

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Equitable and sustainable economic development cannot ignore basic food commodities particularly in developing countries such as Nigeria. Basic food commodities play important roles in economic development as their availability and costs impinge on food security, expenditures and incomes of households, particularly among poor segments of the population in both rural and urban areas. Of all the basic food commodities, rice is particularly important (Akpokodje 2011). Rice is one of the most consumed staple foods in Asia, Europe and in Africa. In Africa, it is observed to be more important in the urban centers where evidence of rising level of income is more prominent (Lang, 2010) and (Fulani, 2010).

International Cooperative Alliance (ICA) (2010), defines cooperative as an autonomous association of persons unified voluntarily to meet their common economic, social and cultural needs through a jointly-owned and democratically controlled enterprise. It is a business voluntarily owned and controlled by its member patrons and operates for them and by them on a non-profit basis. It is also a business enterprise that aims at complete identity of the component factors of ownership control and use of services (Nweze, 2001). There is no consistency to the exact origin of the cooperative movement, however, many scholars believed that the Rochdale Pioneers of 1844 started the organization of cooperative societies in England as a panacea to the inconveniences caused to workers as a result of the exploitation of workers by the then capitalists (Gertler, 2001; Gibson, 2005 and Arua, 2004). Even though cooperatives appeared in the previous century, Rochdale society is seen as the first modern cooperative since it was where the cooperative principles were developed (Gibson, 2005 and Levin, 2005).

International Cooperative Alliance (ICA), a non-governmental organization, was established in 1895 as an umbrella organization to promote friendly and economic relations between cooperative organizations throughout the world. The ICA also aims

to promote exchange of information such as news and statistics between cooperatives through research and reports, directories, conference and publications (Onuoha, 2002). Cooperative societies are very popular in Nigeria. Onuoha (2002) in his study of cooperative history in Nigeria state that there are traditional and modern cooperative societies. The modern cooperative societies started in the country as a result of the Nigerian cooperative society law enacted in 1935 following the report submitted by C. F. Strickland in 1934 to the then British colonial administration on the possibility of introducing cooperatives into Nigeria.

Cooperatives Societies in Nigeria like their counterparts all over the world are formed to meet people's mutual needs. Cooperatives are considered useful mechanism to manage risks for member in agriculture. Through cooperatives, farmers could pool their limited resources together to improve agricultural output and this will enhance socio-economic activities in the rural areas (Ebonyi and Jimoh, 2002).

Arua (2004) viewed cooperatives as an important tool of improving the living conditions of farmers. According to Bhuyan (2007) cooperatives are specially seen as significant tools for the creation of jobs and for the mobilization of resources for income generation. Levi (2005) asserted that cooperatives employed more than 100 million men and women worldwide.

In the same light, Igboji, Anozie and Nneji (2015) say that between the years 1961-2002, per capital consumption of rice in the world increased by 40%. It is perhaps the world's most important food crop being the staple food of over 50 percent of the world's population. Nigeria is one of the largest rice producers in West Africa (WARDA, 2014). In Nigeria, also, it is one of the important cereal grains replacing some of the grains and tuber crops. Rice used to be the "white man's" food meant only for the elites and high class individuals in the society. Before Nigeria independence up till the 80s, the middle class and the peasants, who constitute a higher percentage of the population, only ate rice at Christmas and other major festive periods. Many of them had the belief that rice symbolized Christmas and vice-versa (Ogbuakanne, 2011).

However, in recent times the cost of imported rice in Nigeria has increased as such making rice scarce and unavailable to some households, forcing the populace to demand for local rice. To meet this increased demand for local rice, Talpur (2011) is of the view that intensification of yield from each unit of land harvested to a crop must be increased. However, production has increased over the years from an average of 300,000 tons in the 1990s to over 4 million tons in the year 2013 (FAOSTAT, 2015).

Igboji and Nwankwo (2015) submit that local rice production is expanding in Nigeria as such bound to reduce drastically the foreign exchange spending on rice importation and more importantly lead to the transfer of money into hands of the very vulnerable group of the Nigeria economy. Farming cooperatives are seen as an institutional engine to improve smallholder agricultural performance and they have increased very rapidly in recent years in production of tea, coffee, rice, maize, Irish potatoes, vegetables, fruits, milk, meat and fish (USAID,2013). Agricultural cooperatives play a great role, mainly in rural areas, in distributing subsidized inputs (especially mineral fertilizers and improved seeds), in joint production and in marketing (Chambo, 2009).

Cooperative effectiveness depends on the natural potential of regions and the level of external technical and financial assistance. In high productive regions, cooperatives are profitable and enable members to invest further in order to increase production and income levels. (ROR,2006) Rice is one of the priority crops in Nigeria and it is cultivated by low-input and low-risk smallholder farmers. (Alene 2003). Rice is a factor of monetization of rural areas because almost the total production is easily commercialized and generates income for producers. Rice development in South-East is facing various challenges such as poor quality of seeds, poor control of pests and diseases and poor management of cooperatives. However, some of the priority intervention axes concern improving productivity from current 5.5t/ha to potential 7t/ha through supplying improved seeds and fertilizers (farmers are currently advised to adopt standard fertilizer recommendations), controlling pests and diseases and improving farm operations, and expanding the capacity of extension system in order to enable efficient transfer of technologies on production, soil and water management, pest and disease management, harvesting, post-harvest handling and storage of rice in marshlands. (Alene, 2003), In agricultural zone in South-East Nigerian, about 45% of

rice growers are women, while their rate is 60% in the retail sub-sector. Rice farmers belong to more than 60 cooperatives, distributed within 29 rice schemes country-wide. Most of inputs and other elements of value chain reach individual farmers through cooperatives. Farmers borrow inputs from the cooperatives. At the end of season, the cooperatives collect grains equivalent of inputs from farmers. Despite the absence of cash or mortgages in such transactions, most of the cooperatives are performing efficiently. Akande, (2002), observes that from the perspective of sustainable agricultural growth in Nigeria, the most fundamental constraints are the Peasant's production system with its low productivity, poor response to technology and adoption strategies and poor returns on investment. Martin (2002) further reported that some of the problems of peasant farmers include soil infertility which is caused by water and wind erosion and inadequacy of rain-fed agriculture.

According to Eze (2000) problems of peasant farmers are attributed to the treatment of information delivery by most African government. Agricultural information is not integrated with other development programme to address the numerous related problem that face farmers. The information is exclusively focused on the policy makers, researchers and those who manage policy decision with scant attention paid to the information needs of the targeted beneficiaries of the policy decision which is the peasant farmers. Adisa (2005) posits that a suitable approach for the development or enhancing peasant farmers' effort is through participatory development approach. Participatory development approach is a process that concerns the relationship between different stakeholders in a society such as social group and community-based organizations. Participation is an active process whereby beneficiaries influence the direction and execution of development projects rather than merely receiving share of the project benefits. This strategy advocates that peasant farmers should be involved in project planning, design and execution so that they have a stake in the success of the project; one of the participatory development approaches is agricultural cooperative. Agricultural cooperative also known as farmers' cooperative is where farmers pool their resources in certain areas of activity, Patrick, (2007).

Farmers' cooperatives are private member-oriented, voluntary associations that operate on the principle of a democracy and market economy. Farmers' cooperatives are established by likeminded persons to pursue mutually beneficial economic interest. They provide goods and services to each other and general public in cost effective ways, prevent exploitation of members through self help projects. Furthermore, they defend and protect the right of people as producers and consumers of goods and services and promote mutual understanding and peaceful co-existence among the people (Agbo,2000). Above all, efficiently functioning cooperative organization, according to Eze (2000), inculcates in members a sense of security and participation in development programme meant for them, therefore enhancing the performance of these cooperatives stands a sustainable and veritable instrument for enhancing agricultural development.

To ameliorate the growing demand for rice, the government through its policies and appropriate Ministries has been accelerating rice production around the country. Cooperative enterprise is one of the vehicles for increasing rice production in Nigeria. Co-operative Society is a voluntary association started with the aim of rendering service to its members. It is a form of business where an individual with identical problems or common felt-needs combines their resources for the achievement of their common goals. These are generally formed by the poor people or weaker sections of people in the society. When formed by farmers, it is referred to as agricultural cooperatives. If farmers are becoming more efficient to produce their products at lower cost and to sell them at a fair price through Cooperative Society Marketing system, then it would be possible to achieve higher economic growth. It is pertinent to mention here, that it would not be possible to ensure better living standard of our farmers without bringing farming within Cooperative Society throughout the country.

1.2 Statement of the Problem

Co-operative Society is a voluntary association started with the aim of rendering service to its members. It is a form of business where individuals belonging to the different class join their hands for the promotion of their common goals. The fact that individuals pool their resources together in order to engage in a profitable economic activity, tells us that being unprofitable would be worrisome. Profitability of the business of farmer's multipurpose cooperative society is of paramount importance to members in achieving set out objectives of forming the society; which among other things comprise of economic sustainability, Improve standard of living as well as better farming method.

Various factors contributing to constraints in rice production, such as physical, biological, socio-economic, and institutional constraints, can be effectively improved through participatory research and government attention. (Tran, 1997). Pests and diseases, birds and reptiles can cause significant yield loss in rice crops and successful control is crucial to farmers' ability to produce rice profitably. Pest and disease incidence damage vary widely, so that knowledge of pest ecology and dynamics is therefore, necessary to allow farmers to take appropriate action to manage their rice crops effectively (Defoer, whopperreis, Tones, lancon and Erenstein, 2002).

Developing rice varieties that meet farmers' quality requirements, resistant to pests, diseases, that can tolerate stresses is a major challenge. New rice varieties are needed that can perform well under constantly changing farming systems and environments (drought-prone environments) (Kaaria, Kirkby, Delve, Njuki, Ttwinamasiko and Sanginga, 2004). According to WARDA (2004), the key biophysical constraints are the availability of water and nutrients; in some lowland areas. Lack of adequate drainage is also a major problem. The scarcity of water is perhaps the biggest challenge to increase rice production worldwide. In order to fulfill potential high-yielding, modern rice varieties need good water management and an adequate supply of nutrients, particularly nitrogen.

Some other major constraints identifiable with profitability in rice production include: persistent use of poor quality seed, inadequate supply of fertilizer, lack of farm land and labour, high input costs and limited access to farm credit, use of inappropriate crop and resource management practices, due to general lack of knowledge of improved technologies, limited access to improved varieties (duration and yield), socio-economic problems, lack of appropriate small farm machinery for harvest and post-harvest operations, high labour cost, inadequacy of capital, scarcity of improved rice seed, pest and diseases, inadequate research and extension support, especially in the South-East of Agricultural zones and localized problems of soil degradation. (Lancon, Erenstein, Akande, Ttitilola, Akpokodje and Ogundele, 2003). Igboji, Anozie and Nneji (2015) assert that the major constraints limiting the rice production were identified as economic problem, infrastructural issue and unfavorable government policies.

In summary, the issues and constraint affecting profitability of rice production, gross margin, gross ratio, operating ratio and return on capital invested on rice output are related to factor inputs and socio-economic influences on rice outputs., Issues of factor inputs involves availability of rice seeds for cultivation, timely supply and availability of fertilizers, access to and ability to take hold of sizable farm land suitable for rice cultivation as well as availability of labour. In spite of the myriads of problems identified above which can jeopardize the potentials of filling the rice demand and supply gap in Nigeria, It is against this background that this work was designed to brace up to this research gap challenge.

Moreover, the rural poor are better helped if key constraints are targeted and options identified so that farmers can adopt alternatives that enhance their life style. The complexity of their needs has to be distilled into viable choices that are apparent, readily available, and sensitive to their environments. The study, therefore, is sought to ascertain, the profitability of rice production among members of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria.

1.3 Objectives of the Study.

The broad objective of this study is to determine the profitability of rice production among members of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria.

The specific objectives are to:

- 1 Determine the relationship between productivity and the factor inputs on rice output.
- 2 Examine the relationship between rice output and profitability.
- 3 Examine the influence of farmer's socio-economic variables on profitability of rice production.
- 4 Examine the influence of rice production constraints.

1.4 Research Questions.

Based on the background of this study, the statement of the problem and the objectives, the following research questions were formulated.

1. To what extent is rice output influenced by farm inputs such as rice seeds, fertilizer, farm size and labour?
2. Is there a significant relationship between rice output and profitability indices such as gross ratio, operating ratio and return on capital invested?
3. Do socio-economic characteristics of rice farmers have any significant effect on profitability of rice production?
4. To what extent do constraints such as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases birds and reptiles, affect rice output?

1.5 Hypotheses

To direct the flow of the study, the following null hypotheses were formulated.

1. H_1 Rice output is not significantly influenced by farm inputs such as rice seeds, fertilizer, farm size and labour.
2. H_2 Rice output is not significantly related to rice profitability indices such as gross margin ratio, operating ratio and return on capital invested.

3. **H₃** Profitability of rice production is not significantly influenced by socio-economic characteristics of rice farmers.
4. **H₄** Rice output is not significantly influenced by such constraints as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases, birds and reptile.

1.6 Significance of the Study.

There is a consensus on the assertion that the economic survival of any nation depends largely on her ability to feed the citizenry and also export the surpluses to earn foreign exchange (Nwokolo, 2011). This study analyses the profitability of rice production among cooperative farmers in South-East Nigeria. This study will benefit members of Farmers' Multipurpose Cooperative Society (FMCS) in the study area and beyond. It will be of benefit and knowledge to individual rice farmers, who would comparatively analyze their production benefits in the light of those being gotten by cooperative members.

The study shall be a source of reliable information and knowledge for researchers, government, traders, general public and to rice cooperative farmers in particular in that it will reveal to a large extent how socio-economic characteristics of cooperative rice farmers influence Cooperative Farmers' rice productivity. The study shall also be of significance to the academic institutions especially Nnamdi Azikiwe University, for it is upon it the university will award a doctorate degree in Cooperative Economics and Management to the researcher.

Results of this study shall be valuable to policy makers in government, as well as cooperative professionals, practitioners, and stakeholders in the industry. It is finally hoped that information from the study will form a source of reference to students, institutions and researchers as well as empirical addition to the body of cooperative studies and literature, forming a basis for future studies on related issues.

1.7 Scope of the Study

The study is limited to profitability of rice production among members of Farmers Multipurpose Cooperative Societies in the core rice producing areas in South-East Nigeria. This study focused on Uzo-Uwani Local Government Area of Enugu State; Ayamelum Local Government of Anambra State and Ishielu Local Government Area of Ebonyi State. The choice of these areas is purposive, because they are agricultural zones where rice cultivation and marketing are extensively carried out.

Uzo-Uwani Local Government Area comprises of 15 communities, namely, Adani, Igga, Ogurugu, Ojor, Asaba, Nimbo, Ugbene, Nruobo, Nkpologu, Uvuru, Umulokpa, Adaba, Nkume Akpugo and Ukpata. Ayamelum local government of Anambra State comprises of 8 communities namely, Omor, Umueje, Omasi, Igbakwu, Umumbo, Anaka, Umuerum and Ifite. Ishielu local Government Ebonyi State, and has 7 communities. All the rice producers and marketers in each of the local government will form and constitute the population of the study. In these areas, there are basically two types of rice farming systems based on the availability of water, namely, upland rice and wet paddy swamp rice.

The study limited the variables required in accessing profitability of rice production among members of farmers multipurpose cooperative society (FMCS) in South-East Nigeria to; Factor Inputs (rice seeds, fertilizer, farm size and labour), profitability indices (gross margin, gross ratio, operating ratio, return on capital invested), socio economic variables (age, education, income, family size and so on), and constraints (labour cost, inadequate capital, scarce improved rice seeds, pest and diseases).

1.8 Limitations Of The Study

There are number of limitations in this study. Firstly, the respondents were limited (400 respondents or samples) in terms of size and composition. Secondly, the data collection was restricted only within South-East States of Nigeria, which may fail to represent the actual scenario of the whole country. While filling the questionnaire and supplement interviewing, the researcher faced problems in explaining the questions as most of the people, who were involved in farming program, were illiterate and living

in villages. Therefore, it was difficult to make them understand some of the technical terms. Finally, the accuracy of the analysis heavily depends on the data provided by the respondents.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter examined related literature on the variables that constitute the subject of the study. The aim was to provide the researcher with an in-depth of the subject matter, a better definition of the research scope and evaluative guide on the subject of study. In addition, this chapter critically examined previous studies done and the identified contributions made on the subject of study and also identify gap(s) in the existing literature.

The review of related literature for this research work was done under the following subtitle, Conceptual Review, Conceptual framework, Empirical Review, Theoretical framework.

2.1 Conceptual Review.

The conceptual review of this research work focuses on an in depth assessment of existing literature on internal factors as it affects profitability of rice production among cooperative members. Specifically, the conceptual review covers related issues which include: scholarly definitions of concepts like factor input, profitability, socio-economic variables on profitability and as it relates to rice output.

2.1.1 Productivity and factor input in Rice Production in Nigeria

Rice is cultivated in virtually all the agro ecological zone in Nigeria. It is an increasingly important Crop in Nigeria. It is relatively easy to produce and is grown for sale and for home consumption (Osinaeme, 2012). Despite this the area cultivated to rice still appears small. In the year 2000 out of about 25 million hectares of land cultivated to various crops only about 6.37% was cultivated to rice (Adewale and Abolade 2007). During this period the average national yield was 1.47 ton per hectare (Okeke, 2011). Significant improvement in rice production in Nigeria occurred in 1980 when output increased to 1 million tons while area cultivated and yield rose to 550 thousand per hectares and 1.98 tons per hectares respectively (Ahmadu, 2010). Throughout the 1980 rice output and yield increased. But in 1990 while rice output increased the yield of rice declines suggesting extensive rice cultivation (Akande, 2012).

Rice contributes a significant proportion of the food requirement of the population. Production capacity is far below the national requirement. The output of local rice was estimated to be 3 million tonnes, while the demand amounted to be 5 million ton in Nigeria (Heiko and Matthias, 2010). In order to meet the increasing demand the Nigeria federal government in an attempt to boost rice production allocated N 1.5 billion for certified seeds multiplication and distribution to rice farmers (Olaf; 2014), and also resort importation to milled rice to bridge the gap between domestic demand and supply.

Rice importation was very significant in 1960's and early 1970's. However there was phenomenal rise in import since the mid 1970's. Rice Import begins to decline in 1981 as a result of measures put in place to check the importation of the commodity. The quantity imported on an annual basis was over 300 thousand ton, import dropped significantly from 1985 when embargo was instituted (IRRI world rice statistics, 2000). Given the precarious balance of payment position of the country especially in the late 1980's rice imports become a major source of concern (Akpokodje 2011).

Tunji (2009) reported that Nigeria spent about \$0.1 million on rice importation in 1970 and by 1999 the value of import was \$259 million on average annual import value of \$ 1.2 million. This implies that between 1961 and 1999 Nigeria spent \$ 4 million. Odusina (2014) stated that rice (*Oryza Satriva*) establishment is always manual with three modes of establishment reported, drilling, board casting and transplanting. Transplanting mode of establishment is ecological dependent, in upland rice fields, drilling is the prevalent practice and in irrigated field transplanting. Lowland rice field presents a more varied picture with emphasis on broadcasting and drilling, and to a lesser degree transplanting (Agbo, 2013). Rice seeds are generally kept from the previous Harvest. The reported seed rate average was 75kg per hectare (USAID, 2013).

The mode of crop establishment determines the corresponding labour use with broadcasting being the least labour intensive and transplanting the most (Adewale and Abolade 2007). Over all rice tends to be cropped as a sole crop. Rice intercropping

was reported in 30% of the upland rice field and 3% of low land rice fields (Olaf, 2014). Two varieties of rice are being used by farmer's traditional and improved varieties. In low land irrigated fields it is common for farmers to use traditional varieties. As a result it is only in upland fields that use of high rate of improved varieties clearly surpassed traditional varieties .Upland ecology are more heterogeneous compared to low land (WARDA, 2014).

2.1.2. Rice Seed

Among the cereal crops grown in Nigeria, rice occupies about 79.4 per cent of the total cultivable land and dominates the cropping pattern throughout the country. Rice based cropping pattern dominates throughout the country since almost 90 percent people are rice eaters. Rice contributes to over 63 percent of the caloric intake for urban consumers and over 71 percent for the rural population. The percentages are much higher among the poor (Mpogole, 2013).

Increasing supply of quality seed is an appropriate strategy for ensuring food security. Use of quality seed can increase productivity of almost all the crops. Seed plays a two-way role, production is affected due to inferior quality of seed and economic loss is incurred due to misuse of other inputs with inferior seed. Availability of quality seed is one of the major constraints in increasing the productivity of agricultural crops. At present only 5, 18 and 13% of rice, wheat and jute seeds respectively are supplied from recognized seed companies and the rest of the seeds are available from farmers' sources (Huda, 2011).

Cost effectiveness of rice seed production is most important in rice cultivation by which a farmer feels interested to produce more rice seed for his economic development. Profitability of seed production means return getting from every taka of investment in rice seed production. If a farmer gets more benefit from rice crop for seed production than normal rice production then the farmer is habitually very much interested to cultivate his land for seed production. From the economic point of view, if the farmers get minimum 1:1.50 taka for every taka of investment then it seems to be cost effective and the benefit is economically acceptable (Islam, 2010).

