing of fertilizer, pesticides and agricultural machinery is for agriculture and should be accounted in GFCF for agriculture. But there are some manufacturing goods which serve dual purposes (used both in agriculture and households) such as pesticides. Here proper analysis should be done to determine how much is used in agriculture. Similarly, proportion of electricity, gas and water used in agriculture needs to be estimated. Construction for agriculture includes rural roads, storages, markets, etc. It is also difficult to estimate the share of capital formation in trade used for agriculture. Since railways and other transportation are used for carrying food grain and inputs, a share of capital formation in this sector should also be included. Similarly, services of banking, insurance, public administration and defense are used in agriculture and therefore be considered for estimating capital formation for agriculture.

On measurement, there are number of methods for estimating GFCF in agriculture. However, all of these methods and techniques cannot be implemented across all countries. Two major issues mostly determine the selection of methods of measurement. First, the selection of measurement techniques may vary across countries due to structural differences. Secondly, the paucity and low-quality data forces one to select one method over others.

The gross capital stock of agricultural equipment is generally estimated from the Perpetual Inventory Method (PIM). The PIM generates an estimate of the capital stock by accumulating past purchases of agricultural equipment and deducting the value of agricultural equipment that have reached the end of their service lives. Sectorial GFCF of different sector such as crop production, poultry, fisheries, livestock, etc. can be obtained by collection of primary data. GFCF can also be measured by asset-based approach and Industry-of-use approach. In the asset based approach, capital formation due to construction is obtained through commodity flow approach, machinery and equipment from industrial survey result, and increment in livestock from livestock census. Change in stock is estimated industry wise. GFCF by industry approach estimates the GFCF for public, private corporate and household sectors separately. Since the focus in this study is largely sectorial viz-a-viz rice farmers, consequent on primary data, PIM approach was adopted in computing capital formation in rice farming.

Empirically, Hossain (2004) reported some indirect indicators of capital formation on a farm such as number of livestock and poultry, mechanized irrigation and cultivation. Adopting GFCF approach, census data shows that livestock per capita and livestock per household have decreased over time. However, poultry per capita has increased. While there is no comparable data on mechanized cultivation, household surveys indicate that the use of power tiller, paddy thrashing machine and hand spray machine has increased substantially. Census and sample survey conducted by Federal Ministry of Agriculture show that the number of power pumps, shallow and deep tube wells and also the areas under these technologies have grown significantly, indicating greater capital formation in this sector. This study also draws on two household level surveys to get insight about the size and composition of capital formation in agricultural households. Both the study indicates that GFCF takes the form of agricultural land, livestock, agricultural machinery and equipment. Hossain (2004) further found that about one-thirds of the net addition to fixed capital come from household savings and the rest two-thirds are borrowed from Microfinance Institutions and banks. Regression results indicate that the most important factors determining the level of capital formation are the income from crop and income from livestock, poultry and forestry. Income from business and rent are not significant. He also found that an increase in the average education of the household members increases agricultural capital significantly.

3. METHODOLOGY

3.1. Study Area

Itokin is a town situated in Ikosi-Ejirin Local Council Development Area (IELCDA), carved out of the old Epe Local Government. Itokin is a coaster town know for cultivation of both swampy and upland rice. It host part of the Lagos State Government programme on rice for job. The Rice farmer cooperative has been organized and operating for some time and it is a major cooperative in the LCDA.

3.2. Sources and Type of Data

Data for this study were derived from primary and secondary sources. Primary information elicited using purposive sampling method through the use of questionnaire from 100 rice farmers who are members of the rice farmers' credit cooperative. The questionnaire elicited Information on the socio-economics characteristics of farmers such as age, gender, income from various enterprises on the farm and income from rice, number of years of education and household size. Also collected from the farmers are the amount of loan received from cooperative in the last twelve month and loan from other sources; equipment/tools owned before last twelve month and purchased in the last twelve months. The secondary data entailed the information sourced from Cooperators statement of account from the society and are used to corroborate the primary data. All the 100 questionnaire were collected and the information elicited collated and used for the analysis in this study.

3.3. Analytical Techniques

Descriptive statistics such as percentage, mean and frequency were used to describe the socio-economics characteristics of respondents and their pecuniary activities while multiple regression analysis technique was used to isolate the factors that determine capital accumulation by rice farmers. The regression analysis is expressed as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e_i \quad (1)$$

Where, Y = Agricultural Asset (₦)

β_0 = Intercept

X_1 = Age of farmer/cooperator (Years),

X_2 = Gender (1 if male; 0 if female),

X_3 = Livestock, poultry, forestry income (₦),

X_4 = Rice Income (₦),

X_5 = Household size (No. in family),

X_6 = Cooperative Loan obtained (₦)

X_7 = Sum of Yearly remittance sent to farmer (₦), and

X_8 = Education of farmer (Proxied by numbers of years in formal school).