Like the basic inputs viz. seed, fertilizers, pesticides, irrigation and appropriate management, apart from socio-economic factors, may also influence the effectiveness of rice seed production at farmer's level. Socio-economic status is an economic and at the same time a social measure of a person's position in the society relative to others, based on income, education, and occupation. The socio-economic factors usually influence farmers' decisions as to which crop/variety is to be grown, which enterprise is to be run and so on.

There are some socio-economic factors, having influences even on the particular crop production practice are to be followed, which might have significant impact on crop yield and productivity. Farm size, farmers' education level, technical knowledge of the farmers, training and farming experience etc. may have positive relationship with crop yield. The factors like farmers low income, lack of personal and interpersonal communication skill, less exposure to media etc. might have negative relationship with crop yield and productivity. Different socio economic factors like education level, farming experience, farm size, linking with GO/NGOs, annual income etc. play a significant role in the adoption process of modern agricultural technologies among the farmers. The farmers who have higher socio-economic status could easily adopt the modern technologies or could take any risk of the new technologies for scaling up their agricultural production. Moreover, the success of modern agriculture is dependent on the farmers' knowledge and experience along with available inputs.

2.1.3. Importance of Rice

Rice is one of the leading food crops in the world. It directly supplies more than 507 of all the calories consumed by the entire human population (Odusina, 2014). Area harvested of rice per year is 154 million hectares in Nigeria. Human consumption accounts for 85% of total production of rice. Rice provides 21% of global human per capita energy and 15% of per capita protein. Although rice protein ranks high in nutritional quantity among cereals protein content is modest (Saturnina, 2014).

Oniah and Amiah (2015) reported that rice also provides minerals, vitamins and fibre. Although all constituents except carbohydrates are reduced by milling, rice is an important crop to millions of small farmers who grow it on millions of hectares throughout the region and to many landless workers who derive income from working on these farms. Rice processing techniques have produced breakfast and snack foods for retail markets. Deficient in gluten, rice cannot be used to make bread unless its flour is mixed with flour made from other grains (Akpokoje 2011).

About 3 billion people, nearly half the world's population, depends on rice for survival. In Asia as a whole, much of the population consumes rice in every meal (IRRI, 2003). In many countries, rice accounts for more than 70% of human caloric intake. (WARDA, 2014). Nigeria in total, just over 30% of all calories come from rice because of high domestic consumption of rice in rice-producing countries. Beyond providing sustenance, rice plays an important cultural role in many countries. Products of the rice plant are used for a number of different purposes such as fuel, thatching, industrial starch and artwork (IRRI, 2003). Growing, selling and eating rice is integral to the culture of many countries. In Japan, rice was historically a product for the wealthy and is now a highly prized crop. Many rituals surround the preparation of the rice beds, the sowing of the crop and the harvest (FAO, 2008).

In China, it has been suggested that rice has been cultivated for 3000-4000 years, where it gradually rose to become an important part of aristocratic life. China's rural culture has developed around the growing of rice and food made from rice are the basis of festivals such as the land opening festival, which marks the start of the rice cultivation season, and the spring festival (IRRI, 2003). In Nigeria also, rice is an important part of culture. Rice is used in almost all the important ceremonies, in wedding ceremony, traditional marriage ceremony, in coronation and in many other notable occasions (Agbo, 2013).

2.1.4. Concept of Farmers Cooperative

Farmers cooperatives is a philosophy of common interest and ownership, common sharing and consumption and investment and liability culture (Klemen, 2010). A practical motivation for the creation of agricultural cooperative is sometimes described as overcoming the course of smallness (Agbo, 2000).

A cooperative is an association of a large business entity in the market reaping the significant advantages of economies of scale that are not available to its member individually. Typical examples are machinery pool, a marketing cooperative and a credit Union. In order to increase farmer's ability to benefit from agricultural technologies they should be encouraged to join existing farmers cooperative or form their own (Tiger, 2011). The central concept of cooperative society is that of a group of people who voluntarily come together to form an association with the aim of promoting a common economic interest in accordance with the laid down cooperative principle.

Patrick (2017) reported that cooperatives are formed when people put together their effort in the pursuit of collective goal. Agbo (2013) further stated that farmers cooperative society are number of farmers with variable membership who organize themselves on self help material equitable and democratic basis to form a business enterprises which helps them to solve their socio economic problems for better standard of living. Ambruster (2011) noted that cooperatives all over the world are instrument for social and economic transformation, the social aspect of people are those that deal with their attitudes to life and themselves their mode of behaviour and relationship with one another and as well as their mores and customs.

Eze (2010) stated that farmer are unable to control the prices of the commodities they buy and sell with the result that when they produce more they get less money and when they buy their inputs as individuals they pay more. It is also true that when farmers buy in bulk they may receive discount and when they sell in bulk they can influence market price. It is with the above reason that farmers cooperative are formed, to Control the market price. The major characteristics of traditional forms of

cooperation like Isusu or Esusu contribution clubs, age grade groups and work rotation arrangement are founded on the said principle (Sutherland, 2011).

Cooperative societies are meticulous about who is admitted into their Membership they insist that such people are individuals of known integrity and honesty, good reputation and kindness they exclude debtors, liars spend thrift, dishonest and lazy persons from their fold. In farmers cooperative there should be element of cooperation, competition, conflict and accommodation to enhance the achievement of their common goal which will increase food production and nutritional status as well as their standard of living.

Farmers' cooperative societies are also organizations of financially weaker sections of the society. They convert the weakness of members into strength by adopting the principle of self help through mutual cooperation. It is only by working jointly on the principle of each for all and all for each; the members can fight exploitation and secure a place in the society.

2.1.5. Features and Types of Farmers Cooperatives

The primary objective of every cooperative society is to provide good and services to its member and thus enable them to attain increased income and savings investment productivity and purchasing power and promote among them equitable distribution of nets surplus through maximum utilization of economies of scale, cost sharing and risk sharing without, however conducting the affairs of the cooperative for eleemosynary.

Pickett, (2000) reported that farmers cooperative society is a separate legal entity. Farmers' cooperative society is registered under the cooperative society act. After registration a society becomes a separate legal entity with limited liability of its member. Death in solvency or lunacy of a member does not affect the existence of a society. It can enter into agreement with others and can purchase or sell properties in its own name (Cooperative society 2004 Kenya Amended bill).

Agbo (2000) reported that every farmer's cooperative society in addition to providing services to its member also generates some profit while conducting business. Profits are not earned at the cost of its member profit which are generated is distributed to its member not in the basis of the shares held by the member (like the company form of business) but on the basis of members participation in the business of the society. For example in rice farmers cooperative only a small part of the profit is distributed to members as dividend on their shares a major part of the profit is paid as purchase bonus to member on the basis of goods purchased by each member from the society.

Ambruster (2001) noted that in arrangement of farmers' cooperative society that there is open membership. The membership of farmer's cooperative society is open to all farmers who have a common interest. A maximum of ten members are required to form a farmer's cooperative society Levels of farmers' cooperative according to Patrick (2017) have two categories in terms of membership and in terms of territory. In terms of membership we have.

- Primary – The membership made up of individual not below the age of (16 unless of school cooperatives.)
- Secondary – The member of which is (primary cooperative societies)
- Tertiary – the members of which are secondary cooperative societies upward to one or more apex organizations. In this cooperatives are also categorized according to areas of operations which may not be coinciding with the political subdivision of the country

Agbo (2000) reported that agricultural cooperatives are divided into two groups. The first group is made up of agricultural production cooperatives i.e. those agricultural cooperative involved directly in food and fibre production.

The second group is made up of non-production agricultural cooperative i.e. those not involved in direct production of food and fibre but render useful assistance to them.

Amalu (2000) further stated that the types of agricultural production cooperative include:

i Forestry cooperatives involved in the exploitation of forestry resources eg timber wood pulp poles etc.

ii Fisheries cooperatives involved in the production of fish and fish products for food and industrial uses. Fisheries cooperatives could be made up of farmers running fish farms or cooperative societies of fishermen involved in off shore or on shore fishing.

iii. Pasture cooperatives involved in growing and maintaining pasture lands for grazing livestock.

iv. Livestock breeding cooperatives involved in breeding different types of livestock through the application of different scientific techniques of up grading the available local breeds or introduction of exotic breeds.

v. Dairy cooperatives involved in the production of milk and milk products. These cooperatives produce milk from their dairy animals in commercial quantities.

vi. Beef production cooperatives involved in the production of meat and meat products they produce animals that are fattened and slaughtered for food and other uses.

According to Ijere (2000) Non-production Agricultural cooperatives are also called service cooperatives. They include:

i. Credit cooperatives: They involve in the mobilization of credit and making it available to members for use in their private or society's farms.

ii. Marketing cooperatives involves the marketing of members' products so as to get the best markets for members and enable them get optimum returns from their produce.

iii. Supply cooperative involved in the supply of farm inputs and other consumer items to members.

iv. Farmers' storage cooperatives involved in provision of expensive storage equipment to members as well as storing members products.

v. Processing cooperatives involved in the installation of processing machines for processing members produce Agbo (2013) further stated other types of rice production agricultural cooperatives which include.

- Electricity cooperatives: They involve in generation and distribution of electricity to members for their domestic as well as industrial use.

- Machinery cooperative involved in the purchasing or hiring of farm machinery for members use in their farms at moderate cost
- Housing cooperatives involved in the building low cost houses or even renting them on behalf of members. Members rent these buildings on owner occupier basis. This makes it possible for members to become eventually the landlords of their own houses.

Presently in Nigeria the type of agricultural cooperative that could be relied upon for food production, processing and marketing activities include.

- Farmers multipurpose cooperatives
- Fisheries cooperatives
- Livestock farmers cooperatives
- Agricultural marketing cooperatives
- Rural thrift and credit cooperatives (Amalu 2000).

The production and marketing farmers' cooperatives are often organized with the assistance of the development agency of government such as ADP in collaboration with the government ministry in charge of cooperatives (Katrine 2002).

2.1.6. Rice Farmers Cooperatives

Rice farmer cooperatives work to develop production, milling and marketing programmes to ensure a secure supply of quality rice for consumers and a profitable return on the investments made by its members. Agbo (2000) stated the purpose of a rice cooperative is to improve small holder farmer access to market and to create a fair price for goods. Some achieve this by the purchase of small plots of land at a price mutually agreed by members and others buy various tools and items needed for farming in large volumes keep the hiring cost for the farmers down. The main aim of a rice farmers cooperative is to give farmers support to process rice as well as given training on how to improve their techniques (Satumia, 2014).

Ogundele, Lancon, Olaf, Akande (2013) stated that these cooperatives are formed by small farmers to work jointly and thereby enjoy the benefits of large scale farming. At least ten (10) persons having the capacity to enter into a contract with common

economic objective like rice cultivation, rice processing and rice marketing can form rice farmers cooperative. A joint application along with the bylaws of the society containing the details about the society and its members has to be submitted to the registrar of cooperative societies.

According to Martin (2012) rice farmers cooperative are divided into two groups. The first group is made up of rice production cooperatives: They are those rice cooperatives that are involved directly in rice cultivation while the second group is made up of those that are not involved in production but render assistance in processing and marketing of rice. They are also known as service cooperatives. In a nut shell rice farmers cooperatives are

- Rice cultivation / production cooperative society
- Rice processing cooperative society
- Rice marketing cooperative society.

Lancon (2011) stated that rice production cooperative societies are formed by small farmers to work jointly in the management practices involved in rice cultivation from land clearing to harvesting stage. Rice processing cooperatives are cooperative business owned by farmers to undertake transformation and packaging of farm products. They are also involved in installations of processing machines for processing members produce.

On the other hand Akopkodje (2011) reported that rice marketing cooperative as “a cooperative business owned by farmers to undertake marketing of processed and packaged rice. He further stated that these operate mainly where small farms do not have a means of transportation necessary for delivery there produce to the market or else the small volume of their production may put them in an unfavourable negotiating position with respect to intermediaries and wholesalers a marketing cooperative will act as an integrator collecting the output of its small members and delivering them in large aggregated quantities downstream through the marketing channel.

2.1.7. Roles of Rice Farmers Cooperative

Cooperatives have been noted for their roles in enhancing economic activities including agricultural production, economic development and social transformation especially in rural communities (Shepherd, 2010). Rice farmers Cooperatives are established by likeminded persons to pursue mutually beneficial economic interest. Provide goods and services to each other and general public in cool effective ways, prevent exploitation of members through self helped project defend and protect the right of people as producers and consumers of goods and services and promote mutual understanding and peaceful co-existence among the public (Onuoha, 2014).

Rice farmers' cooperative play significant role in provision of service that enhance rice production. Patrick (2017) described rice farmers cooperative as medium through which services like provision of farm input farm implement farm mechanization agricultural loans, marketing of members farm produce and other economic activities and services rendered to member regular. Agbo (2013) further stated other roles of rice farmer cooperative are increased opportunity for capital formation for their farm business provision of services to members at greatly reduced cost, improved marketing opportunities to members that members will not bear loss in selling their products again, create the atmosphere for a more effective spread of government aid schemes among rice farmers.

In the study of Ambruster (2011), it was noted that rice farmers cooperative have been noted for their role in assuring bargaining power for loans and other services and improved dissemination of extension services through the group approach, increases employment opportunities for members, they assure self enhance and motivation for individual members.

Rice farmers cooperative play a significant role in making sure that members have increased access to improved skills and educational opportunities offered through adult education and literacy programmes and they also create avenue for members to practice democracy and assume collective responsibility (Eze, 2010). Cooperatives

society in existence like in every other country cooperative has been an important of the economic development of Nigeria (Sutherland, 2011).

Despite the fact that some of these cooperatives have been successful while others failed in achieving their goals, there has been no other institution that has brought people together for a common cause like them. However Martin (2012) noted that farmers cooperative model of economy has proved to be the safe and secure model which can provide a ray of hope to the common masses. Due to strong roots in the community in which the cooperative are embedded the cooperative model is governed by community consciousness.

Eze (2010) further stated that farmers cooperative model of development is unique as it does not depend on external influences like stock markets. It is a model which is owned and controlled by the people. The democratic principles of cooperative are its life blood. Rice farmers' movement in India has a very long and illustrious history for the period of 105 year, the movement has diversified manifold and has played a significant role in bringing about important socio economic changes in different sectors of the economy.

These cooperatives are now major force in important sectors like rice milling and toning, rural credit housing marketing, fertilizer and farming. Several cooperative society brands have already become a household name not only in India but also abroad However with the advent of the market economy the functioning of cooperative has undergone changes they are now transformed through adoption or professional financial and administrative skills. The farmers' cooperative society movement has provided to be an effective social and economic development model which ensures inclusive growth.

They are also the organizations of financially weaker sections of society. It converts the weakness of members into strength by adopting the principle of self help through mutual cooperation. It is only by working jointly on the principle of each for all and all for each, the members can fight exploitation and secure a place in the society.

Patrick (2017) observed that provision of credit is the widespread activity of the majority (95%) of the registered rice farmers' cooperative societies. A review of the cooperative role at the international level indicates that the cooperative plays essential role in all aspect of rice production from land clearing to consumption stage.

2.1.8. The Concept of Profitability

The word "Profitability" is composed of two words viz. "Profit" and "Ability", to obtain profit from accounting point of view total expenses are less from the total revenues for a given period. On the basis of the concept profitability may be defined as the ability of the investment to earn as the return from its use. The words ability means the earning power or operating performance of the concern on its investment. The word profitability is a modulation of two words profit and ability. Profit is the bottom line of the financial statement the meaning of profit derives according to the purpose and usages of figures. While term ability indicate the power of the business organization to generate profits. Ability is also referred to as "earning power or operating performance of the concerned investment, Franks and Broyles (2015)

The word „Profitability“ may be defined as the ability of a given investment to earn a return from its use Murthy(2014).It can be remarked that „profitability“ is helpful in providing a useful basis for measuring business performance and overall efficiency. Baumol and Blinder,(2010) Observed that the word profitability may be defined as the ability of an investment to earn to return on its use. Thus profitability is the ability of an organization to earn profits in other words; profitability is a composite concept relating the efficiency of an organization to earn profit, Mapula, and Abiodum,(2011) Profitability is the ability of the firm to generate earning. Block and Hire (2014), “The expected return from the capital markets represents an opportunity cost. Since incrementally companies can employ their funds in the capital market. That market provides the appropriate reference point against which to measure profitability. Put another way a profitable investment project is one which provides a return sufficient to attract capital from the capital market, Sadig (2013)

Profitability is distinguished from “Profit”. Profit refers to the absolute quantum of profits. Whereas the profitability refers to the ability to earn profit. Nwike, and Ugwumba,(2015) Profitability is a relative measure; It indicates the most profitable alternative. Profit on other hand, is an absolute measure, it indicates the overall amount of profit earned by a transaction. Very high profit does not always indicate a sound organizational efficiency and low profitability is not always a sign of organizational sickness.

$$\text{Profitability} = \frac{\text{Sales}}{\text{Operating Assets}} = \text{Sales}$$

Operating income

Operating Assets

It can be remarked that profitability is helpful in providing a useful basis for measuring business performance and overall efficiency. Profitability is the relation between profit and investment made.

Significance of Profitability

The aim of a firm is to derive maximum profit. Profit and profitability play the same role in business as blood and pulse in human body. Without adequate blood and ability to generate blood, human existence is not possible. The same is true for any business. It is very difficult for a firm to service without prospects and ability to earn adequate profit. The profitability is the most powerful motive factor in any business. Any company goal is to maximize profit or not the users of an accounts are certainly interested in its profitability. Therefore the overall objective of a business to earn at least a satisfactory return on the funds invested, in it, consistent with maintaining a sound financial position.

Factors affecting to profitability

The following two factors which affected the profitability of any organization

- 1) The Operating Profit Margin
- 2) The Rapidity of Turnover of Capital Employed.

Profitability is the product of two factors and therefore maximum or operating profit can be earned only by maximizing them. In technical terms the combination of these two factors is known as the “Triangular Relationship”. Its significance exists not only in its use as an analytical tool but also because the profitability ratio can be calculated directly from the specific earnings and investment data.

2.1.9. Relationship between Rice Output and Profitability Indices

Profitability is a measure of the relationship between the levels of profits earned during an accounting period and the level of resources committed to earn those profits. Profitability measures the ability of farmers to recover from their costs and is an important concept, because it provides incentives for entry into and longevity in the farming business. Cooke and Bryon (2013) ranked profit, risk minimization and crop complexity respectively as the three most important objectives by farmers. The profit objective was defined in farm as the sum of gross margin of each crop less the costs. The risk minimization objective was based on the principle of minimization of total absolute deviation.

The risk values are linked to farmer satisfaction and represent the best or worst possible farm income deviation a farmer would expect over a 5-year period. The number of crop types grown measured the crop complexity. The number of crop types grown is associated with a number of different operations and a level of difficulty. Thus, the author identified three kinds of relationships between farm inputs and outputs that determine the decision making capacity of the farmer.

One is input-output relationship which indicates the physical relationship between inputs and outputs. This deals with the varying level of outputs corresponding to the varying level of inputs. For example, the variation in potato output resulting from the different levels of fertilizer.

Secondly, factor–factor relationship which refers to the different combination of two or more inputs required to produce a specified output. For example, the different amount of land and labour that can give the same quantity of potatoes.

Thirdly, product-product relationship that refers to the varying outputs that can result from a given set of farm inputs. For instance, the different quantities of potatoes and onions that can be obtained from the same area of land. Output is usually measured as the market value of final output. The production function consists of different functional forms. These include the Cobb Douglas, linear, quadratic polynomials and square root polynomials. Others are semi-log and exponential functional forms (World Bank, 2008). The use of production functions to determine farm productivity is restrictive, as it does not account for disparities in input and output prices across farms. An analysis of farm profits addresses this shortcoming by including the effect of price of agricultural inputs and outputs (Elodie 2015).

Productivity and profitability persist to be the two most important indicators in assessing the success or failure of crop production. Productivity and profitability are some of the basic concepts in economics of agricultural production (Itam and Itera 2014).

Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs. Its measures can be subdivided into partial, multifactor and total. Partial factor productivity is the amount of output per unit of a particular input. It only considers a single input in the ratio. For example, it uses yields of crops to determine the productivity of field crops. In this study partial factor productivity was employed in production function. Both Multifactor productivity (MFP) and Total factor productivity (TFP) are defined as the ratio of total agricultural output to a subset of agricultural inputs. They utilize more than a single factor (Mapula and Abiodun 2011). In other words Ellis (2013) pointed out that the farmer is an individual decision maker concerned with choices like how much labour to use to cultivate a certain type of crop, whether to use purchased inputs or not, which kind of crops to grow in a certain field, etc.

Profit measures the financial performance of farms. It is a measure of accepts less costs. Different profit measures include different definitions for receipts and costs. Economists generally split costs into fixed and variable. Fixed costs are those that do not vary with output produced (for example, an annual lease payment on a tractor does not vary with the quantity of crop harvested). Variable costs do, as their name suggests, vary with output (a large area of crops will generally require more fertilizer, all else constant). The accountants' method of calculating costs differs from the economist's.

For example, an accountant may not consider family labour as a cost because it does not involve a cash outflow. However, the economist considers family labour a resource that could have been used elsewhere, if it were not used on the farm, the labour has an opportunity cost (Coelli, Rao and Battese,2014). This opportunity cost is included in the economist's calculation of profit. (Coelli, Rao and Battese,2014) For a given definition of receipts and costs, there are two ways of measuring profitability. In an absolute or a relative sense we now look at each of these in turn. (Opportunity cost is defined as the cost of the next best alternative use of that resource.) For example, land that is being used for wheat production can also be used to run sheep.

2.1.10. Absolute Profitability

Measures of absolute profitability are based on the level of profit. Absolute profitability can be measured on a farm basis or on a per Clint of output or input basis (Coelli, Rao and Battese,2014) .Absolute farm profit is a measure of whole of farm performance, and it may be calculated as total farm receipts less total (fixed plus variable) costs, or total farm receipts less variable costs (which we call variable profit, or farm gross margin). Absolute farm profit may obscure how a farm was able to generate profits. For example, a farm may undertake several agricultural activities, where one generates a loss, but another earns a profit. A farm level profit measure may not contain any information on the profitability performance of the farm's different activities. Therefore, farm-level profit may provide a partial evaluation of the profitability of the farm. Farm profit can usually be disaggregated into different farming activities.

For example, in a mixed cheep-cropping farm, we may be able to determine how much profit the farm derives from crops, and how much it derives from sheep. However, this is only true to the extent we know how to attribute the farm's costs between crops and sheep. This allocation of costs is complicated by interactions between outputs. For example, cropping activities may depend on rotating land use between different cropping activities and livestock activity in order to maintain a nutrient balance in the soil. Therefore, the allocation of costs is not clear-cut in practice. Nevertheless, disaggregated farm profit may still be a useful management tool in identifying potential profitability problems.

Absolute profitability measured on a per Unit or per output basis-such as gross margin per hectare may be useful to compare intra-farm activities. If we ignore cross-activity interactions (mentioned above), then a relatively low per-unit. Profit result may suggest that a farm is badly using the relevant inputs, it could reallocate some of these inputs to other uses, and increase overall farm profit. A farm that chooses the profit maximizing input mix, given input prices is called *allocatively efficient*.

However, we need to fade allocate efficiency in the light of factors such as risk. Some farmers are relatively more risk averse (they null more actively try to avoid risk). They might do this, for example, by diversifying production to several output classes. This allows the farmer to lower his risk of a large loss in any one year from bad weather or prices, but this comes at the cost of a potentially huge return if all goes well.

Specifically, in a mixed wheat wool farm, the impact of a fall in wheat prices may be buffered by the farm's wool output. An analyst needs to take account of this, if an analyst assumes all farmers have the same risk aversion, they may judge a more risk averse farmer as alocatively inefficient when in fact he is efficient given his risk preferences. Absolute farm profit may be misleading indicator of performance across farms. For example, one farm may have a lower level of absolute profit because it has a smaller scale of operation, that is, it may still place it resources in high- valued uses,

but its overall profit simply reflects the fact that it uses less resources to produce less output.

2.1.11. Relative Profitability

Relative profit measures give the analyst an indication of the wealth being generated across disparate industries. Whereas absolute profit measures (for example, gross-margin per cow) could be useful within an industry, relative profit measures (return on assets) can be used within and across industries. Although measuring relative profitability is one part of an analyst's exercise, the important part is usually disentangling the reasons for differences in relative profitability which is more difficult. Arrange of variable can (and have) been used to try and do this in the past. For example, it would appear that dairy farms with large herds have higher absolute and relative profitability than smaller farms. Some variables that are commonly used to explain relative profitability include farm size, manager's education, access to information and whether the manager is full-time. Another variable that is commonly used to explain relative farm profit is geographical location. Location may explain differences in relative profitability within an agricultural industry. For example, climate disturbances, such as drought, are usually confined to a region; some regions have more fertile soil, have a significant effect on relative farm profit. We would expect however, that disadvantaged regions would be reflected in land prices.

The choice of using an absolute or relative profitability measure depends on the task at hand. Absolute profitability is appropriate for analyzing the financial performance of farm in terms of levels or dollars. Relative profitability, on the other hand, is more relevant for comparisons between farms or between group of farms using both measures would improve profitability analysis by providing more information on the financial performance of farms than is possible by one measure alone.

2.1.12. Profitability Indices

The profitability index (PI), also known as profit investment ratio (PIR) and value investment ratio (VIR) is the ratio of payoff to investment of a proposed project. It is an indication of the costs and benefits of investing in a particular capital project by a business firm. It is a cost/benefit ratio used in capital budgeting financial analysis.

Profitability index is an appraisal technique applied to potential capital outlays and is a useful tool for ranking projects because it allows you to quantify the amount of value created per unit of investment.

2.1.13. Common Methods of Profitability Analysis

There are many methods that can be used to determine the profitability of an enterprise as well as identify the factors that influence profitability. Some of these methods include gross margin analysis, gross ratio, operating ratio, return on capital invested, value of production and total revenue. However, gross margin analysis appears to be a common method used to determine profitability, this method of determining profitability has been used in many studies. Ahmadu (2010), in studying the factors affecting the profitability and yield of carrot production in two districts of Punjab included a partial budgeting model that was used to determine profitability of carrot growing. This methodology included a gross margin analysis which was used to determine the costs of various inputs and the profitability of carrot cultivation.

According to Ahmadu (2010) the gross margin was used because of its accuracy in estimating profit. Factors affecting yield in this study were determined by carrying out a regression analysis using a Cobb-Douglas production function which was used due to its ease in computation and interpretation. In another research that was done on the profitability of sorghum farming in Tanzania, a gross margin analysis was also used to determine the profitability of sorghum. In this study gross margin analysis was done using Microsoft excel in which the total variable costs were subtracted from the total revenue (Erbaugh, 2010).

A regression model was then carried out in this study in order to test factors that might have influenced gross margin and hence profitability of rice production. The gross margin variable was regressed on the farm size used to produce sorghum, farm gate price, farm production costs, farm location, the interaction between production costs and farm gate prices, seed variety used, technology used such as fertilizer, the interaction between seed variety and fertilizer applied and production technology used. In another study that was done on the performance and profitability of the

banana sub-sector in Uganda, a gross margin analysis was used to determine the profitability of banana production.

The gross margin analyses involved cost benefit trade -offs where total variable costs were subtracted from total revenue. Budgeting techniques were used to measure comparative advantage of various crops to the farmer in terms of income earned and return to family labour. Regression analysis was used to determine the factors affecting banana productivity and profitability in the study area. Yield of bananas was regressed against variables thought to influence farmers 'decisions to invest in agricultural production. Thus yield of bananas was regressed on the total farm size, total farm income, off-farm income, age of the farmer, weevil damage, interaction with government extension agents, gender of the farmer, distance from the farm to the tarmac, years spent in school and number of cattle owned. (Bagamba, 2014).

Gilbert (2001) carried out a study in which he compared gross margin analysis to total revenue in terms of which method was better in estimating profit. He concluded that gross margin was a more accurate estimate of profit compared to total revenue. From these studies the most accurate and common method of estimating profits is gross margin analysis, where as the most common method of identifying factors that influence profitability is multiple regression in which gross margin is regressed on different factors expected to affect profitability.

2.1.14. Gross Margin Analysis

A gross margin is simply an estimate or a budget of the income and costs associated with a specific crop or activity in a farming business and it is not an absolute measure of profit as its left fixed cost elements, but will determine the best financial result when a number of different crop alternatives are compared (Debertin, 2013). Despite its usefulness there are some limitations to gross margin analysis and they need to be considered when is being used. Ponte (2012) explains these limitations as follows;

I. Labour can be difficult to allocate as most businesses have permanent labour and casual labour. Gross margin analysis; focus on the casual labour associated with that particular activity such as harvesting labour.

ii. If a farm operates a nursery to establish seedlings for production, it is advised that complete a gross margin analysis for the nursery business, so that its operation costs can be measured and they do not impact on the ordinary crop production activities. If the costs of a nursery business are included in a gross margin analysis they can misrepresent the results.

iii. There is inherent risk in agricultural production, such as pricing in markets, crop failure and variable input costs. If a gross margin analysis showed that there was a single crop that was far more valuable than others, this does not mean that it is the best decision to plant only that particular crop; rather an assessment needs to be made so that the risks can be managed. The result may be that some less profitable crops may be grown alongside the most profitable crop in order for the business to manage risk.

iv. Gross margins do not take into account overhead costs. Some crops/businesses have high debt loads or high overhead costs or both. If this is the case, then a gross margin analysis may show a good result for one particular crop; however, after all the overhead costs are included such as in a cash flow budget or a profit and loss budget, the business may still make a loss. It can be concluded that, a gross margin analysis is an excellent tool, but it needs to be used in conjunction with other financial management tools.

Gross Margin: Gross margin is a company's total sales revenue minus its cost of goods sold (COGS), divided by total sales revenue, expressed as a percentage. The gross margin represents the percent of total sales revenue that the company retains after incurring the direct costs associated with producing the goods and services it sells. The higher the percentage, the more the company retains on each dollar of sales, to service its other costs and debt obligations.

$$\text{Gross Margin (\%)} = \frac{\text{Revenue} - \text{Cost of Goods Sold}}{\text{Revenue}}$$

Gross Ratio (G ratio) is a profitability ratio that shows the relationship between gross profit and total net sales revenue. It is a popular tool to evaluate the operational performance of the business. The ratio is computed by dividing the gross profit figure by net sales,

$$\text{Gross profit ratio} = \frac{\text{Gross profit}}{\text{Net sales}}$$

Operating ratios: Operating ratios Ratios used in expense control, and in measuring the profitability and financial soundness of a firm, by expressing each income statement item as a percentage of sales revenue. They also show the essential connections between income statement and balance sheet items. Operating ratios include operating cash flow to sales ratio, operating expenses to gross margin ratio, operating expenses to sales ratio, operating performance ratio.

Return on capital invested, is a ratio used in finance, valuation and accounting, as a measure of the profitability and value-creating potential of companies after taking into account the amount of initial capital invested.

2.1.15. Productivity

Productivity is a measure of the output produced per unit input. It is a physical rather than a financial measure, using data on physical quantities of inputs (labour, hours, hectares of land etc) and outputs (tons of wheat, kilograms of wool, etc). We can most easily measure productivity when there is one output and one input. For example, when the output is wheat, and the input labour. Then, a measure of productivity could be tons of wheat per hour of labour. Note that productivity is quite different to profit. Productivity is usually measured as a relative concept, either across farm or across time.

The rate of productivity growth (usually the excess of output growth over input growth) is also an important indicator of economic viability of a farm or an agricultural industry. If the productivity growth of an international competitor (like the New Zealand dairy industry) were far outstripping Australia's, then we would expect the competitor to win existing and new markets on the basis of their price per unit, thereby displacing Australia's sales on the world market. An important concept of productivity analysis is technical efficiency. This is a farm level concept. It measures how efficient one farm is, relative to the best farm around at the time (the market lead,

if you like). The market leader (s) could be seen as the yard stick(s) for all other farms.

However, the market leader can only be as good as the local setting (policy, land quality, etc) and technology (determined by research) allows it. A farm doing the absolute best it can give the local settings is solid to be on the local production frontier (the term frontier is used to show it is at the fore front of technology). Conversely, the further away a farm is from the frontier (the further behind the market leader), the less technically efficient it is, and the greater scope it has to improve its technical efficient (it has greater scope for “catch up”). If a farm is not technically efficient, it is unlikely to be viable in the long term.

2.1.16. Partial Productivity

When total output or a subset of total output is measured in relation to a subset of inputs, this is called a partial productivity measure. Crop yields per hectare and milk per cow are two examples of partial productivity measures. However, these measures, as their name suggests, are incomplete depictions of productivity changes that may be occurring on a farm. To interpret these measures as total farm productivity changes would be misleading because partial productivity measures, by definition do not include the full set of inputs. While partial productivity measures may be inadequate to analyze overall productivity changes occurring on a farm, these measures are potentially useful in identifying sources of changes.

2.1.17. Influence of farmers Socio-Economic Variable on profitability of rice production

Socio-economic status is an economic and at the same time a social measure of a person's position in the society relative to others, based on income, education, and occupation. The socio-economic factors usually influence farmers' decisions as to which crop/variety is to be grown, which enterprise is to be run and so on. There are some socio-economic factors, having influences even on the particular crop production practice are to be followed, which might have significant impact on crop yield and productivity. Farm size, farmers' education level, technical knowledge of

the farmers, training and farming experience, profit etc. may have positive relationship with crop yield. The factors like farmers low income, lack of personal and interpersonal communication skill, less exposure to media etc. might have negative relationship with crop yield and productivity.

Different socioeconomic factors like education level, farming experience, farm size, linking with GO/NGOs, annual income etc. play a significant role in the adoption process of modern agricultural technologies among the farmers. The farmers who have higher socio-economic status could easily adopt the modern technologies or could take any risk of the new technologies for scaling up their agricultural production. Moreover, the success of modern agriculture is dependent on the farmers' knowledge and experience along with available inputs.

2.1.18. Factors That Influence Profitability of Rice Production

There are many factors that may have an effect on profitability of rice production. In crop production most of the factors that affect profitability are the production costs, farm gate price, fertilizer usage, improved seed variety, tillage methods, labour, land tenure, power sources, extension services, remittances, pests, diseases and farmer characteristics. Most of these factors have been considered in many studies on profitability. Some studies find some of these factors to have significant effect on profitability were as other studies find that these factors have insignificant on the profitability. For instance a study that was done on the profitability of sorghum in Tanzania found that the farm size, production costs, farm location, interaction between production costs and farm gate price as well as the interaction between the varieties used and fertilizer applied were significant. Surprisingly, farm size was negatively influencing the gross margin contrary to the literature.

Similarly in a study that was carried out on the market value of rice in Malaysia, the farm size, production costs, seed variety, tillage methods and power sources, farm price were found to be significant. In these studies some factors were common in affecting profitability of each of these enterprises; however some of the factors were specific in affecting a particular crop. These factors include inadequate and high costs

of basic farm inputs such as improved seeds/planting materials, organic and inorganic fertilizers and agro-chemicals; insufficient and high costs of agricultural equipment and machineries. There is also the issue of poor storage facilities causing high post-harvest losses of farm produce and inefficient marketing system [Oteng.w.1998, World Bank2011]. Similarly, rice producing households store rice 5-7 months in some form for various purposes such as seed retention from the previous harvest and for consumption and sales under difficult conditions (Akande, 2012).

This is compounded by a lack of small scale processing plants for excess perishable farm produce and the absence of all year round farming due to non-operational irrigation facilities. Furthermore, one of the most serious long-term challenges to achieving sustainable rice yield in the state is climate change. Previous studies have shown that humidity and minimum temperature are the climatic factors that affect rice production in the area, such that 1% increase in humidity resulted in a 17% reduction in rice production in Niger state (Ayinde, 2013). The gravity of the issues herein analysed reinforces the need for a mix-scale analysis anchored in descriptive statistics and Geographic Information Systems (GIS) mapping of rice yield trends essential in the design of a crop index. This will help track output with a path towards the eradication of postharvest losses in the state.

Other agricultural input prices, such as for urea fertilizer and insecticides, have also been increasing worldwide. How will these changes affect the profitability of highly labour-intensive rice farming in developing countries? Will these changes favour small farms or large farms? Intuitively, small farm households might face more difficulty in adjusting to the rising input costs, as they have less opportunity to use mechanization because of scale and financial capacity constraints, and thus might incur more loss than large farms.

By contrast, large farm households might be able to purchase and deploy more machines and other inputs in place of hired labour because of their financial capacity, access to credit, and scale advantages. Thus, large farm households might be in a relatively more advantageous position. Although this has important policy

implications for sustainable growth in agriculture in developing countries, existing studies seldom focus on the relationship between farm size and profitability over time (Ahmadu and Qureshi, 2016). Among the cereal crops grown in Bangladesh, rice occupies about 79.4 per cent of the total cultivable land and dominates the cropping pattern throughout the country. Rice based cropping pattern dominates throughout the country since almost 90 percent people are rice eaters. Rice contributes to over 63 percent of the caloric intake for urban consumers and over 71 percent for the rural population. The percentages are much higher among the poor (Rahman, 2013)

Increasing supply of quality seed is an appropriate strategy for ensuring food security. Use of quality seed can increase productivity of almost all the crops. Seed plays a two-way role, production is affected due to inferior quality of seed and economic loss is incurred due to misuse. Availability of quality seed is one of the major constraints in increasing the productivity of agricultural crops. At present only 5, 18 and 13% of rice, wheat and jute seeds respectively are supplied from recognized seed companies and the rest of the seeds are available from farmers' sources (Huda, 2011).

Cost effectiveness of rice seed production is most important in rice cultivation by which a farmer feels interested to produce more rice seed for his economic development. Profitability of seed production means return getting from every taka of investment in rice seed production. If a farmer gets more benefit from rice crop for seed production than normal rice production then the farmer is habitually very much interested to cultivate his land for seed production. From the economic point of view, if the farmers get minimum 1:1.50 taka for every taka of investment then it seems to be cost effective and the benefit is economically acceptable (Islam, 2010). Like the basic inputs viz. seed, fertilizers, pesticides, irrigation and appropriate management, apart from socio-economic factors, may also influence the effectiveness of rice seed production at farmer's level.

2.2 Theoretical Framework

Microeconomic theory and business strategy can provide useful foundations for assessing profitability of rice production among Members of Farmers Multipurpose Cooperative Society. This section examines the relevant theories which can be applied in the interpretation of the various findings of the study. The theories are;

ISSUE	FRAMEWORK
GROUP DYNAMICS	THEORY OF GROUP DYNAMICS
COLLECTIVE ACTION	THEORY OF COLLECTIVE ACTION
SOCIAL ACTION	THEORY OF SOCIAL ACTION

2.2.1. Group Dynamics.

This study is anchored on Group dynamics theory. The study of groups in a psychological manner was first founded by Kurt Lewin in (1943), which consisted of explaining the way small groups and individuals act and react to different circumstances; he called this group dynamics. Group dynamics is based on group processes that develop within a group that is not present in a random collection of individuals. The processes develop through the interactions and influences between individuals and the group. A group is a special circumstance that consists of two or more individuals who are connected through common goals and a shared identity. The study of group dynamics can shed light on how to increase diversity in a community and how to combat the negative aspects that arise from certain group dynamics of groups with strong similarities and goals. Evolutionary theory suggests that humans evolved into a species that is best equipped for survival when it functions in groups. Groups allow for critical support mechanisms that increase the chance of survival for all group members. For this reason it is only natural that humans today either unconsciously or consciously form or flock towards groups. Groups, however, do not possess these survival benefits without important costs such as inter and intra group competition, inter and intra group conflict, and social shielding from others outside of the group Smith (2001), These individuals interact with, and have strong social attractions to one another therefore, developing certain processes which in turn affect

the group and its members. It is important to look at group dynamics of all groups to understand group behaviors. Why are some groups capable of accomplishing positive goals (Habitat for Humanity) and other groups capable of accomplishing negative goals (Nazi's)? Looking at the different processes that develop within a group, the group dynamics could help one understand how and why it is possible that, in certain situations, groups can evolve to act and behave immorally Smith(2001).

2.2.2. Tenets of Group Dynamics Theory

Major issues as suggested by Kurt Lewin in Group Dynamics Theory emphasize that:

1. An individual can be influenced by many different factors on many different levels. Individuals can be influenced by: majority, a certain situation, a leader, persuasion, their own behaviors and attitudes, etc Asch's (1956) study of conformity suggests that individuals conform to the majority even there is no social pressure to conform, no rewards for conforming , or no punishments for being the majority.
2. Other research conducted by Milgram (1965) suggests that individuals can be influenced under certain immediate situations that make the individual feel they are emotionally distant, following the orders, and/ or part of a larger group. In the situations where a group is formed to accomplish a task, an individual is more likely to be influence by a task-oriented leader, and situations where a group is formed to increase social relations; an individual is more likely to be influenced by a socially-oriented leader.
3. An individual, no matter the situation, is more likely to be influenced by a leader that possesses both task and social leadership Fiedler,(1971) cited in (Webb 1996). Research on persuasion suggests that individuals are influenced by the credibility and trustworthiness of an individual (Cook & Flay, 1978 cited in Myers).
4. Individuals can be influenced by their own attitudes and behaviors (Zimbardo, 1971; Pilner, 1974; Cialdini, 1978 all cited in Myers). Research suggests that individuals' attitudes can influence their own behavior can be also influence one's attitudes (Waller, 2002; Zimbardo, 1971; Pilner 1974; Ciadini,1978 all cited in Myers). This research on what influences individuals plays on

important role in group dynamics because it can influence the group cohesion and later inter-group dilemmas.

Relevance of the Theory to the Study

This study focuses on the Profitability of Rice production among farmers multipurpose cooperative society in south east Nigeria.