X_9 = Loan from other sources (₦)

4. RESULTS AND DISCUSSION

4.1. Socio-Economics Characteristics of Respondents

The socio-economic characteristics of rice farmers with membership of Rice Farmer credit Cooperative are presented in Table 1.

Table-1. Socio-economic Characteristics of Respondents

Characteristics	Mean	Standard Deviation
Age of farmers (Years)	49.64	0.0865
Income from other sources (₦)	13254.87	0.6780
Rice Income (₦)	34749.5	0.8601
Household size	6.09	0.0474
Cooperative Loan (₦)	128183.6	0.7865
Remittances (₦)	25000	0.1009
Education (years)	4.14	0.6740
Loan from other Sources (₦)	84674.28	0.7641
Farm Size (Ha)	0.04	0.9056

Source: Author's Computation from field survey

Table 1 gives some basic demographic and socio-economic information of the households. The average age of the farmers is about 50 years and these farmers do not have much education. On an average, they have only four years of education which indicates high levels of illiteracy among farmers. The average size of the households of about 6 persons is an indication of large household. Large household size ensures availability of family labour to address labour challenges on farm. Mean land holding of agricultural land is 0.04 hectares, which implies that respondents are largely smallholders. The mean income source from rice production (₦128183.6) which is the major activity of the farmers is greater than from other sources (₦13254.87), which is an indication that rice farming is a major occupation of these farmers. The mean loan size from their cooperative (₦128183.6) is larger than from other sources (₦84674.28), an indication of the major role played by their credit cooperative in capital formation in rice farms in the study area. The mean sum of internal remittances or remittances received from family member living outside the study area was ₦25,000.

4.2. Capital Formation in Rice farms in the Study Area

Table-2. Investment in rice farms and its financing during Last 12 Months

Purpose		Self-financed (₹)	Short term Loan(₹)	Long term Loan (₹)	Total Loan(₹)	Total Outstanding loan (₹)
Purchase/Hire of Capital goods	Machinery and equipment	7744.32	17354.51	13333.33	30687.84	24174.44
	Tractor Hire	1626.42	4525	75000	79525	48310
Working capital	Seed	4361.32	6575.13	14800	21375.13	9630
	Fertilizer	8821.28	11908.96	20050	31958.96	18006.45
	Irrigation	6299.10	5907.69	3100.30	9007.99	4199.91
Other Purpose	Land development	5897.06	15600	1000	16600	6800
	Others- Pest-control, sack, etc	6052.71	22803.85	75900	98703.85	47872.50

Note: Short term implies loan for less than one year and long term implies loan for more than one year.

We categorize the investment into three groups - purchase of capital goods, working capital and others (e.g., land development, purchase sacks, pest-control). About one-quarter of the finance for machinery and equipment come from farmers' personal savings. Personal savings of farmers also formed about one-third of investment in aggregate working capital which includes expenditure on fertilizer, seeds and irrigation. The components of farmers savings in other purpose such as land development, cost of pest control etc. is miniature with one-twentieth of the total loan for that purpose. It is not surprising that investment in other purpose is relative huge considering the menace of pest such quiver birds to rice farms. On aggregate, share of loan is five times the share of own savings in the investment made by rice farmers in the last twelve month on their farms. On sources of the external fund used in investment, the long term loans are loans from their cooperatives while the short terms loans are from other sources as indicated by the farmers. This indicates that these farmer cooperators could not satisfied all their loan requests through their cooperatives alone and cooperative source is still the best in terms of loan duration for investment in farming especially for small holders.

Table 3 is crucial to the understanding of the capital formation among rice farmers in the study area as revealed by the cross sectional data. The table presents the data on stock and value of the different capital components of capital used in rice production. Listed are 6 types of fixed capital common among rice farmers.

Table-3. Mean expenditure on rice farm, equipment, machineries

S/No	Items	Current quantity (Nos.)	Current Value (₹)	Total cost (₹)	Major maintenance/repair cost in last 1 year (₹)
1	Tractor	2	378857.14	60000	11285.71
2	Power Tiller	2	32111.11	43400	7750
3	Water Pump	1	9125	2000	2140
4	Thresher	1	4041.30	6161.11	820.43
5	Sprayer	1	823.61	1234.08	267.69
6	Others	1	4000	15000	2000

Source: Society book and Field survey

The Credit Cooperative hold in trust two tractors for their members, and members pays for hire to use them for their farm operations. Using the amortization technique, the total value of the tractors to the 100 farmer cooperators, adjusting for depreciation as at the time of the study was ₹378,857.14; total value for power tiller i.e. harrow, plough etc. was ₹32,111.11 and for water pump, threshers, sprayer and others were ₹9,125, ₹4,041.30,

₦823.61 and ₦4,000 respectively. On average, farmers hired tractors for four hours per season at the rate of ₦15,000 per hour. The average of data collected for other fixed capital were computed as shown on table 3.