Whether a group works well together is multi-factorial. It depends on the members, the environment and the group tasks. The group's cohesion depends on the extent that the individuals in the group want to accomplish the group's common goals and group identity. The cohesion of a group is an important factor that could help explain the group's behavior and its inter-group relations. The elements of cohesion are the member's attraction to the group, normative influence, information influence, and outside sources in the world. A cohesive group consists of having a common identity, a sense of shared purpose and a structured pattern of communication (Carron, 1980 cited in Yalom, 1995), Depending on the group, some factors might be more important than other factors. For example, if a group is task oriented, then all that matters is accomplishing the task, whereas if a group is socially oriented, then all that matters is how everyone gets along with one another. However, most groups incorporate both these aspects into their groups. One would think that having a highly cohesive group would help the group accomplish their goals and make good decisions, however, previous research suggests that groups can intensify decisions by groupthink (Janis, 1972 Yalom, 1995) and by group discussion creating group polarization.

2.2.2. The Collective Action Theory

Collective action theory was propounded by Mancur Olson, Jr. in his 1965 published text, *The Logic of Collective Action: Public Goods and the Theory of Groups*. He argues that individuals in any group attempting collective action will have incentive to free ride on the effort of others if the group is working to provide public goods. Individuals will not free ride in groups that provide benefits only to active participants.

Olson's theory explores the market failures where individuals' consumer rationality and firms profit seeking do not lead to efficient provision of the public goods, that is,

where another level of provision would provide a higher gain at lower expenses (Tuomela, 1992).

Collective action occurs when a number of people work together to achieve some common objective (Dowding, 2007). It is an action taken together by a group of people whose goal is to enhance their status and achieve a common goal. Collective action refers to the joint actions of a number of individuals which aim to achieve and distribute some gain through coordination or cooperation (Holzinger, 2003). The essence of collective action is the inherent reward that members or a group can derive.

The study of Gale (2008), opines that group members gain when all individuals do their share, but for any individual the marginal benefit of contributing exceeds the cost. If each individual follows his or her self-interest, the outcome—total defection—is worse for everyone than if all had cooperated in supplying the public good or accomplishing their set objective. He asserts further that, collective action frequently relies on the initiative and sacrifice of committed leaders who supply information, resources, and monitoring and lay the foundation of subsequent conditional cooperation among narrowly self-interested actors.

According to Meinzen-Dick and Di Gregorio (2004), collective action is a voluntary action taken by a group to achieve common interest. They affirm that, collective action and networks among community members can facilitate access to information and even allow farmers to participate in technology development. Collective action can increase food security through mutual insurance. According to Ostrom (2004), people living in rural areas and using natural resources engage in collective action on a daily basis when they:

- i. Plant or harvest food together;
- ii. Use a common facility for marketing their products;
- iii. Maintain a local irrigation system; and
- iv. Meet to decide on rules related to all of the above.

The study of McCarthy (2004), communities throughout the world, work together to provide goods and services that their governments do not provide. They build and maintain local parks, feeder roads, community halls; sometimes local groups share responsibilities for maintaining public services, such as schools and health clinics, with their local or central government. She argues that more participating forums for setting the collective action agenda and implementing activities, transparency and accountability mechanism, and credible and fair conflict resolution mechanisms all contribute to successes in collective action.

It plays a vital role in much aspect of human endeavors. It can assume various forms both in formal and informal sectors; voluntary self help groups and organizations. It can be a onetime occurrence, that is, an event or it applies overtime, that is, in an institution. The Collective Action Theory is in line with, the cooperative business models—where members are rewarded through patronage dividend in percentage of their use of the cooperative business—and the topic of the research, Profitability of Rice Production among members of FMCS. This is because without the members working together towards a common goal, they will not accomplish the set goal. The success of agricultural cooperatives entails collective action, that is, active participation of members, and through this active participation, provision of benefits are made available to active participants in order to avoid free riders. Hence, the collective action theory was relevant to this research.

2.2.3. Social Action Theory

This study adopt the social action theory. The social action theory was founded by Max Weber in 1932. The Social Action Theory is a community-oriented model that is used "to increase the problem-solving ability of entire communities through achieving concrete changes towards social justice. That is, individuals within communities come together to redress the imbalance of powers or privileges between a disadvantaged group and society at large. Although this community-community-organization model is applicable to many social issues, that are disproportionately affecting certain communities. The Social Action Theory applies key concepts and tenets that are used within many community-organizing and community-building models.

As described in the literature (Minkler, Wilson, 2008; Glanz, 2008), these key concepts and tenets include empowerment, critical consciousness, community, capacity, social capital, issue selection, and participation and relevance, which are defined below.

1) Empowerment is any social process that allows people to gain mastery over their lives and their community. In doing so empowerment aims to transform power relations between communities, institutions, and governmental agencies. For example, communities may feel more empowered when they work together to strengthen their cultural identity and their community assets.

2) Critical Consciousness is a mental state by which members in a community recognize the need for social change and are ready to work to achieve those changes. Although this process is not obvious, it is completely necessary in achieving community involvement. We can raise critical consciousness by engaging individuals in dialogues, forums, and discussions that clearly relate how problems and their root cause can be solved through social action.

3) Community Capacity are characteristics of a community that affect their ability to mobilize and identify and solve social problems. These characteristics include the presence of leadership, Participation, "skills, sense of community, and more. Community capacity can be enhanced in many ways, such as through skill-building workshops that allow members of the community to become more effective leaders.

4) Social Capital are community resources that exist via relationships formed between community members. Social resources such as trust, reciprocity, and civic engagement can connect individuals in a fragmented community across social boundaries and power hierarchies, facilitating community building and organization. Social networking techniques and enhancing social support are important methods that build social capital.

5) Issue Selection is the process by which communities identify winnable, specific goals that unify and build community strength. In this process, individuals work together to select issues they feel are relevant to the entire community.

6) Participation and Relevance. Lastly, after selecting an issue, communities need to engage members and work on implementing their plan of action. Applying the social action theory to our study, individuals may feel more empowered when they work together in cooperative to strengthen their businesses thereby improving their economic status. Again, joining cooperative raises critical consciousness in an individual. This is because joining cooperative avails a member the opportunity of engaging in productive dialogues, forums, and discussions that clearly relate how their social and economic problems and their root cause can be solved through social action. By joining cooperative, capacity building is possible as members are privileged to enhance their leadership and management ability in many ways, such as through skill-building workshops that allow members of the cooperative to become more effective leaders. In cooperative, there is a value of trust, reciprocity, and civic engagement which can connect individuals in a fragmented community across social boundaries and power hierarchies, facilitating community building and organization. Cooperative organizations all over the world are instruments of social and economic transformation (Ijere, 1992)

2.3 Review of Empirical Literature

Several studies have been carried out in the world on the profitability of rice production among cooperatives members. Most of these studies concentrated on cereals and very few on tuber crops.

The study of Mohammed (2011) on rain fed and irrigated rice production found that labour, farm size, family size, fertilizer use, education level, and market variables were determinants of production. Fertilizers, seeds, pest control, extension services, credit availability, reliability and market storage affect productivity of small scale (Christopher, 2013). This shows that by increasing the quantity use of each input individually or collectively the productivity of small scale can be increased.

Adewuyi and Adebayo (2014) studied the efficiency of male and female rice-farmers Adamawa State, Nigeria. The data were analysed using both descriptive statistics, and inferential statistics which include stochastic frontier function and gross margin analysis. The study identified the socio-economic characteristics of both male and

female rice-farmers in the area. The results revealed that the Gross Margins for male and female farmers were ₦45,311.24 and ₦38,344.86 respectively indicating that rice production in the area was a profitable venture. However, the male farmers were shown to be operating at a higher level of profitability than their female counterparts.

Igboji, Anozie, Nneji and Priscilla. (2015) investigated, on socio-economic factors and profitability of rice production among small scale farmers in Ebonyi State. Multi-stage random sampling technique was employed to select a total of 120 rice farmers. In the result of multiple regression analysis, it was observed that coefficient of determination was 87% and all the variables used were positively significant and some statistically insignificant such as age, marital status, household size, educational level, farming experience and annual income. The major constraints limiting the rice production were identified as economic problem, infrastructural issue and unfavourable government policies. The study recommended that extension agents should be trained and empowered to educate farmers on how to process rice to different product, Government should work with existing social organization and involve them in distribution of necessary inputs for rice production and timely provision of necessary farm inputs to enhance rice production.

Ohen and Ajah (2015) studied on cost and return analysis in small scale rice production in Cross River State. Specifically, the study described the socio-economic characteristics of small-scale rice farmers, estimated costs and returns from production and examined socio-economic factors affecting small scale rice production in the area. Data were analyzed using descriptive and inferential statistics such as mean, frequency count; percentages, gross margin analysis and multiple regression analysis. The study revealed that small scale rice production in the area was profitable; Age of the farmer, farm size, Education and cost of seed were the significant factors that affected rice production in the study area.

Kareem, Arigbabu, Akintaro, and Badmus (2012), In their study, determine the level of contribution of North Central States of Nigeria in rice production to the total output of rice in Nigeria. Secondary data were collected from National Bureau of Statistics.

The data include land area used for rice cultivation and output of rice from the period of 1994/1995 to 2005/2006 cropping season. For the area of land used for rice cultivation, the regression model was tried under the four basic functional forms and the double log function was chosen as the lead equation. This was based on the value of coefficient of multiple determinations (R^2) of 0.625 and the significant variables in conformity with prior expectations. For rice output, the double log function was chosen as the lead equation with R^2 value of 0.542 and explanatory variables significantly affecting total output of rice in Nigeria in consonance with a priori expectations. All explanatory variables had positive influence on rice output. The study, recommended that the only sustainable and socially acceptable way forward is to enhance the competitiveness of local rice against imported rice, both in terms of quality and price.

Zohurul, Ratna, Sajia and Akteruzzman (2014), examine the profitability, constraints and factors affecting rice production in coastal area of Shamnagar upazila, Satkhaira district, Bangladesh by using stratified random sampling method. Simple statistical technique as well as Cobb-Douglas production function was used to achieve the objectives of the study. The study found that the small farmers (Tk. 10292.89) got higher net returns than the medium (Tk. 6894.39) and large (Tk. 4798.70) farmers per hectare, respectively. It is found that the coefficient of seed, fertilizer, power tiller, irrigation cost and human labour have significantly impact on gross return. Lack of saline tolerable good quality seeds, high price of inputs, low price of outputs and natural calamity were the major problems for rice farming in the study area though rice farming was a profitable enterprise.

Lakshmi, Sant and Aruna (2012) examine the relationship between farm productivity and farm structure has been analyzed focusing mainly on one channel of transmission of this relationship, viz. input-use pattern in rice production. The hypothesized relationship tested in this study is that land inequality influences access to/ use of resources in rice production and in-turn influences productivity. Market imperfections aggravate the negative effect of land inequity on productivity. Results shown that smallholders' share in inputs like fertilizers, and irrigation has increased over time, but

a large number of smallholders still do not have access to these resources. Study has demonstrated that policies like fertilizer subsidy, agricultural credit, and minimum support prices are able to address market imperfections only partially. Hence, for improving productivity and profitability of rice production of smallholders in particular and other farmers in general, addressing of structural inequity needs attention besides a focus on technology development.

Fantu and Kinya (2014) analyses indicate that household head age has no effect on productivity. But the study of Steve and Stephen (2014) revealed that age of household head influence productivity of small-scale rural female maize farmers. Older farmers tend to possess larger pieces of land, larger family labour force and more experience in growing and selling potato which enable them to grow and sell more (Sebatta 2012).

Odoemelam (2014) shows that there are differences in yield between male and female farmers, not because the female farmers are less skilled than their male counterpart but because they are constrained by lack of access to agricultural inputs and resources. Emerging evidence suggests that women farmers have lower returns to inputs than men farmers, further contributing to the gap in agricultural productivity (Aguilar and Oscar., 2015; Oseni and Daudu, 2015).

Fantu and Simba (2014) result indicate that male headed households have higher output and the households with better educated heads perform better in productivity. Education enhances the acquisition and utilization of information on improved technology by farmers which tend to positively influence productivity (Osondu and Okoye, 2014). Educational attainment had a direct relationship with cassava output (Itam and Elim, 2014). Farming experience, access to credit, farm income and pond size were significant determinants of output of fish production (Osondu and Ijioma, 2014).

Okoli and Okiwe (2015) examined factors influencing agricultural production among cooperative farmers. Their result indicated that several variables such as age,

education, farm experience, credit, soil fertility, amount of fertilizer and amount seed affect farmers output. Farmers who are nearer markets tend to participate more in the market because they have access to most of the market information.

Rios and Rio (2008) results indicated that regardless of market access factors, households with high productivity tend to participate in agricultural markets. In contrast being accessible to better markets does not actually lead to productivity. Their finding implies that investment in markets access and infrastructure provides less advancement in agricultural productivity, whereas programmes targeted on enhancements in farm structure and capitals have the potential to increase both productivity and market participation.

Tolno and Pio (2016) studied factors affecting the quantity of potato produced. Their result showed that potato area, the use of improved seeds and production losses significantly influenced potato output. The low productivity of smallholder farming is due to use of traditional farming tools and the heavy reliance on traditional rain-fed cropping methods hamper productivity (Mpogole, 2013). Abdullahi (2012) found that farm size use was determinants of output. Farm size, value of land and farming experience had a direct relationship with cassava output (Itam and Elim, 2014). But the study of Sheng (2014) did not showed the impact of farm size and household size on productivity of small-scale rural female maize farmers. Sabasi and Kompaniyets (2015) revealed that both farm size and public research investment affect productivity but not profitability.

Beaman (2013) found that increase in fertilizer use had a large average impact on production. Changes in fertilizer amounts have been found to affect crop yield, which is a significant determinant of farm profit (Jannoura, 2014). However the effect of fertilizer on crop yields has a diminishing effect with increasing use. From an economic viewpoint, in order to maximize profit, marginal revenue obtained for applying fertilizer on a crop must equal the marginal cost of applying the fertilizer (Farquharson, 2016). But in the study of Supaporn (2015) fertilizer did not affect

production rather cultivated area, hired labour and capital affect sugarcane production among smallholder farmers.

According to Azam and Khan (2010), agricultural productivity is greatly affected by a number of inputs such as land, labour, capital, seed, fertilizer, irrigation and soil. According to the authors, all the inputs are categorized into three main variables such as land, labour and capital, where land includes the rental value of land for 12 months and labour consists of the hired labour and family labour. Institutional factors like land ownership, presence of extension service and relation with the local municipality influence vegetable production amongst small-scale farmers (Raleting and Obi, 2015). Contract farming has been very important and fruitful concept in potato cultivation both for farmers and for the industry partners (Pandit and Puerile, 2015; Rais, 2013). There are ample opportunities for contract farming in potato where the output is well accepted in the market and potato could be supplied in a short period of time.

Similarly, in Ethiopia, Bezabih and Hadera (2016) examined the utilization of low level agricultural technologies, risks related to natural occurrences such as storms and disease outbreak to be the major sources of the decline in productivity. Furthermore, rapid population growth, the size of land allocated to each household has reduced resulting to a decrease in production. The most important factors responsible for the low productivity of potato is Late Blight and managements of potato (Amin and Osin 2013). Dissemination of improved variety to the farmer is vital to increase the productivity of Irish potato (Wondwesen, 2015).

Oyinbo (2011) in their study of assessment of the profitability of small scale cassava production found that labour, farm size, family size, fertilizer use, education level, and market variables were determinants of profitability. The authors employed the use of gross margin in their analysis. Mohammed (2011) found that farm size and market variables determine profitability of rain fed and irrigated rice production.

Beaman (2013) found that increase in fertilizer use had a large average impact on production but no significant impact on profit. However the study of Mohammed (2011) and Oyinbo (2011) on rain fed and irrigated rice production and assessment of

the profitability of small scale cassava production respectively showed that fertilizer use determines profitability.

Afolami, Obayelu, Agbonlahor and Lawal (2012) conducted a study to determine the impact of farmers' membership of cooperative societies on rice production. Against the backdrop that the promotion of membership of cooperative society among farmers would give them better access to agricultural inputs and consequently improve their income. Multistage sampling technique was employed to select a total of 310 rice farmers. Data collected were analyzed using descriptive statistics, budgetary technique and inferential statistics. The result showed that there is no significant difference in the gross margin per hectare realized by farmers that were cooperative members (N90, 222) and the non cooperative members (N92, 986). The input-use structure showed that cooperative members were more intensive users of purchased inputs like fertilizer and pesticides valued at N124,555 per ha (about 41% of variable cost) compared to the non cooperative members valued at N57,647 per ha (about 22% of the variable cost).

The finding of Behjat and Ostry (2013) indicated that the average farm size, farm area, soil conservation and operation expense had positive impact on Gross Margin. Irrigation, fertilizer applied, education, credit accessed and farming experience determine profitability of rice (Onoja and Herbert, 2012). Nonfarm employment, education, extension service, age, farm experience, credit status degree of specialization and frequency of weeding determine profit inefficiency of Irish potato among smallholder farmers (Assa and Akinde, 2012).

By using Gross Margin as the measure of farm profitability, Zulu (2011) in his study analysed the profitability of cowpea farmers in Zambia and concluded that yields, land tenure and farm gate price had a positive influence on profitability whereas production costs and area had a negative influence on profitability. Seed variety affects the profitability of round potato (Mpogole and Kadigi, 2012). Selling price and amount of seed affects profitability of rice, onion and tomato. Warm season and cold season affects profitability but not productivity of onion (Elodie, 2015).

Gender of household head, fertilizer, manure, hired labour and tools influence profitability while age of household head, education, family size, contract farming and

soil conservation did not influence profitability of diversified cash crop farming among smallholder tea farmers (Mwangi, 2015).

There evidences were men spend most of their time working on cash crops while women on food crops so as to feed their families. With the work burden being high on women than men and farming objectives varying between these two types of households, male headed households were able to produce more and also make more profits. In addition, fertilizer and manure application is especially important in their study since most crops are perennial and the farms are too small such that fallowing is not a feasible solution to soil infertility.

Rahman (2013) found that experience in modern rice farming plays an important role in raising profitability and reducing inefficiency among rice farmers reasoning as farmers with more experience in growing modern varieties earn significantly higher profit, incur less profit loss and operate at significantly higher level of profit efficiency. The farm tools variable represents the value of all tools and implements used for the agricultural production process. The farmers with higher value of farm assets are in a better position to grow crops which may require different specialized tools and make more profits compared to farmers with very few assets (Masuku, 2011; Rahman, 2013). The principal argument for household asset holding as a determining factor in smallholder economic excellence can be viewed from the production side perspective which asserts that farm tools are essential for the production of a marketable surplus at a smallholder level.

Jirgi and Girgo (2010) investigated the profitability of millet/cowpea mixed farmers production by farm budgeting technique and exponential production function. Their results of the regression with NFI indicated that although these enterprises are profitable, farmers should use more seed, family labour, agrochemicals, less of hired labour and land in order to gain more profits. Contrary to other findings, Bahta and Baker (2015) inferred that profit could not be determined by age and gender of head household but distance to market, education level of head household and access to credit determine profit among smallholder beef producers.

Lighton (2014) examined the profitability of smallholder out-grower tea farming and its determinants. Their study found that smallholder out-grower tea farming is on average marginally profitable. Their findings also revealed that access to extension services, the extent of farm specialization, communal farming, farmer's level of education, amount of labour used influence out-grower tea farming profitability.

The recent studies, in Ethiopia, of Ayalew (2014) explained that unavailability of storage facilities, low price of produce and entire dependency of farmers on pre-planting treatment affects profitability of potato. Almaz (2014) results also indicated that family labour, quantity produced and selling price determine household's profitability of tomato for male household. Access to price information, achievement motivation, fertilizer cost, selling price and quantity produced determined household's tomato profitability in female household.

Abraham (2015) stated irrigation plays dominant role in increasing agricultural productivity. Their OLS revealed that land size and irrigation participation have positive effect on household income. Farmers align harvest time to meet off-season higher market demand, when farm-gate prices are much higher to get good return from their vegetable production (Bezabih 2015).

The study done by Olujenyo (2013) on the determinants of agricultural production and profitability used OLS methods when estimating parameters of production function and found that only labour had a significant influence on output. Fred and Oscar. (2012) used OLS regression and gross margin to analyse the resource use efficiency in rice production and found out that labour and chemicals were utilized while land, fertilizer and seed were under-utilized. In addition, gross margin was employed by Fred and Oscar. (2012) to assess the profitability of rice production.

Akinola and Owombo (2012) used gross margin for economic analysis on adoption of mulching technology in yam production. Therefore, in this study OLS regression analysis was used to analyse productivity and profitability of smallholder potato growers at Bore district. There are many profitability analysis tools. Sadiq (2013) used Net Farm Income (NFI) in analysing profitability of small scale maize production.

Ogisi,2013) used NFI to analyse profitability of cassava and Mwang andi Elodie. (2015) used Net Farm Margin in analysing profitability of diversified cash crop farming among smallholder tea farmers. In this study, Net Farm Income was used to determine profitability of smallholder potato growers.

Conceptual Framework Educational level, farming experience, farm size, extension contact and labour had relationships with productivity (Obasi 2013). Hired labour, farm size, farming experience and age were affecting output and profitability cassava (Ogisi 2013).

The findings of Lighton (2014) reveal that access to extension services, farm size, educational level, labour, yield per hectare and total area influence out-grower tea farming profitability. Gender of the household head, experience, farm size, access to credit, quantities of fertilizer and manure affects profitability of diversified cash crop farming (Mwangi,2015).

Behjat and Ostry (2013) indicated that average of farm size, farm area, soil conservation, and operation expense had significant positive impact on Gross Margin whereas increasing in age had significant negative impact on farm profitability. Farm size, hired labour, age, household size, income, credit access, experience and planting material determine productivity while education, extension visit and fertilizer does not affect productivity of waterleaf (Akpan, 2011).

The study of Masuka and Xaba (2013) showed that access to credit, selling price, fertilizer quantity, gender and distance to market were influencing the productivity of the vegetable farmers while profitability of vegetables was influenced by the farmers' level of education, land under vegetable production and marketing agency. Labour, seed, fertilizer, variety, age and access to extension are the determinants of productivity while herbicides and years in school are determinants of rice profitability (Mugula, 2013).

Takele (2010) studied the profitability and marketing chain of rice in Fogera Woreda, South Gondar zone of Amhara Regional State, Ethiopia. The results show that

wholesalers and millers are the most important buyers of rice from the producers of about 45% and 27%, respectively, the market concentration ratio was 0.77, which show rice market was oligopolistic in nature. On the profitability analysis, the study used cost benefit analysis which shows rice production is a profitable business to farmers while assemblers obtain much profit than the rest of the actors.

Femi and Fumilola (2014) examined the profitability and marketing channels of rice in Menchum River Valley in Cameroon. Sub sector mapping analysis was used and results showed that there are nine main marketing channels exist in the study area illustrate the movements of rice from farmers to consumers. Also the study found that the channel that went out of the production region hosted the largest volume of rice, which means rice production is the main economic activity in the area, and the main actors who were involved in the marketing channels of rice produced in Menchum river valley were; individual's farmers, producer organizations, processors, wholesalers, retailers and consumers. The study found that production and marketing of rice in Menchum river valley is a profitable venture, however, profit margins of the rice business are unevenly distributed and varied depending on the number of actors involved and their role in the marketing channel and conclude that in general farmers receive the smallest margins among actors in the channel. On the other hand, rice millers receive the greatest share of the profit margins in the rice channel of about 18.69%, followed by the producers 12.77%, wholesalers 8.5% then retailers 8.33%.

Also, according to Femi and Fumilola (2014), paddy produces seven to ten percent of rice bran and on average the quantity of rice bran obtained per ha was 322.15kg rice bran per hectare. Risks were also identified to actors along the channel such as 14.69% of the actors agreed that transport was a major problem to them, also 17.56% of traders agreed that poor quality of rice is a major challenge to their marketing activities.

A study by Inuwa (2011) to determine the profitability of rice processing and marketing in Kano State in Nigeria used farm budgetary technique to analyze data. The study found that the millers accrue higher net milling income followed by

wholesalers, retailers and lastly parboiler's. Also parboiling activities were dominated by women with lower net income accrued due to high operating costs and low bargaining power.

Inuwa (2011) further found that wholesalers who purchased milled rice in large quantity with high bargaining power to farmers and those wholesalers who are involved in value addition processes like re-milling and winnowing attract a higher price. This explained why wholesalers of processed rice attracted higher net marketing income than retailers.

Bassey (2013) examined the inter market performance and pricing efficiency of imported rice marketing in Akwa Ibom State traders in Southern Nigeria. The results show that rice prices were higher in the rural than the urban markets, the correlation coefficient between the urban market pair was higher of about 0.81, than those between the urban and the rural market pairs which ranged from 0.21 to 0.46. This means that, the flow of market information was higher among the urban market pairs and very low between the rural and urban market pairs which imply that the urban market pair was highly integrated than the rural-urban market pairs.

Also, Bassey (2013) compared the mean wholesale prices between urban markets and rural markets and the results shows that there is a significant difference in the mean wholesale prices between the urban and rural market pairs while there were no significant differences in the mean wholesale prices between the two urban market pair due to differences in the level of market integration. However, there were a number of challenges facing rice traders in Southern Nigeria, which are high cost of transportation (53.3%), high rent and taxes (21.7%), lack of credit facilities (13.3%) and rampant incidence of theft (6.7%).

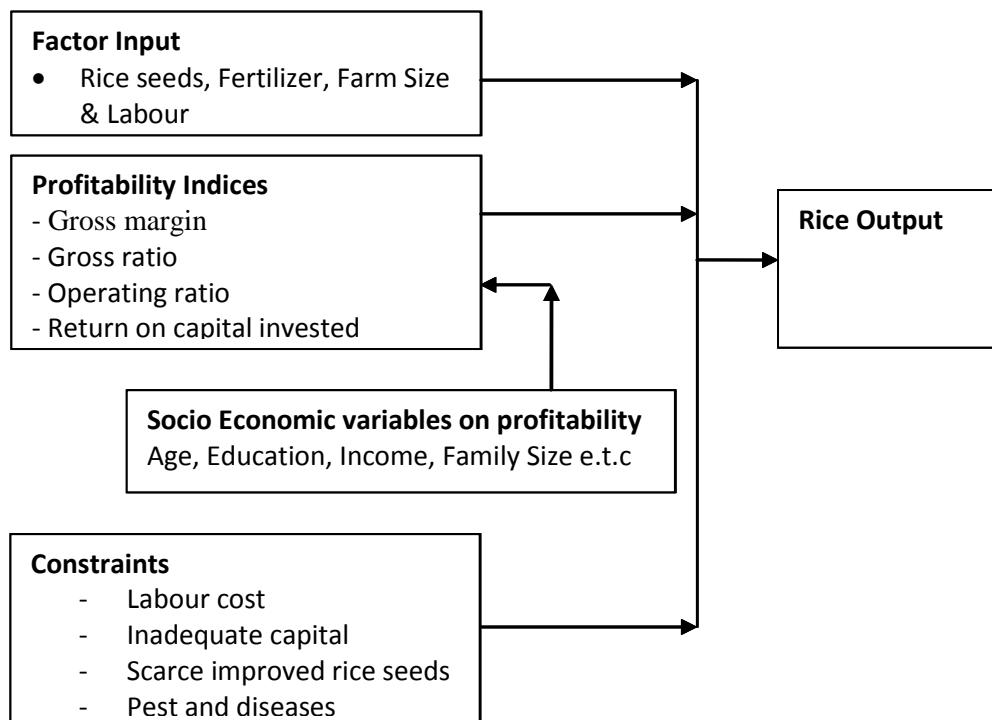
2.3.2 Rice marketing and value chain in Tanzania.

2.4 Summary /Gap in the Literature

From the literature reviewed, it is likely that no study had been thoroughly investigated on the Profitability of Rice Production among Members of Farmers Multipurpose Cooperative Society (FMCS) In South East Nigeria. This is the area of the interest to the researcher and this makes the researcher in her present study to employs more robust factor inputs (rice seeds, fertilizer, farm size and labour),that seems to be very vital in assessing productivity of rice output which previous studies did not explored.

It is against these observations that it becomes imperatively essential for the present study to seek and address on Profitability of Rice Production among Members of Farmers Multipurpose Cooperative Society (FMCS) In South East Nigeria and as well make suggestions based on the findings of the study on how these problems could be harnessed.

Figure 2.5: Conceptual Framework



Source: Researchers' Variable (2016).

CHAPTER THREE

METHODOLOGY

This chapter aims at providing procedure for conducting the research. it was done under the following sub-headings: research design, area of study, population of the study, sample size determination and sampling techniques procedure, sampling procedure, sources of data, description of data collection instrument, validity and reliability of instrument, method of administration and collection of data and Instruments of data analysis.

3.1 Research Design

This study make used of descriptive survey research which enables the use of questionnaire in eliciting information from the respondents. The study focused on people, their opinions, attitudes, motives and behavior. As a survey research, the study is on the profitability of rice production among members of Farmers Multipurpose Cooperative Societies in the core rice producing areas in South-East Nigeria..

3.2 Area of Study

The Uzo-Uwani Local Government Area of Enugu State; Ayamelum Local Government of Anambra State and Ishielu Local Government Area of Ebonyi State these State are located in the South East of Nigeria. Anambra was created from old Anambra and with its State capital situated in Awka and the state has 21 LGA, shared into 3 senetoral zones (Anambra North, Anambra South, and Anambra Central).Anambra is located along the river bank of famous river Niger and shared boundaries with Enugu State in the east, Delta in the west; Imo in the south and Kogi in the north. In Ayamelum local government of Anambra State, is a local government comprises of 8 towns, namely, Omor, Umueje, Omasi, Igbakwu, Umumbo, Anaka, Umuerum and Ifite.

Uzo-Uwani Local Government Area comprises of 15 communities, namely, Adani, Igga, Ogurugu, Ojor, Asaba, Nimbo, Ugbene, Nruobo, Nkpologu, Uvuru, Umulokpa, Adaba, Nkume Akpugo and Ukpata. The people of Uzo-Uwani are generally farmers and partly business men (Amdusuun, 2013).

Uzo-Uwani Local Government Area is endowed with fertile, soils. According to Ibezim (2015), rice prefers clay loamy soils which is high in nitrogen phosphorous and potassium. These are attributes of a fertile soil. It has an average rainfall of about 1700mm, usually spread over a period of seven months from April to October. The pattern of rainfall usually dictates the calendar of farming. The average temperature is about 27°C, with variations throughout the year (Amadusum, 2012). Thus, the average amount of temperature, length of day, distribution and efficiency of rainfall in Uzo-Uwani Local Government Area, make the area well suited for rice production. Other crops grown in the area include maize, yam, cassava and cocoa yam.

The part of Ishielu LGA of Ebony State used for this study were; Ezillor, Ezza, Ohufu, Ogboji, Agba, Umuhuali. The choice of these towns was based on the fact that they have the highest concentration of the rice farmers, Rice Mills and consumers in the State. All the rice producers in the three communities from each of the local government formed the population of the study.

In each of the communities selected, lists of rice producers were drawn with the help of the District Cooperative Officers and extension agents in the areas, respectively.

The choice of these areas is purposive, because it is an area where rice cultivation and marketing are extensively carried out.

3.3 Population of the Study

The population of the study consists of all the cooperative Rice farmers in the study areas. Information gotten concerning the farmers in Ayamelum L. G. A of Anambra State shows that there are 26 Farmers Multi propose cooperative society (FMCS) involved in Rice production consist of 300 males, 240 females totaling 540 members. For the case of Uzo-uwani LGA, there are 12 Farmers Multi propose cooperative society (FMCS) involved in Rice production consist of 370 males and 300 females totaling 670 members. So also in Ishielu, there are 14 Farmers Multipurpose Cooperative Societies consist of 450 males and 350 females totaling 800 members.

Table 3.2.1 Showing Population Distribution of the study area and of Parameter of Interest

S/N	Senatorial Zones	Area of Operation	Total Number of FMCS	Male	Female	Total Number of Members	Respondent
1	Enugu North Enugu East Enugu West	Uzo Uwani	12	370	300	670	133
2	Ebonyi North Ebonyi Central Ebonyi South	Ishielu	14	450	350	800	159
3	Anambra North Anambra Central Anambra South	Ayamelum	26	300	240	540	108
Total			52	1120	890	2010	400

Source: Field Survey (2016).

3.4 Sample Size Determination and Sampling Techniques Procedure

Since the population of the study is known to be 2010 members of Farmers Multi propose cooperative society composed of 52 FMCS across the 3 agricultural senatorial zone. The researcher adopted simple random sampling in selecting 400 members from 2010 members after application of Taro Yamani's formular as shown below.

Bowler's formula was also used in determining the quota of the 400 that goes to each of the 3 local governments (Uzo Uwani, Ayamelum and Ishielu) as also shown below.

The researcher however used judgmental sampling techniques in distributing the randomize 400 members to the 3 FMCS ie (159 to Ishielu FMCS, 107 to Ayamelum FMCS and 133 to Uzo Uwani FMCS)

Taro Yamane formula is however expressed below as:

$$n = \frac{N}{1+N(e)^2}$$

Where:

n = The desired manageable sample size

N = Population

I = Mathematical constant

e = Margin of acceptable error.

In this case,

n =? (Unknown),

N = 2010

e = 5%

I = constant

Substituting the above values into the formula we have

$$n = \frac{2010}{1+2010(0.05)^2}$$

N = 399.9

Approximate= 400

Therefore, sample size (n) =400

Thus, 400 rice cooperative farmers will be the respondents for this study.

Lastly, at this stage, to ensure that the distributions of questionnaires are appropriate for each FMCS, Bowler's formula was used.

Bowler's formulae:

$$n_h = \frac{n \times N_h}{N}$$

Where:

n_h = the appropriate proportion size for each FMCS

N_h = Total Cooperative Rice Marketer

n = pre determine and calculated sample size = 400

N = determine or estimated population for the study =2010

Ishielu FMCS

$$n_h = \frac{n \times N_h}{N}$$

$$n_h = \frac{400 \times 800}{2010}$$

$$n_h = \frac{320}{2010}$$

$$n_h = \mathbf{159.20}$$

Ananyamelum FMCS

$$n_h = \frac{n \times N_h}{N}$$

$$n_h = \frac{400 \times 540}{2010}$$

$$n_h = \frac{216000}{2010}$$

$$n_h = \mathbf{108}$$

$$\text{Uzouwani FMCS} \quad nh = \frac{nxNh}{N}$$

$$nh = \frac{400 \times 670}{2010}$$

$$nh = \frac{268000}{2010}$$

$$nh = 133.33$$

An appropriate proportion of structured questionnaire was administered to the cooperative rice farmers.

3.5 Sampling Procedure

In order to have a good spread of respondents for the study, purposive sampling method was adopted in selecting 52 cooperative rice farmers from Agricultural zones of Uzo-Uwani, Ayamelum and Ishielu.

Also in selecting the members of the selected rice producers in the study zone (52 cooperative societies), simple random sampling was explored in order to give all the rice producers equal chance of being selected:

3.6 Source of Data Collection

Data were collected from primary and secondary sources. The primary data are those first hand data and information gotten from the respondents and the method through which the use of structured Questionnaires. while secondary source are those data and information other than first hand and these were sourced from the use of journal, library, textbooks, research report as well as the internet.

3.7 Description of Data Collection Instrument

The data were collected using two sets of pre-tested copies of questionnaires Section A socio-economic data. This enables the researcher to examine the socio economic profile of the individual cooperative rice farmers. while Section B was designed to obtain data relating to costs, revenue and other logistics relating to rice production as they relate to the respondents. Section C sought to obtain data regarding constraints to

rice production. To achieve this, the Likert-type scale procedure was adopted. Each questions/item had a choice with five levels: Strongly Agree (5); Agree (4); Undecided (3); Disagree (2); and Strongly Disagree (1) to obtain responses from the farmer-respondents. The farmers were requested to indicate their level of agreement with each of the items relating to constraints in rice production.

3.8 Validation of research instrument.

The validation of research instrument was deemed necessary to determine which questions actually elicit the purpose of the study, so as to enable the research achieve the study objectives. The questionnaire was therefore subjected to validity test through the scrutiny and modifications of the supervisor, and 3 other research experts, 2 in the Faculty of Management Science, another from other Department. They were given copies of the questionnaire for their necessary inputs sequel to the approval of the research's Supervisor.

3.9 Reliability Test of Data Collection Instrument

In order to ensure reliability of instrument, test were adopted, to achieve this. A well-structured questioner were administered to the cooperative research farmers which were be filled and returned. Then another set of question were administered to the middleman. Therefore their response were subjected to internal consistency test with cornbach's Alpha at 5% level of significance. In this study, cronbach's Alpha were adopted as it has the ability to determine the strength or importance of each item in the research tool. If the Alpha level is greater than threshold of 0.6 it indicate that there is high level of internal consistency in the research instrument and it will be otherwise, if Alpha level is less than the threshold of 0.6. The coefficient of reliability for rice output influence by farm inputs is ($\alpha= 0.725$), while relationship between rice output and profitability indices had ($\alpha=0. 820$), socio-economic characteristics and profitability of rice production was ($\alpha=0. 862$) and constraints ($\alpha=0. 819$). This illustrates that all the four variables were considered high enough.

Cronbach's Alpha Reliability Test

Item-Total Statistics					
3.9.1. Reliability test using Cronbach's Alpha Reliability Test					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
To what extent is rice output influence by farm inputs such as rice seeds, fertilizer, farm size and labour?	29.92	47.421	.725	.833	.858
Is there a significant relationship between rice output and profitability indices such as gross ratio, operating ratio and return on capital invested?	30.17	46.214	.820	.913	.920
Is rice production profitability significantly influenced by socio-economic characteristics of rice farmers?	30.60	49.571	.862	.921	.953
To what extent do constraints such as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases affect rice output?	31.54	53.943	.819	.909	.943

Source: Researcher's computation. (2016)

3.10 Administration and Collection of the Research Instrument.

Copies of the questionnaire were administered to the respondents through the enumerators, who were chosen from the communities. The use of enumerators from the study was largely due to their knowledge of the dialect of the farmers and the topography of the area. A total of 400 copies of the questionnaire were prepared and distributed, and the entire 400 copies were returned and certified usable for appropriate analyses. The return rate of the questionnaire was 100%.

3.11 Instruments for Data Analysis

Data collected during the course of the study were primarily presented and discussed using descriptive statistics such as percentage, mean, Standard deviation and frequency count and a cost return analysis. Inferential statistics such as Pearson correlation and multiple regression analyses were employed to analyse and to test formulated hypotheses. Indeed, hypotheses one, three and four were addressed through the use of multiple regression analyses, while hypothesis two was addressed through the use of Pearson correlation analysis.

Cost and Return Analysis

Cost and return analysis was carried out to assess the profitability of rice production by the respondents. This includes determination of gross margin, return to farm management and labour, gross ratio, operating ratio and return on capital invested by the respondents. Gross margin is the difference between the gross value of farm output (Gross Farm Income, GFI) and the Total Variable Cost (TVC). It is a useful planning tool in situations where fixed capital is just a negligible portion of the farming enterprises (Olukosi, Isitor, and Ode, 2016; Omotesho, Falola, Muhammad-Lawal, Oyeyemi, 2012).

$$GM = GFI - TVC$$

Where

GM = Gross Margin,

GFI = Gross Farm Income (gross value of output),

TVC = Total Variable Cost.

Operating Ratio is directly related to the farm variable input usage Okeowo, Agunbiade, Odeyem (1999). The lower the ratio, the higher the profitability of the farm business.

$$OR = TOC/GFI$$

Where

OR = Operating Ratio,

TOC = Total Operating Cost and

GFI = As earlier defined

Return on Capital Invested is defined as gross margin divided by total variable cost

$$RCI = GM/TVC$$

Where

RCI = Return on Capital Invested,

GM = As earlier defined and

TVC = As earlier defined

Analytical Regression Model

The multiple regression models that were adopted in the study were of the OLS type.

The implicit specifications of the models are:

Model for Hypothesis One

Rice output = f (rice seeds, fertilizer, farm size, labour) (1)

Rice profitability = f (age, gender, hsholdsize, educ, frmsze), (2)

Rice output = f (inadcap, lndten, hilabcost, scarceed, inapmgt, poorseed, pesdis, prexst)

(3)

Where

Rice output = Amount of rice produced in tones.

Rice seed = Expenditure on rice seed procurement in 2016 (Naira).

Fertilizer = Expenditure on fertilizer in 2016 (Naira).

Farm size = Farm size of the respondent in 2016 (hectare).

Labour = Expenditure on farm labour (both imputed and hired) in 20016 (Naira).

Model for Hypothesis Three

Rice profitability = Profitability in rice production as measured by gross margin in 2016 (Naira).

Age = Age of farmer in years

Gender = Gender of farmer (Dummy: female 1, otherwise 0)

Household size = Size of farmer's household (no. of persons)

Education = Years of formal education

Farm size = Farm size (in hectares)

Model for Hypothesis Four

Inadcap = Inadequacy of capital (mean rating),

Lndten = Land tenure (mean rating)

Hilabcost = High input/labour cost (mean rating),

Scarseed = Scarcity of improved rice seeds (mean rating),

Inapmgt = Inappropriate farm management (mean rating)

Poorseed = Persistent use of poor quality seeds (mean rating)

Pesdis = Pest and diseases (mean rating).

Presext = Poor research and extension support

The explicit specifications of models (1), (2) and (3) are given below:

$$\text{Riceoutpt} = \alpha + \beta_1 \text{rice seeds} + \beta_2 \text{fertilizer} + \beta_3 \text{farmsize} + \beta_4 \text{labour} + \varepsilon_i \quad (\text{Hyp 1})$$

$$\text{Riceprofit} = \alpha + \beta_1 \text{age} + \beta_2 \text{gend} + \beta_3 \text{hshd} + \beta_4 \text{educ} + \beta_5 \text{frmsz} + \varepsilon_i \quad (\text{Hyp 3})$$

$$\text{Riceoutpt} = \alpha + \beta_1 \text{inadcap} + \beta_2 \text{lndten} + \beta_3 \text{hilabcost} + \beta_4 \text{scarseed} + \beta_5 \text{inapmgt} + \beta_6 \text{poorseed} + \beta_5 \text{pesdis} + \beta_6 \text{presext} + \varepsilon_i \quad (\text{Hyp 4})$$

The α s and the β s are the parameters to be estimated while the ε_i s are the error terms, designed to capture the effects of unspecified variables in the models.