In terms of total value, investment in tractor and power tiller and water pump machine dominated the investment profile of the farmers. Similar trend is observed in all other headings.

4.3. Determinants of Rice Farmers' Farm Assets

The factors that determines capital formation among the rice farmers were estimated using equation (1). The results of the estimated regression analysis are presented in Table 4. The dependent variable is the agricultural asset which is the summation of the current market values of agricultural land, crop inventory and equipment. The coefficient of determination (R^2) as adjusted gives the value of 0.78 (Table 4) implying that 78% of the variation in level of capital formation by rice farmers is explained by the independent variable. As shown in the Table, the performance of individual variables included in the regression indicate that income from other sources (Livestock, poultry, forestry income), household size and yearly remittances do not significantly influence capital formation in the study area. We include incomes of the rice farmer from different sources. It turns out that the most important one is the income from rice production. Income from other sources (livestock, poultry and forestry) is not significant. It is surprising that in spite of observed large size of household among participants, household size was not significant. This is a defiant of known theories – even the substitution effect of technology for manual labour on the farm should make this variable significant in the negative direction. It could be a revelation of effect of underplay of other factors that are important in capital formation included in in the model. Yearly internal remittances was not significant and negative. This outcome align with explanation among development economists that increase in remittances leads to loafing and increased consumption rather than investment (Adams, 2005). The parameter estimates of the remaining six of the nine variables turned out to be the main factors influencing capital formation among this farmers in their rice farms. They are Age, Rice income, Cooperative loan, Education, Loan from other sources and Farm size.

Table-4. Estimates of Factors that determines Rice Farmers Capital Formation

Variables	Coefficient	Standard Error	T-value
Age	72104.89	29675.94	2.43**
Livestock, poultry, forestry income	-0.004	0.082	0.05
Rice Income	0.182	0.07109	2.56***
Household size	0.016	0.01777	0.900
Cooperative Loan	0.499	0.01559	3.08***
Yearly remittance	-0.035	0.2692	-1.302
Education	644.14	286.2844	2.25**
Loan from other sources	15532.08	5177.36	3.01***
Farm size (Ha)	5.885283	2.618464	2.246**
Number of observations	100	100	100
Constant	0.0861	0.04305	2.03**
R^2	0.777		
Adjusted R^2	0.7833		

***= 1% significant, **5% significant, *10% significant

These results implied that an increase in age, rice income, cooperative loan, education, loan from other sources and farm size would lead to an increase in farm capital significantly. Positive significance of age suggest that the older the rice farmer the more capitalised their farm. This however, contradict the previous studies on farmers and technology use, which show a negative relationship (Rafael *et al.*, 1999; Olomola, 2000). The coefficient of rice income ($\beta=0.182$) indicates that increases in rice income increased farm capital. As expected, positive significance ($\beta=0.499$) of cooperative loan shows that increase in cooperative credit lead to increased ability to capitalize farms

among rice farmers. This is so because, cooperative loans are long term loan which give time allowance to farmer to repay without stress. It is also found that an increase in the average education of the farmers increases agricultural capital significantly. This confirms the role education play in appreciation and acquisition of technology especially among farmers. Unexpectedly, Loan from other sources was found to significantly lead to larger farm capital. This implies finance in agriculture is critical and no one source could adequately satisfy the yearning of productive farmers. Finally, as expected, farm holding is positive and significant depicting that the bigger the farm size, the more the farmer would like to increase capital in farming. Actually the bigger the farm size the better the capacity to yield incentives for reinvestment and acquire more capital in farm operations.

5. CONCLUSION AND RECOMMENDATION

Capital accumulation in agriculture among private farms has been the least studied and investigated among researchers. This study primarily investigated and took stock capital formation among selected rice farmers who are members of rice farmers' credit cooperative in Itoikin in Ikosi-Ejirin local council development area of Lagos state. Both secondary and primary data elicited from hundred farmers who were purposively selected for the study were analysed using percentages, mean and multiple regression techniques. Results indicates that on average, farmers were 50 years with about 4 years of education, 6 persons in household size and about ₦73,004.37 as mean income. Capital Formation takes the form of agricultural land, rice, agricultural machinery and equipment. The study further found that about one-quarter of the net addition to fixed capital come from household savings and the rest three-quarter are borrowed from Cooperative and other sources. Regression results indicate that the most important factors determining the level of capital formation are age, the income from rice, Loan from cooperative and other sources and farm holdings. We also found that an increase in the average education of the farmers increases agricultural capital significantly. Based on fore-going, policy measures that promote education of farmers/rural dwellers and ease access to credit facility of long term duration is recommended.

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