The regression analyses were run using version 22 of the SPSS package so as to determine the order of importance of the explanatory variables in explaining the variations observed in the dependent variables. The t-tests were performed to test the significance of each of the explanatory variables and to test hypotheses one, three and

four at the alpha levels of 5%. Additionally, the joint effects of all the specified variables on market participation were measured through the application of analyses of variance (ANOVA) to obtain F ratios, indicating the strength of these effects.

Pearson Correlation

In order to test the research hypothesis two in establishing the relationship and the strength of the relationship between the variables under investigation, Pearson Product Moment Correlation Coefficient (PPMC) techniques was used. Pearson Product Moment Correlation Coefficient test is an inferential statistics for establishing the relationship between two or more variables.

The statistical formula for the correlation coefficient were given below

$$r = \frac{\sum xy - \frac{\sum x \sum y}{n}}{\sqrt{\left[\frac{\sum x^2 - \frac{(\sum x)^2}{N}}{N} \right] \left[\frac{\sum y^2 - \frac{(\sum y)^2}{n}}{n} \right]}}$$

Where:

n= the total no of observation

($\sum x$) = sum of independent variable (population)

($\sum y$)= sum of the dependent variable

($\sum xy$) = sum of the product of x and y

($\sum x^2$) = sum of the squares of x

($\sum x$)² = square of the sum of x

($\sum y^2$) = sum of the squares of y

CHAPTER FOUR
DATA PRESENTATION AND ANALYSIS

4.1 The socio-economic characteristics of respondents.

Table 4.1 shows the socio-economic characteristics of the respondents.

Table 4.1. Socio-economic characteristics

	Item	Respondents	Percentage
1	Gender		
	Male	165	41.25
	Female	235	58.75
	Total	400	100.00
2	Age distribution (years)		
	20-29	53	13.25
	30-39	173	43.25
	40-49	128	32.00
	50-59	29	7.25
	60-69	17	4.25
	Total	400	100.00
3	Secondary Occupation		
	None	248	62.00
	Trading	54	13.50
	Civil servants	98	24.50
	Total	400	100.00
4	Marital status		
	Single	68	17.00
	Married	283	70.75
	Divorced	49	12.25
	Total	400	100.00

5	Farm size distribution (acres)		
	0-5	139	34.75
	6-10	246	61.50
	11-15	10	2.50
	16-20	5	1.25
	Total	400	100.00
6	Education level		
	Not been to school	27	6.75
	Primary school	121	30.25
	Secondary	232	58.00
	Tertiary institution	20	5.00
	Total	400	100.00
7	Income distribution (N'000)		
	Below 2,000	109	27.25
	2000-4,000	197	49.25
	4,000 and above	94	23.50
	Total	400	100.00
8	Rice farming experience (yrs)		
	0-3	27	6.75
	4-7	172	43.00
	7 and above	161	40.25
	Total	400	100.00

Sources: Field Survey 2016.

Rice production in the study area is dominated by female farmers. Almost 58.75% of the respondents are females. The age distribution of the farmer's shows that majority

of them are at very active age bracket as 43.25% and 32% of them fall between 30-39 and 40-49 respectively.

The occupation of the respondents shows that almost 62% of them had farming as their sole occupation, while about 42% of them have secondary occupations in civil service and petty trading. Almost all the farmers are married 71%, which indicates that farmers marry early to raise families that will provide labour and assist them in their farm work.

Most of the respondents have large families. More than 61% had family sizes of between 6-10 and 5% had family sizes of between 11-15. Educational level of the respondents show most had attended formal schools. More than half (58) had secondary school education, while about 30% attended primary schools. The income distribution of the farmers shows that about a half (49.25%) had income range of between N2,000,000 and 4,000,000, while 27.25% had income range of below 2,000,000. The rest of the respondents (23.50%) had income range of over 4,000,000. These indicate that the respondents were purely small-scale farmers. The Table also shows that the farmers were moderately experienced in rice farming: 43% had rice farming experience of between 4 and 7 years, while 40.25% had over seven years experience in rice farming.

4.1.2. Production Related Variables

Table 4.1.2. Sources of initial and additional capital

Capital source	Frequency*	Percentage*
Personal savings	333	83.25
Friends/Relations	360	90.00
Money lenders	200	50.00
Cooperatives	400	100.00
Commercial banks	8	2.50

***Multiple responses**

Sources: Field Survey 2016.

The sources of initial and additional funding for the rice farming activities of the respondents are presented in Table 4.1.2. It is seen that most of the respondents obtained funds from cooperatives (100%) and from friends and relations (90%). These were closely followed by personal saving which was indicated by about 83% of the

respondents. Two hundred respondents (50%) indicated they equally obtained funding from money lenders, Only 2,5% of the respondents indicated they obtained funds from commercial banks. It is therefore, clear that most of the funding needs of the rice farmers in the area were satisfied from cooperatives, friends and relations and money lenders.

Table 4.1.3. Farm Size (Ha)

Farm size in (Ha)	Frequency	Percentage
Less than 2	248	62.00
2-4	130	32.50
4 and above	22	5.50
Total	400	100.00

Source: Field survey 2016.

Table 4.1.3 shows that the farm size of most of the farmers (62%) were less than 2 hectares. Other farm sizes indicated were 2 to 4 hectares (32.5%). Only 5.5% of the respondents had farm sizes of over 4 hectares. This again shows the rice farmers were small-scale farmers. The smallness of the farm size obviously minimizes their output which invariably affects profitability.

4.1.4 Farm Operational Variables and Rice Output

Table 4.1.4 level of operation

Operation level	Frequency	Percentage
Cultivation only	45	11.25
Cultivation and processing	320	80.00
Processing only	55	13.75
Total	400	100.00

Source: Field survey 2016.

Table 4.1.4. Levels of operation of the responding rice farmers. It is seen that most of the respondents are involved in rice cultivation and processing, while 13.75% are involved in rice processing only. Only 11.25% were involved in rice cultivation. The value added as result of processing adds to the overall profit of the farmer.

Table 4.1.5. Rice varieties produced.

Varieties	Response	Percentage
Improved	325	81.25
Local variety	75	8.75
Total	400	100

Source: Field survey 2016.

Table 4.1.5 shows the varieties of rice produced, 325 respondents representing 81.25% were involved in improved rice variety, while the remaining 75 respondents representing 8.75% were involved in local rice variety.

Table 4.1.6. Rice Output Level.

Output ton per Ha	Frequency	Percentage
Less than 10	170	42.50
10-29	200	50.00
30-49	100	5.00
50 and above	10	2.50
Total	400	100.00

Source: Field survey 2016.

Table 4.1.6 shows less than 10 ton per ha has a frequency of 170 representing 42.50%, from 10-20 ton per ha has a frequency of 200 representing 50%, from 30-49 ton per ha has a frequency of 100 representing 5%, while from 50 and above has a frequency of 10 representing 2.5%.

4.2 Influence of Farm Inputs on Rice Production

Test of hypothesis one.

H_1 Rice output is not significantly influenced by farm inputs such as rice seeds, fertilizer, farm size and labour.

H_2 Rice output is significantly influenced by farm inputs such as rice seeds, fertilizer, farm size and labour.

Table 4.2.1: Effect of Farm Inputs on Rice Output (Regression estimates).

Model	Coefficient Estimates	t-Value	Significance
(CONSTANT)	18768.296	2.482	0.013
<i>Rice seed</i>	1.798	4.246	0.000
<i>Fertilizer</i>	0.052	2.018	0.044
<i>X₃ Farm size</i>	303.532	0.079	0.937
<i>Labour</i>	1405.166	0.363	0.717
<i>R²</i>		0.062	
<i>Adj R²</i>		0.052	
<i>F</i>		6.512 (Sig. @ 0.000)	

Source: Field survey 2016.***Dependent Variable: Rice Output***

Table 4.2.1 shows that the estimates of R^2 , the coefficient of multiple determination, suggests that all the variables in the model collectively accounted for more than 62% of the variations in rice output of the respondents. The F ratio value of 6.512 was significant at 0.000% level. All the variables had expected positive signs suggesting direct relationships with rice output. However, only coefficients of rice seeds and fertilizer were significant at the 0.05 level. These, therefore, suggest that two variables were the most important factors that influence rice output decisions among the farmers.

Decision: The result shows that all the variables in the model jointly explain more than 62% of the variations in rice output. The F ratio associated with this was only 6.512 which were significant at 0.000% level. The null hypothesis is, therefore, rejected and the alternate, “rice output is significantly influenced by farm inputs such as rice seeds, fertilizer, farm size and labour”, is accepted.

4.2.2 Cost and Returns Analysis of Rice Production.

Table 4.2.2.1: Cost and returns analysis

	N	Sum	Mean	Std. Deviation
Land Clearing	400	25376986.67	63442.4667	12638.09199
Labour Cost	400	19032740.00	47581.8500	9478.56899
Rice Seeds	400	4758185.00	11895.4625	2369.64225
Fertilizer	400	3806548.00	9516.3700	1895.71380
Weeding	400	3460498.18	8651.2455	1723.37618
Processing Cost	400	71934490.00	179836.2250	255452.34151
Total Variable Cost, TVC (Naira)	400	128369447.85	320923.6196	256680.53593
Fixed Cost-admin, office overheads, etc.	400	39759750.00	99399.3750	221942.59098
Land Rental	400	13843100.00	34607.7500	81522.11573
Implement	400	2086500.00	5216.2500	1167.69848
Total Fixed Cost	400	55689350.00	139223.3750	231944.45155
Total Operating Cost (TOC)	400	168129197.85	420322.9946	4628.80252
Total Cost (TC)	400	184058797.85	460146.9946	4642.41488
Gross Farm Income (GFI)	400	491987400.00	1229968.500	9726.25280
			0	
Gross Margin GM)	400	363617952.15	909044.8804	9796.85391
Gross Margin Ratio, GMR (%)	400	73.91	73.9080	55.67640
Gross Margin/Ha	400	2272.61	2272.6122	4611.23565
Operating Ratio, OR (%)	400	34.17	34.1734	8.38518
Return to Capital Invested, RIC, (Naira)	400	2.83	2.8326	5.67833

Source: Field survey, 2016.

Table 4.2.2.1 shows the analysis of profitability of rice production by the respondents. The average gross value of revenue from rice output of the respondents was N1,229,968.50, while the total variable cost incurred was N320,923.62. The major variable costs incurred by the respondents were costs of land clearing. Labour cost, fertilizer, rice seeds, weeding, and rice processing accounting for N63,442.47, 47581.85, N11,895.46, N9,516.37, N8,651.25, and N17,9836.23. Overall, an average gross margin of N909,044.88 was obtained by the respondents.

Given the average gross margin of N909,044.88 by the respondents, a gross margin of 2272.61per hectare was calculated. The operating ratio for the respondents was

34.17%, implying that about 34% of gross income was used for operating and administrative expenses. The return on capital invested of N2.83 obtained implies that for every N1 invested, N2.83 was earned as returns from rice production. Thus, the results in Table 4.2.2 shows that rice production in the area was a profitable venture.

4.2.3 Relationship between Rice output and Gross margin, Gross ratio and Returns to capital.

Test of hypothesis two.

H_1 Rice output is not significantly related to rice profitability indices such as gross margin ratio, operating ratio and returns to capital.

H_2 Rice output is significantly related to rice profitability indices such as gross margin ratio, operating ratio and returns to capital.

Table 4.2.3.1: Correlations between rice output and gross margin ratio, operating ratio and returns to capital.

Rice Output			Gross Margin Ratio	Operatin g Ratio	Returns to Capital
Rice Output	Pearson	1	0.609**	-0.466**	0.848**
	Correlation				
	Sig. (2-tailed)		0.000	0.000	0.000
	N	400	400	400	400
Gross Margin Ratio	Pearson	0.609**	1	-0.854**	0.573**
	Correlation				
	Sig. (2-tailed)	0.000		0.000	0.000
	N	400	400	400	400
Operating Ratio	Pearson	-0.466**	-0.854**	1	-0.510**
	Correlation				
	Sig. (2-tailed)	0.000	0.000		0.000
	N	400	400	400	400
Returns to Capital	Pearson	0.848**	0.573**	-0.510**	1
	Correlation				
	Sig. (2-tailed)	0.000	0.000	0.000	
	N	400	400	400	400

** . Correlation is significant at the 0.01 level (2-tailed).

The result of the Pearson correlation analysis between rice output and each of gross margin ratio, operating ratio and returns to capital is presented in Table 4.2.4. All the indicated variables: gross margin ratio, operating ratio and returns to capital had significant relationship with rice output. The relationship between rice output and

gross margin ratio (0.609) was modest and positive, thus implying that as rice output rise so also does gross margin. Similarly, the relationship between rice output and operating ratio was indicated by a coefficient of -0.466, suggesting that as rice output increases the operating ratio decreases. Finally, the coefficient of correlation between rice output and returns to capital, 0.848 was high and positive.

Decision: From the computation above, it was observed that rice output had significant relationship with all the three indices of profitability: gross margin ratio, operating ratio and returns to capital, at the conventional 5% levels. The null hypothesis is there rejected and it is concluded that rice output is significantly related to rice profitability indices such as gross margin ratio, operating ratio and returns to capital.

4.2.4 Effect of Socio Economic Factors on Rice Output

Test of hypothesis three

H₁ Gross margin is not significantly influenced by socio-economic characteristics of rice farmers.

H₂ Gross margin is significantly influenced by socio-economic characteristics of rice farmers.

The test of hypothesis three was accomplished through the application of the regression result in Table 4.2.4.1

DECISION: The result show that all the socio-economic variables jointly explain less than 1% of the variations in market produce. The F ratio associated with this was only 3.69 which were not significant at the conventional 5% level. The null hypothesis is therefore accepted and we conclude that socio-economic characteristics of the members were not significant determinants of marketing decisions of the responding farmers.

Table 4.2.4.1: Effect of socio economic factors on rice output (Regression estimates).

Model	Coefficient Estimates	t-Value	Significance
(CONSTANT)	25298.009	5.289	0.000
<i>Age</i>	163.168	2.729	0.007
<i>Gender</i>	5719.050	2.768	0.006
<i>Household size</i>	-555.514	-1.569	0.117
<i>Education</i>	-142.690	-.735	0.463
<i>Farm size</i>	1564.769	2.039	0.042
R^2		0.051	
$Adj R^2$		0.039	
<i>F</i>		4.242 (Sig. @ 0.001)	

Dependent Variable: Gross margin

The estimates of R^2 and $Adj. R^2$ suggest that all the variables in the model collectively accounted for less than 1% of the variations in gross margin. The F ratio (4.242) was not significant at the conventional level. Indeed of all the socio-economic characteristics in the model, only age, gender, and farm size were significant at the conventional 5% level.

The results further revealed that the age of the rice farmers was positively and significantly related to their rice output ($p < 0.05$). This implies that the older the farmer is, the more the rice output. Older farmers have the experience to manage rice farm operations and the associated challenges. Gender of the respondents was also significant at 1% and had positively influenced their output. This is likely because men, who in spite of constituting the minority rice farmers, are naturally more disposed and better equipped mentally to handle the stress and challenges that of rice farming.

Farm size was equally found to significantly influence rice output at the conventional 5% level. This result is not surprising since rice farming is labour intensive and our observations during the field visits confirm that wealthy and successful rice farmers are usually those with large rice farms

Decision: The result show that all the socio-economic variables jointly explain less than 1% of the variations in market produce. The F ratio associated with this was only

4.242 which is significant at the 0.001 level. The null hypothesis is therefore rejected and we conclude that Gross margin is significantly influenced by socio-economic characteristics of responding rice farmers.

4.2.5. Effect of Constraints on Rice Production

Table 4.2.5.1: Constraints to rice production.

Constraint	Sum	Mean	Standard Deviation	Decision
Inadequate capital	1373.00	3.4325	0.66449	Agree
Land tenure act	1317.00	3.2925	0.55922	Agree
High cost of input/labour	1171.00	2.9275	0.92161	Disagree
Inappropriate farm management	1199.00	2.9975	0.95644	Disagree
Pest and disease	1323.00	3.3075	0.80906	Agree
Persistence use of poor quality stems	1114.00	2.7850	10.00812	Disagree
Poor research and extension support	1019.00	2.5475	0.95132	Disagree
Grand mean	1216.57	3.0414	0.43340	Agree

Source: Field survey 2016.

Table 4.2.7.1 sought the views of the respondents on the various constraints that confront them in rice production. The table shows that there is commonality of agreement in only three out of the 10 indicated constraints: inadequate capital (3.43); land tenure act (3.29); and pest and disease (3.31). All the other responses: high cost of input/labour (2.93); inappropriate farm management (2.99); persistence use of poor quality rice seeds (2.79); and poor research and extension support (2.55), had mean ratings of less than 3.0. The grand mean however had mean rating of 3.04. Furthermore, the relative importance of the items could also be assessed from the magnitude of their individual mean scores. Thus, the most important item of influence was “inadequate capital (3.43)”. This was followed by land tenure act (3.29). The implication of the above is that the constraints as indicated could have a substantial influence on rice production in the area.

4.2.6: Influence of constraints on rice output

Test of hypothesis four

H_1 Rice output is not significantly influenced by such constraints as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases.

H_1 Rice output is significantly influenced by such constraints as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases.

Table 4.2.6.1: Influence of constraints on rice output (Regression Estimates).

Model	Coefficient Estimates	t-Value	Significance
(CONSTANT)	11.729	8.801	0.000
Inadequate capital	-1.465	-4.247	0.000
Land tenure act	-1.063	-2.548	0.011
High cost of input/labour	0.094	0.246	0.806
Inappropriate farm management	0.466	1.301	0.194
Pest and disease	-0.363	-0.968	0.334
Persistence use of poor quality stems	0.198	0.440	0.660
Poor research and extension support	-0.241	-0.607	0.544
R^2		0.139	
$Adj R^2$		0.124	
F		9.073 (Sig. @ 0.001)	

Dependent Variable: Rice output

The coefficient of multiple determination, R^2 , was 0.139, while the adjusted R^2 was 0.124. Thus, not more than 14% of the variations in rice output was explained by the constrained indicated in the model. The F ratio value of 9.073 was significant at 0.001 level of significance. Table 4.2.8.1, also shows that inadequate capital and land tenure act were the only constraints that were significant at the conventional 5% level and had inverse relationships with rice output. The significance of the two variables suggest that each unit of each of inadequate capital and land tenure result in reduction of rice output by 1.465 and 1.063 respectively.

Decision: From the regression analysis in Table 4.12, F ratio value of 9.073 was significant at less than 1% level of significance. Based on this, the null hypothesis which stated that rice output is not significantly influenced by such constraints as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases is rejected and the alternative is accepted. Thus, we conclude that rice output is significantly influenced by such production constraints as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases.

4.3 Discussion of Findings

In line with the objectives of the study and the data generated through secondary sources and field study, the research findings were as follows:

Objective One:

To determine the productivity of factor inputs (rice seeds, fertilizer, farm size and labour) on rice output.

From the above analysis, hypothesis one reveals a significant positive and direct relationship between rice seed and fertilizer and the F ratio of 6.512 were significant at the conventional 5% levels. Rice seed and fertilizer were significant at 5% level and had positive relationship with rice output. The rice seed of coefficient of 0.7% shows that an increase in rice seed where other variables remain constant increases rice output, also the fertilizer use of 0.6% shows that an increase in fertilizer use where other variables remain constant increases rice output.

Based on this, the null hypothesis was rejected, while the alternate hypothesis was accepted which connotes that rice output is significantly influenced by farm inputs such as rice seeds, fertilizer, farm size and labour.

Objective Two:

To examine the relationship between rice output and profitability indices such as gross margin, gross ratio, operating ratio and return on capital invested on rice output.

The outcome of the above hypothesis shows a significant relationship between rice output, gross margin, gross margin ratio and returns to capital; this showed a negative correlation between the variables but not significant to operating ratio. Rice output

shows a significant relationship with gross margin, gross ratio and return to capital with a p-value of 0.001, 0.005 and 0.001, while operating profit shows an insignificant relationship with rice output with a p-value of 0.342.

Thus, null hypothesis was rejected while alternate hypothesis accepted which denotes that rice output is significantly related to rice profitability indices such as gross margin, gross ratio, operating ratio and return on capital invested.

This is in tandem with Nwike and Ugwumba (2015) which established that Maximum variable profit was statistically and significantly influenced by per unit price of output.

Objective Three:

To examine the influence of farmer's socio-economic variables on profitability of rice production. The outcome of the above analysis significantly explains the variations at the conventional 5% level. The overall model has direct relationship with gross margin. As such, null hypothesis was rejected, while alternate hypothesis was accepted which shows that Gross margin is significantly influenced by socio-economic characteristics of rice farmers (Profitability of rice production is significantly influenced by socio-economic characteristics of rice farmers).

Objective Four:

To examine the influence of constraints such as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases on rice output.

Hypothesis four which was drawn from objective four shows that two variables; inadequate capital and land tenure are found to be significant at 1% level with a negative sign.

As such null hypothesis was rejected and alternate hypothesis accepted which presupposes that rice output is significantly influenced by such constraints as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases. This is in tandem with Nwike and Ugwumba (2015) which established that High cost of labour and lack of capital were identified as the most serious constraints to rice production.

Discussion of Test results

Farmer's cooperative society provides services to its members and generates some profits while conducting businesses. This is in line with Agbo (2000) who opined that profit are not earned at the cost of its member's profit which are generated, rather it is distributed to its members not in the basis of the shares held by the member's but on the basis of members participation in the business of the society. This agree with Igboji,(2015) who observed that rice input jointly explain more than 62% of the variation in rice output. The F ratio associated with this was only 6.512 which were significant at 0.000%.

The estimates of R^2 and Adj. R^2 suggest that all the variables in the model collectively accounted for less than 1% of the variations in gross margin. The F ratio (4.242) was not significant at the conventional level. Indeed of all the socio-economic characteristics in the model, only age, gender, and farm size were significant at the conventional 5% level. The results further revealed that the age of the rice farmers was positively and significantly related to their rice output ($p < 0.05$). This means that the older the farmer, the more the rice output. Older farmers have the experience to manage rice farm operations and the associated challenges. However it was also observed that socio-economic variables jointly explain less than 1% of the variations in market produce. The F ratio associated with this was only 3.69 which were not significant at the conventional 5% level.

This is in agreement with Adewuyi and Adebayo (2014) in their study on the efficiency of male and female rice-farmers, using both descriptive statistics, inferential statistics stochastic frontier function and gross margin analysis, identified the socio-economic characteristics of both male and female rice-farmers in the area. The results revealed that the Gross Margins for male and female farmers were ₦45,311.24 and ₦38,344.86 respectively. This implies that rice production in the area was a profitable venture. However, the male farmers were shown to be operating at a higher level of profitability than their female counterparts.

It was seen that most of the respondents are involved in improved rice varieties of 81.25%, while 8.75% are involved in local variety rice processing only. This is in line

with Rahman (2013) who opined that experience in modern rice farming plays an important role in raising profitability and reducing inefficiency among rice farmers, as farmers with more experience in growing modern varieties earn significantly higher profit than loss and operate at significantly higher level of profit efficiency.

Nevertheless, the Pearson correlation analysis between rice output and each of gross margin ratio, operating ratio and returns to capital indicated that relationship between rice output and gross margin ratio (0.609) was modest and positive. This implies that as rice output rise so also does gross margin. This is in line with the findings of Behjat and Ostry (2013) who indicated that average of farm size, farm area, soil conservation, and operation expense had positive impact on Gross Margin whereas increase in age had negative impact on farm profitability.

Nevertheless from the regression analysis, the coefficient of multiple determination, R^2 , was 0.139, while the adjusted R^2 was 0.124. which means that more than 14% of the variations in rice output was explained by the constraints indicated in the model. The F ratio value of 9.073 was significant at 0.001 level of significance, this also shows that inadequate capital and land tenure act were of the only constraints that were significant at the conventional 5% level and had inverse relationships with rice output.

This is in line with Azam and Khan (2010), who opined that agricultural productivity is greatly affected by a number of inputs such as land, labour, capital, seed, fertilizer, irrigation and soil. This implies that when farmer's cooperative society team up as a group in order to connect through common goals and shared identity, the issue of mentioned constrained will be addressed to some extent. This can be achieved by subsidize fertilizers; make rice farm lands available to members of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria. Equipment hiring centers should be established in farming regions to facilitate and accelerate rice farming. By doing so they help to put their resources together, try to have some farm input in common or hire the necessary farm input that will help them in farming diversity. So then the study of group dynamic theory can help members of FMCS shed light on how to increase diversity in a community and how to combat the negative

aspects that might arise from the group dynamics with strong similarities and goals. The success of agricultural cooperative entails collective action and group dynamic, which is active participation of members, helps the group to accomplish their goal.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The summary of the findings arising from the study are:

The study established that rice output is positively and significantly influenced by farm inputs such as rice seeds, fertilizer, farm size and labour as shown on Table 4.2.1. The entire farm inputs considered jointly explain more than 62% of the variations in rice output. The F ratio associated with this was only 6.512 which were significant at 0.000% level.

The study established that there is a significant relationship between rice output, gross margin, gross margin ratio and returns to capital as shown on Table 4.2.3. However, there is an insignificant relationship between rice output and operating profit with a p-value of 0.342.

The study established that all the socio-economic variables jointly explain less than 1% of the variations in market produce as shown on Table 4.2.4. The F ratio associated with this was only 4.242 which is significant at the 0.001 level.

The study established that rice output is significantly influenced by such production constraints as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases.

5.2 Conclusion

Results from the study have shown that profitability of rice production among members of FMCS in South East Nigeria depends not only on availability of resource inputs such as rice seeds and fertilizer, but also on issues with regards to the socio-economic characteristics of the rice farmers. The implication of the findings is that policies that are meant to promote rice production and profitability in the area should emphasize supply of rice seeds and fertilizer, focus on issues relating to age, gender,

and farm size and address production constraints such as high labor cost and capital inadequacy. In conclusion Rice production is a profitable venture in the study area.

5.3 Recommendations

Based on the findings of the study, the following policy recommendations were made;

1. Having established that rice output is influenced by farm inputs, the government, as well as agricultural cooperatives and venture capitalist should consciously increase rice seeds' availability, subsidize fertilizers, make rice farm lands available to members of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria. Equipment hiring centers should be established in farming regions to facilitate and accelerate rice farming.
2. Members of Farmers Multipurpose Cooperative Societies should be trained by cooperative extension officers constantly so as to impart them with skills on how to sell their outputs profitably. It is not enough to produce rice; to achieve profitability is also key in the sustenance of rice farming among members of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria.
3. Youth and women Farmers multipurpose cooperative societies should be encouraged, Policies that make farm lands available to young farmers as well as women farmers should be formulated by the government. since the study reveals that age, gender, as well as farm size significantly influences rice output.
4. The management of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria should key into the single digit interest loan facilities facilitated by the Central Bank of Nigeria in conjunction with Bank of Agriculture, Bank of Industry, Microfinance Banks, as well as other financial institutions, to access capital for rice farming so as to mitigate inherent constraints involved in the farming process.

5.4 Contribution to knowledge

This study has established that rice output is positively and significantly influenced by farm inputs such as rice seeds, fertilizer, farm size and labour. An increase in rice seed and fertilizer use, other variables remaining constant, will increase rice output among members of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria. Also established is that there is a significant relationship between rice output, gross margin, gross margin ratio and returns to capital; farmer's socio-economic variables significantly influenced profitability of rice production in the study area. while rice output among members of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria was established to be significantly influenced by such production constraints as high labour cost, inadequacy of capital, scarcity of improved rice seeds, and pests and diseases. This therefore contributes to knowledge.

5.5 Suggestions for Future Research

This research work intended to investigate the profitability of rice production among members of Farmers Multipurpose Cooperative Societies (FMCS) in South-East Nigeria. Other researchers may in furtherance of this study delve into investigating the profitability of rice production among members of Farmers Multipurpose Cooperative Societies (FMCS) in other geo political zones of the country. Also, a comparative study could be done on profitability of rice production among members of Farmers Multipurpose Cooperative Societies (FMCS) and Non-cooperative farmers in South-East Nigeria.

REFERENCES

- Abdullahi, D. (2012). Using Nigerian agricultural cooperative and rural development bank small holder direct loan scheme to increase agricultural production in rural, *International Journal of Agricultural Economic and Rural Dvelopment*, 2(1), 20- 24
- Abraham, U. (2015). Agricultural marketing information system in Myanmar, *Journal of Empirical Literature*, 2, 34-36
- Adewale, D.& Abolade, M, (2007). State of Nigerian agriculture: *Ministerial press briefing by minister of agriculture and Rural development, maizube, Niger state.*
- Adewuyi, Y., & Adebayo, E. (2014). GIS Applications in land management: The loss of High Quality Land to Development in Central Mississippi, *International Journal of Environmental Research and Public Health*, 2(2) 234-244.
- Adisa, D. A. (2005). The marketing of staple food crops in enugu state Nigeria: a case study of rice, maize and beans, *M.Sc. Thesis, University of Nigeria, Nsukka.*
- Adolph, B.& Chancellor, F, (2006). Government policies and competitiveness of Nigerian rice economy, *a paper presented at the workshop on rice policy & food security in Sub-Saharan Africa*
- Afolami, A., Obayelu, O., Agbonlahor, K., & Lawal, A. (2012). Economics of small scale rice production in Patigi and Edu Local Government Areas of Kwara State, Nigeria. *African Journal of Agricultural Research*, 5(4), 56-59
- Agbo, A. (2013). *Famine early warning systems net work (FEWS NET) market*, (2nd ed), London: Prentice/hall International.
- Agbo, F. (2000). Increasing the output of cassava through women cooperative, *Nigeria Journal of Cooperative studies*, 5, 24 – 28
- Aguilar, M., & Oscar, R. (2015). Costs and returns analysis of rice production in Kwara State, *Advance in Agriculture and Biology* 1(2), 79 83
- Ahmadu, I.C.& Qureshi, J. (2016). Efficiency of resource use in small scale swamp rice production in Obubra local government Area of Cross River State, Nigeria, *Middle East Journal of Scientific Research*, 3(3), 145-148
- Ahmadu, R. (2010). Agriculture in Nigeria the role local participation can play to make it move. *A paper presented in facilitators National workshop on*

- Akande, P. (2012). An overview of the Nigerian rice economy, an online paper retrieved on the 13th of October 2010.
- Akende, O.E. (2002). Evaluation of the effects of climate change on rice production in Niger state, *Ethiopian Journal of Environmental Studies and Management*, 6 (6), 763-773
- Akinola, J., & Owombo, P. (2012). Strategy for effective agricultural Marketing extension to meet the Challenges in 21st century. *Manage Extension Research Review*, 6 (3), 34-38
- Akpan, O. E. (2011). Co integration and error correction modelling of agricultural export trade in Nigeria: The case of Cocoa, *Journal of Agriculture and Social Sciences*, 4, 5-9
- Akpokodje, A. (2011). *National agricultural resiliency policy framework*, Abuja: Federal Ministry of Agriculture and Rural Development.
- Alene, T. (2003). Management of major pest of rice in Tanzania. department of crop science and production, *Sokoine University of Agriculture, Morogoro, Tanzania*
- Almaz,J. (2014). The Nigerian Rice Economy in a Competitive World: Constraints, Opportunities and Strategic Choices, Concept Note Submitted to USAID, *Abidjan CoteD'Ivoire*, 3(2): 14-16.
- Amadusum, N. (2012). Maize Production, Prices and Related Policy in Thailand. *British Journal of Arts and Social Sciences*. 11, 174-185.
- Amalu, M. (2000) Principles of Agricultural Cooperative, *Nigeria Journal of Cooperative Studies*, 1 (2),25-30
- Ambruster, T. (2011). Cooperative banks in Europe, values and practices to promote development *IRU Courler*, 3, 10-13
- Amdusum, L.O. (2013). Agro-Forestry Practices and Sustainable Agriculture in Yam Producing Communities of Niger state, Nigeria. *Journal of Environmental Science and Water Resources* 2(6)167-171
- Amin, I., & Osin T. (2013). Field crop production in tropical Africa, *Journal of Empirical Literature*, 2(3), 56-71
- Arua, E. O. (2004). Comparative Cooperative System. Unpublished Departmental Mimeograph. Department of Agricultural Economics, University of Nigeria, Nsukka.

- Asch's.E. (1956). Operationalizing the strategic framework for rice sector revitalization in Nigeria, *Project Report the Nigeria rice economy in a Competitive world. Constraints, Opportunities and Strategies Choices Abidjan WARDA*
- Assa, H., & Akinde. K.(2012). Quality Characteristics of long-grain rice milled in two commercial systems, *Journal of Cereal Chemistry*. 75 (4), 560-565.
- Ayalew, J.W. (2014). Rice production in Africa: Current situation and issues, Rome: Italy, FAO Corporate Document Repository.
- Ayinde, T. O. (2013). *Radigns in agricultural marketing*, Ibadan: Longman Nig Limited
- Azam, E. D., & Khan, A. C. (2010). Meeting the rice production and consumption demands of Nigeria with improved technologies, *National Cereals Research Institute*, 7(4), 12-15
- Bagamba, M. (2014). Integrated rice production and export in Nigeria, *paper presented at a seminar on sustainable rice production in Nigeria organized by Central Bank of Nigeria at Hamadala Hotel, Kaduna*
- Bahta, C., & Baker, E.M, (2015). Efficiency of Rice farmers in Nigeria: Potentials for Food Security and Poverty Alleviation'' IFMA, 6-Theme 3, *Farm Management Paper*, 613-624.
- Bahta, M., & Baker, G.(2015). Socio- economic Determinants of farmers' participation in Fadama II project in Kaduna State, Nigeria. *Journal of Food and Fibre Production*, 2010, 3(1):592 – 601
- Bassey E.G (2013). Analyzing Environmental Issues In The Lower Savannah Watershed, In Georgia and South Carolina. *American Journal of Environmental Engineering* 5(1), 1-20.
- Baumol, I., & Blinder, J.O. (2010). Economics of Rice production in ebonyi state south east, *Nigeria International Journal of Food, Agriculture and Veterinary Sciences*, 3(2), 77-81
- Beaman ,.A. (2013). Analysis of the Impact of Fadama II Project on Beneficiary Farmers Income in Kaduna State: A Double Difference Method Approach. *International Journal of Economics and Management Sciences*. 1(11)1-8
- Behjat, J. R. & Ostry, W. N., (2013). Women and the demand for alcohol: Estimating participation and consumption. *Journal of Consumer Affairs*. 27(2): 319-324.
- Behyat, M., & Ostry,T. (2013).Transaction costs, institutions and smallholder market integration: potato producers in Peru .*Working Paper* No. 05-04

- Bezabih, E., & Hadera, C., (2016). Meeting the Rice Production and Consumption Demands of Nigeria. with Improved Technology. National Cereals Research Institute Badeggi, Niger State, Nigeria.
- Bezabih, T. (2015). The Configuration of Comparative Advantage in Rice Production in West Africa: Surv. Empirical Stud
- Bezabith, G., & Hadera, D. (2016).Towards a sustainable rice production in Nigeria, *proceedings of a seminar organized by Nigeria Export Promotion Council at Hamadala Hotel, Kaduna*
- Bhuyan, S. (2007). The People Factor in Cooperatives; An Analysis of Members, *Canadian Journal of Agricultural Economics*, 55(3): 275-298.
- Block, S. & Hire,J. (2014). Rice processing in Nigeria, a survey, the Nigerian rice economy in a competitive world constraints, opportunities and strategies choices Abidjan WARDA 20- 25
- Borgens, S. O. (2001). Identification as a Trust-generating Mechanism in Cooperatives. Annual Publication of Cooperative Economics.
- Carron , C.J. (1980). Profit function analysis of small ruminant enterprises in Nsukka Local Government Area of Enugu State, Nigeria, *Economic Affairs*, 47, 209-214.
- Chambo, O. (2009). A review Nigeria's rice policy and development WARDA, Abidjan
- Christopher O.B (2013). Rice innovation system and operation in igbemo rejoin Nigeria wheat challenges *International Journal Global Business* 2 (1) 229 – 244.
- Coeli, D. Rao,T.& Battese, O. (2014). Technical efficiency differentials in rice production technologies in Nigeria. *Nigerian Institute for Social and Economic Research (NISER)*, 3, 90-97
- Cooke, S., & Bryon, A. (2013). Rice production, marketing and policy in Nigeria, *west Africa rice development association*.
- Cooperative Society, (2004). Manual for mobilizing cooperative, federal ministry of Internal Affairs *Abuja Kenya amaemde bill* .
- Dawit, M. (2015).*Farmers centred enterprises for agricultural development*, England: Phinkett Foundation
- Debertin.E, (2013). Cultivation of rice in Nigeria, *Journal of Central African Agriculture*, 8 (3), 140-147

- Defor, A. Whoperries, M. Tones, U. Lancon, & Erenstein, M. (2002). A review of policies, acts and initiatives in rice innovation system in Nigeria. *Journal of Agricultural Extension (AESON)*, 12 (2), 94-152.
- Dowding, T. (2007). Strategy for rice sector revitalization in Nigeria, *Draft for discussion at Technical workshop*
- Ebonyi, V. & Jimoh, O. B. (2002) Cooperative Movements; A way out of Poverty. Lagos, Lonman Publishers.
- Ellis, M. (2013). GIS, the US census and neighborhood scale analysis, *Planning, Practice & Research*, (18), 213-217.
- Elodie, F. (2015). Operationalizing the strategic framework for rice sector revitalization in Nigeria, project report the Nigeria rice economy in a Competitive world, *Constraints, Opportunities and Strategies Choices Abidjan WARDA*
- Erbaugh M. O. (2010): The Structure and marketing system in east Pakistan, Occasional paper, Department of Agricultural Economics, Cornell University, *USAID Prices Research Project*, 2(3)
- Erenstein, O., Lancon, F., Akande, S.O., Titilola, S.O., Akpokodje, G., & Ogundele, O.O. (2003). Rice production in Nigeria: A survey project report - The Nigerian rice economy in a competitive world, constraints, opportunities and strategies choices. Abidjan WARDA. Retrieved from http://pdf.usaid.gov/pdf_docs/PNADB852.pdf (retrieved, 4th March 2007)
- Erenstein, G. (2003). *An introduction to efficiency and productivity*, Czech: Kluwer Academic Publisher.
- Eze, R. (2010). The perception of government participation in cooperative organization: a case study of Biu local government Borno State Nigeria. *Unpublished dissertation for the degree of M.Sc submitted to Department of rural sociology and Anthropology Univ of Maiduguri*.
- Eze, C. (2000). *Environmental accounting for changes in farmland use: A Canadian Case Study*, New York: Edwin Mellen.
- Fantu, B., & Simba, P. (2014). Economic and constraint analysis of rice cultivation in Kaithal district of Haryana, *India Research Journal of Extension Education*, 9 (1)
- Fantu, E.C., & Kinja, Y.A. (2014). Geospatial information systems analysis of regional environmental change along the savannah river basin of Georgia, *International Journal of Environmental Research and Public Health*. 5(1), 281-294.
- FAO. (2008). Federal ministry of agriculture organization and rural development (FMARD), on food and agricultural organization (FAO), *Rice Conference*

- FAOSTAT. (2015). The rice sector in Nigeria, United Nation Crop Project (UNCP) Country Agricultural Project on trade liberalization in Agricultural sector and the environment, Geneva.
- Farquharson, D. (2016). Policy issues in meeting rice farmers agricultural information needs in Niger state. *Journal of Agricultural Extension*. 12(2),84-94.
- Femi, R., & Fumilola, L. (2014). The impact of alternative agro- industrial investments on poverty reduction in rural Mozambique, *MINAG/DE/DAP Research Report*
- Frank, J.& Broyel,M. (2015). Economic Analysis of rice production in cross river state, Nigeria, *Journal of Development and Agricultural Economics*, 3(9), 469-474.
- Fred, S., & Oscar, L. (2012). The Nigerian rice economy in a competitive world: Constraints, opportunities and strategic choices. Strategy for rice sector revitalization in Nigeria
- Gale, A. (2008). Impact of Rural Infrastructural Development on Agricultural Production under Fadama II project in Oyo State. Unpublished M.Sc thesis, University of Ibadan.
- Gertler, M. (2001). Rural Cooperatives and Sustainance Development, Saskatoon SK: Centre for the Study of Cooperatives, University of Saskatchewan.
- Gibson, R. (2005). The role of Cooperatives in Community Economic Development, RID Working Paper # 2005-3.
- Gilbert, E.U. (2001) Poverty Alleviation through Cooperatives *Nigeria Journal of Cooperative Studies* Vol. 3 (4) Pp 103-122
- Glanz, I. (2008). Poverty Profile of Working Women in Akure North and South Local Governments of Ondo State in Fabiyi, Y.L. and Idowu, E.O. (eds.), Poverty Alleviation and food Security in Nigeria, *Nigerian Association of Agricultural Economists (NAAE)*. 127-131
- Heiko, Z., & Matthias, V. (2010).Socio economic impact of upland rice production on rural livelihoods, the case of three Nigerian state. *A paper presented at the conference on international agricultural research for development*
- Hermida, J. (2008). Agricultural Cooperative in Asia. Retrieved October, 1 2011, from http://asiadhrra.org/wordpress/2008/01/11agric_coops-in-asia/.
- Holzinger, L. (2003). The role of rural organization in empowering of the rural poor, *African Rural Development magazine*, 4(1), 28-50
- Huda, J. (2011). *Sharing the city participation in urban management*, Britain: Earthscan Publication Ltd.

- ICA. (2010). International Cooperative Alliance. Retrieved 1, October, 2011 from <http://www.ica.coop/.ss>
- Igboji, C., Anozie, R., & Nneji, C. (2015). Analysis of socio-economic factors and profitability of rice production among small scale farmers in Ebonyi State, *IOSR Journal of Agriculture and Veterinary Science*, 8(2), 20-27
- Igboji, S., & Nwankwo, G. (2015). Rice prices and market integration. Project report-Nigerian rice economy in competitive world: constraints, opportunities and strategies choices, *Institute of Social and Economic Research*, 3, 1-20
- Ijere, (1992). Poverty in Nigeria: Concepts, Measurements and Determinants. Obaseki, P.J. (ed), Poverty Alleviation in Nigeria, *Nigeria Economic Society (NES)*, .93- 120.
- Ijere, M. (2000) Cooperative development through development plans *Nigerian journal o'f cooperative studies*, 1, 1-2
- Inuwa, B. (2011). Participating approaches to urban infrastructural development and management: policy implications and challenges, *Proceedings at the 34th Annual Conference of the Nigeria Institute of Town Planners, held at Abeokuta*
- IRRI, (2003). Rice innovation system and operation in Igbemo rejoin Nigeria wheat challenges, *International Journal Global Business* 2 (1) 229 – 244.
- Islam, E. (2010). Tropical landscape change and the role of agroforestry in southern Nigeria, *The British Journal of the Environment and Climate Change*. 2(3), 285-319.
- Itam , J., & Elim, E. (2014). A Class of Decomposable Poverty Measures, *Econometrica* 52 (1):761-766.
- Itam, T. C.,& Itera, B. (2014). Gender difference in marketing styles, *Journal of Agricultural Economics*, 38, 1-7
- Janis, C. (1972). Challenges of rice production in Nigeria. Punch Newspaper
- Jannoura, E. (2014), Technical inefficiency in Vegetable Farms of Humid Regions: An Analysis of Dry Season Farming by Urban women in South- South Zone, Nigeria. *Journal of Agriculture and Social Science*. 1(2):80 – 85.
- Jirgi, G., & Girga, A. (2010). Rice adaptation in Metema Woreda North Gondar one of the Amhara Regional State, *Bureau of Agriculture, Bahir Dar*. (Unpublished)
- Kareem, W., Arigbabu, C., Akintaro, P., & Badmus, H. (2012). Analysis of rice chain; towards sustainable (P) Rice, Report on an international workshop, Polonnaruwa, Sirlanka

- Karia,F, Kirkby, B. Dele,V. Njuki,D. Twinamasiko,N.& Sanginga. H, (2011): *The marketing challenge distribution increased production in developing countries*: New York, Macmillan Co.
- Katrine, K. (2002). *Challenges and opportunities for improving irrigated rice productivity in Nigeria*, Abidjan: McGraw Inc
- Lakshim, C., Sant, M., & Aruna, P. (2012). Economic analysis of small holder rice production in IHITE-Uboma L.G.A of Imo State. *Nigeria Journal of Agriculture Food and Environment*, 9(2), 37-41.
- Lancon.F, (2011). Using GIS To Assess the Contributions of Farming Activities to Climate Change In The State of Mississippi, *The British Journal of Environment and Climate Change*, 2(2) 1-15.
- Lang, J. & Fulani, G,(2010). Farmers' adoption of improved rice technology in Nigeria, *Niger Republic world Journal of Agricultural Science*, 3(4), 530-535
- Levi, Y. (2005). *A Cooperative Perspective*, Ireland: International Cooperative Research Institute.
- Levin, M (2005). The Promotion of Cooperatives, ILO Cooperative Branch at www.ica.coop/europe/ra2002/speech.
- Lighton, G.(2014). *Marketing the English language book society and Macdonald, Evans Ltd, Canalizati (2000)*.
- Mapula, J., & Abiodun, S. (2011). Introduction to agricultural marketing and prices: principles and applications, Abuja: Living Books Series GU Publication
- Martin, A. (2012). Cooperative for the sedentarization of bedouins in Egypt, *Journal of North west coastal zone Rural parental*, 2. (1), 21-24
- Masuka, K., & Xaba, I.(2013). Demand for Fertilizer in Nigeria: An Application of Co-integration and Error Correction Modeling. *Journal of Agriculture and Social Research* 10, 142- 151.
- Masuku, K. (2011). Rice Growing Environment and Biophysical Constraints in Different Agro-Ecological Zones of Nigeria. *Metrol. J.* 2(1): 35-44.
- Masuku, K.(2011), Rahman,. S. (2013). Analysis of technical efficiency of rice farm in Nasarawa State, Nigeria. *Inter J Agri Biosci*, 2013, 2(5): 266-269.
- Mc carthy, A.I (2004). Rural Livelihood Diversification and Poverty in South Western Nigeria. *European Journal of Social Sciences* 5(1): 28 42.
- Meinzen, D., & Digregorio , Y., (2004). Impact of Community Driven Development Strategy of the National Fadama Development Programme in Billiri Local Government Area of Gombe State, Nigeria. *Pro-Journal of Agricultural Science Research*,1(3) 42-56

- Milgram, J. (1965) Economics of small scale rice production in Patigi and Edu Local Government Areas of Kwara State, Nigeria, *Afr. J. Agric. Res.* 5(4)
- Minkler, B., Wallerstein, E., Wilson, A., (2008). Poverty Alleviation in Nigeria: Some Macroeconomic Issues, In Egbon, P.C. (ed.), *Poverty Alleviation in Nigeria. Proceedings of Nigerian Economic Society Annual Conference*, Pat Mag Press Ltd, Ibadan, Nigeria.
- Mohammed, T. (2011). The Impact of the National Fadama Facility in Alleviating Rural Poverty and Enhancing Agricultural Development in South-Western Nigeria, *Journal of Social Science*, 9(3): 157- 161.
- Mohammed, T., & Oyinbo, S., (2011). Impact of Price and Total Expenditure on Food Demand in South-Western Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*, 10,(11), 4350 – 4363. ISSN: 1684-5358.
- Mpogole, T. (2013). Using Nigerian agricultural cooperative and rural development Bank small holder direct loan scheme to increase agricultural production in rural, Oyo state, Nigeria, *International Journal of Agricultural Economic and Rural Dvelopment-2(1)*20-29.
- Mpogole, T., & Kachigi, J.D. (2012). Market structure, conduct, and performance; constraints on performance of Ethiopian grain markets. *Working paper 8, Grain market research project Ministry of economic development and cooperation*
- Mugula, G. (2013). Geospatial assessment of the impacts of changing agricultural landscape in Louisiana, *The Journal of Marine Sciences*, 3, 19-29.
- Murthy O.A. (2014). Urban rice demand analysis, a case study of Ijebu ode township department of agricultural production and management Science Tai Solarin University of Education, Ijebu ode, *Middle East, Journal of scientific research*, 3(2), 62 – 66.
- Mwangi, B., & Elodie. H. (2015), Rice Production, Imports and Food Security in Nigeria: An Application of Co-integration and Error Correction Model. *Journal of Food Agriculture and Environment*. 4, 86-90.
- Mwanyi, J. (2015). Analysis Credit Repayment Among Arable Crop Farmers Under Rural Banking Scheme in Abia State,
- Nweze, N. J (2001). Poverty, Microfinance and Cooperative Promotion in Nigeria. *Nigerian Journal of Cooperative Studies*, (1): 2-5.
- Nwike, M. C., & Ugwumba C. O. A. (2015). Profitability of rice production in Aguata agricultural zone of Anambra state Nigeria: A Profit Function Approach. *American Journal of Agricultural Science*, 2, 24-28.
- Nwokolo, C.O. (2011). Resource use efficiency in cassava based food crop production systems in Delta State, Nigeria Ph.D dissertation, Delta State University, Asaba, Nigeria).

- Obasi, I. (2013). Performance of rice market in Ebonyi state, *Journal of economic theory*, 2(3), 3-7
- Odoemelam, A., (2014). Production Efficiency of Farmers under National Fadama II Project in Oyo State, Nigeria. *International Journal of Agricultural Management & Development*, 2(1): 11 - 24
- Oduşina, S. L. (2014). Tropical crops a textbook of economic botany, London: Macmillan Publishers,
- Ogbuakanne, K. (2011). Effect of climate change on rice production in Anambra State, *Journal of Agricultural Extension*, 16(2), 81-91
- Ogisi, U. (2013), Fertilizer Consumption and Agriculture value Added Growth in G8 Countries: Granger Causality and Co-integration Tests. *Advance in Environmental Biology*. 5, 3135-3137.
- Ogundele. E, Lanco.F, Olaf,J.Akende,T. (2013). Comparative analysis of permanent and non-permanent rubber tappers in State rubber farms of Nigeria. Retrieved from <http://www.fsublishers.org>
- Ohen, C., & C, Ajah. (2015). A comparative analysis of costs and returns of non irrigated and irrigated rice production systems in Uzo Uwani local government area of Enugu State, *Nigeria, Agricultural Systems in Africa*, 4(2)
- Okeowo, T., Agunbiade, J., Odeyem, L. (1999) An assessment of the level of involvement of farm-children in farming decisions in Ikorodu Area of Lagos State, *Proceedings of the Second Annual Conference of Children-In-Agricultural Programme (CIAP) 1999*, 275 - 282.
- Okoli, U.,& Okwi, M., (2015). Analysis of farmers' poverty profile and its alleviation in Jos-North L.G.A; PlateauState, Nigeria. *Journal of Development Research*, 3(4), 34-37
- Okoye, B. (2014). Nigeria's Agricultural Sector Assessment, Issues of Technology Development and Transfer. In Ikpi A, USAID, Washington D.C, USA.
- Olaf, A. (2014). *Mobilizing indigenous technology for Agricultural and rural development* in Eboh, E.C., Okoye, C.U., and Ayichi, D. (eds), Rural Development in Nigeria Concepts, Processes and Prospects, Enugu: Auto-century Publishing Company
- Olujenyo, M. (2013). A Global Development Strategy for Cassava: Transforming a Traditional Tropical Root Crops. Spurring Rural Industrial Development and Raising Incomes for the Rural Poor.
- Olukosi, E., Isitor, H., & Ode, T. (2016). Managerial behaviour, entrepreneurial style, and small firm performance. *Journal of Small Business Management*, 41 (1), 41-67

- Olukosi, J., & Isitor, S. (1990). *Introduction of Agricultural Marketing and Price: Principles and Applications* Abuja: G.U. Publication.
- Omotesho, O., Falola, A., Muhammad, L., & Oyeyemi, A (2012) Comparative analysis of the performances of adopters and non-adopters of yam miniset technology in Kwara State, Nigeria, *International Journal of Agriculture and Rural Development* 15(3),1335-1341.
- Oniah, C.&Amiah,J, (2016). A divariate analysis of factors affecting rice processing in Igbemo Ekiti, *Ondo State Agricultural Journal* 3 (6) 442 – 446
- Onoja, P., & Herbert, U. (2012). Vietnam in the international rice market, *A Review and Evaluation of Domestic and Foreign Rice Policies, Rapport* 132
- Onuoha, E. (2014). *Principles of cooperative enterprises*, Enugu: Express Press
- Oseni, R., & Daudu, K. (2015). Using Nigerian agricultural cooperate and rural development bank small holder direct loan scheme to increase agricultural production in rural, Oyo state, Nigeria. *International Journal of Agricultural Economic and Rural Dvelopment-2(1)*
- Osiriaeme.G,(2012). Cooperative policy for Nigeria Abuja Government printer.
- Ostrom J.I. (2004). Economics of rice production in Yola-North and South Local Government areas. *Nigeria Journal of Tropical Agriculture*, 1:.15-20
- Osundu,V., & Ijeoma, R. (2014). Marketed surplus of paddy- A regression analysis. National level quarterly, *Journal of Agricultural marketing*, 45 (2)
- Oteng, S. (1998). Comparative study of the methods and performance of micro finance institution in south eastern Nigeria, *Central Bank of Nigeria Economic and Financial Review*, 39 (4), 243-269
- Oyinbo, S.C. (2011). Assessing agricultural landscape change in northern Mississippi region, *World Environment* 4(2), 43-60
- Pandit, R., & Pwerile, M. (2015). Socio –Economic Determinant of Small-Scale Rice Farmers Output in Abuja, *Asian J. Rural Dev.* 4(1) 16-24
- Patrick, A. (2017). *Agricultural credit strategies for Nigerian farmers*, USA: Spring Press Inc
- Patrick, O. (2007). The way forward, a seminar paper presented at National training Workshop on participation, *Approach in Agricultural Development Abuja Nigeria*
- Pickett .S. (2000). The role of rural organization in empowering of the rural poor, the experience of international fund for Agricultural Development. *African Rural Development Magazine*, 4(1), 35-50

- Pilner, B. (1974). Rice Revolution in practice lessons from other countries. *Paper presented at a seminar, on sustainable rice production in Nigeria organized by central bank of Nigeria held at Hamadala Hotel, Kaduna.*
- Ponte, D. (2012). *Regional Planning and Regional Plans*, in Faniran, Ibadan: University Press.
- Rahman, D. (2013). *Elementary mathematics and statistics for economist*, Delhi: Virinda publications (P) Ltd.
- Rais, J. (2013). Introduction to farm management economics: Principles and Applications, Zaria: AGITAB Publishers Ltd
- Raleting,T., & Obi, K. (2015). Nigeria: Poverty in the Midst of Plenty- The Challenge of Growth with Inclusion. A World Bank Poverty Assessment.
- Rios, B., & Rio, G. (2008). Marketable surplus of rice and wheat and benefits of storage to the farmers in India, *Indian Agricultural marketing journal*, 46 (1).
- ROR,(2006). The Nigerian rice economy in a complete world: constraints, opportunities and strategic choices: rice production systems in Nigeria: a survey. *Abidjan: Côte d'Ivoire, West Africa Rice Development Association (WARDA)*
- Sabasi, R., & Kompaniyets, G. (2015). Linkages between market participation and productivity, *Results from a Multi-Country Farm Household Sample*
- Sadig, C.J. (2013). Performance evaluation of coffee marketing in Sidama Zone, *An M.Sc Thesis Presented to the School of Graduate Studies of Alemaya University*
- Sadiq, H. (2013), An Analysis of Cointegration: Investigation of Cost-price Squeeze in Agriculture, Selected paper prepared for presentation at the Southern Agricultural Economics Association Annual Meeting
- Satumina, A. A. (2014) History of agricultural extension in Fola Adeoyin (ed.) *Agricultural Extension in Nigeria*, 4, 1-12.
- Sebatta, L.O. (2012). Rice Marketing in Abeokuta Local Government Area of Ogun State of Nigeria, A functional Approach. *The Nigerian Journal of marketing* 2(9)
- Sheng, G.O. (2014). Rice revolution in practice: Lessons from other countries. Paper presented at a seminar on sustainable rice production in Nigeria. *Organized by Central Bank of Nigeria. Held at Hamdala Hotel, Kaduna.*
- Sheperd, O. (2010). A divariate analysis of factors affecting rice processing in Igbemo Ekiti, Department of urban and regional planning federal university of technology Akure, *Ondo State Agricultural Journal* 3 (6) 442 – 446.

- Smith.E (2001). Rice production in Nigeria, a survey project report the Nigerian rice economy in a competitive world, constraints opportunities and strategies choices Abidgan WARDA
- Steve, E. C., & Stephen, Y.A. (2014). Using spatial information technologies as monitoring devices in international watershed conservation along the senegal river basin of west Africa. *The International Journal of Environmental Research and Public Health*. 5(5), 464-476.
- Supaporn, N. (2015). Sesame market chain analysis: the case of Metema Woreda, North Gondar zone, Amhara national regional State. *An M.Sc Thesis Presented to the School of Graduate Studies of Haramaya University*
- Sutherland, J.N. (2001). Adoption of improved agricultural technologies disseminated via radio, farmers programme by farmers in Enugu state, *Nigeria M.Sc. Research findings Department of Agricultural Extension University of Nigeria Nsukka*
- Sutherland, M. (2011). Problems of agricultural development in Nigeria. *Journal of Agriculture Extension*, 13 (2), 27-47
- Takele, M. (2010). Impact of Mandatory Prices Reporting on Fed Cattle Market Integration. *Journal of Agricultural Research Economics*. 31, 508-579.
- Talpur, E. (2011). Strategies for managing the opportunities and challenges of the current agricultural community, Booms in SSA in seminar paper on managing commodity Booms in sub Saharan Africa. *A publication of the AERC Senior policy seminar K African economic Research consortium AERC Nariobi Kenya*.
- Tiger, B. (2011). Government policies and competitiveness of Nigerian rice economy paper presented at the workshop on rice policy and food security in Sub Saharan Africa, *WARDA Cotonou Republic of Benin*, 245-300.
- Tolno, M.,& Pio, H. (2016). Rural Poverty in Developing Countries, Finance and Development, December. Washington: IMF
- Tran, F. (1997).*Rice production in the tropics: A guide to development of national programme*, Ibadan, Nigeria: Macmillan Publishers Ltd.
- Tunji, A. (2009). An overview of the Nigerian rice economy, *The Nigerian Institute of social and Economic Research (WFSER)*
- Tuomelo.D, (1992). The economics of catfish production in Anambra State, Nigeria: A profit function approach. *Journal of Agriculture and Social Sciences*, 6, 105-109
- USAID, (2013). Nigeria's rice economy: state of the Art, *Draft Report submitted to WARDA, Bouake, and Cote d' Ivoire*.

- USDA/FAS (2003). Statistical Bulletin and Annual report and statement of account, *Consultative Group on international Agricultural research (CGIAR)*
- Waller, M. (2000) An analysis of linkages in rice based knowledge system in Triaidad, *Proceedings of the 12th Annual conference of the Association for International Agriculture and Extension in Education (AIAEC) held in Arlington Virginia, 131-136.*
- WARDA (2014) Rice trends in sub Saharan Africa: A synthesis of statistics on rice production, trade and consumption, *West Africa Rice Development Association, Bouake, Cote d' Ivoire.*
- WARDA,(2004). collaborative survey on national agriculture sample survey (NASS) 2010/2011, *Abuja FCT: Federal Ministry of Agriculture and Rural Development*
- Webb, (1996). The agricultural marketing system, Columbus: Grid Publishing
- Wondwesen, P. (2015). *Marketing management*, New York: Pearson Education, Inc.
- World bank, (2011). *Meeting the rice production and consumption demands of Nigeria with improved technologies*, Rome: Italy, FAO Corporate Document Repository.
- Yalom , R.(1995). Attitudes and opinions of texas agricultural cooperative members, *Texas Agricultural Extension Service. USA.*
- Yuguda, U. (2003). Towards a sustainable rice production in Nigeria, *Paper presented at a seminar on sustainable rice production in Nigeria organized by Central Bank of Nigeria at Hamadala Hotel, Kaduna, 16-22*
- Zimbardo, K. (1971). Production in Ganye Local Government Area, Adamawa State. *Journal of Sustainable Management, 2(3)*
- Zohurul, A. K., Ratha, K. N., Sajia, P. K., & Akteruzzman, A. (2014). Marketing strategies of rice in Chhattisgarh, *Indian Journal of agricultural marketing, 45(3).*
- Zulu, G. (2011). Nigeria: Investing in rice production and rice processing project, *available: www.thiday.ng (Retrieved on 4th March, 2011)*

APPENDIX
QUESTIONNAIRE

Instruction: Tick(>) as appropriate that will suit your opinion.

SECTION A: Socio-Economic Characteristic of Rice Cooperative Marketers.

- 1) **Sex:** (a). Male [] (b). Female []
- 2) **Age:** (a). 15 – 20 yrs []; (b). 21 – 30 yrs []; (c). 31 – 40 yrs []; (d) 40 and above []
- 3) **Marital status:** (a). Single []; (b). Married []; (c). Widow []; (d). Widower []; (e) Divorced [].
- 4) **Family size:** (a). 10 – 12 []; (b). 7 – 9 []; (c). 4 – 6 []; (d). 1 – 3 [].
- 5) **Educational Qualification:** (a) Non- Formal Education []; (b) F.M.C.S []; (c) WASC, Tertiary [].
- 6) **Family experience:** (a). 10 – 20 yrs []; (b). 5 - 10 yrs []; (c) 1 – 4yrs [].
- 7) **Farm size:** (a). 10 – 5 (hectare) (b) 7 – 5 (hectare) (c) 4 – 3 plots.
- 8) **Annual income:** (a) N 60,000 – N 120,000 (b) N 120,000 – N 160,000

Section B: Determine the gross/net income.

What is the level of your monthly gross and net income.

Kindly choose from the estimated amount listed below.

- a) Less than N 1,000 []
- b) N 1,000 – N 5000 []
- c) N 10,000 – N 20,000 []
- d) N 20,000 – N 40,000 []
- e) N 40,000 – N 60,000 []
- f) Above N 60,000 []

2) what are the type of labour used by the farmer

- a) Hired labour []
- b) Family labour []

c) Hired & family labour[]

d) Co-operate labour[]

3) What is the condition of selling their farm produce?

a) Store the rice []

b) Sell at farm gate

c) Sell from time to time

4) What is the source of planting material by the rice farmers?

a) Buy from market

b) Old stock from the farm

c) From extension agent

5) How do the farmers package the produce before selling?

A)10-24kg

b)26-50kg

c) 57-10kg

d) Above 100kg

6) What is the cost and returns of rice marketing?

a)variable cost(i)land clearing(ii)tilling(iii) nursery preparation(iv)transplanting(v)gap filling(vi)bud scanning(vii)threshing

B) Capital input (a) pesticide(b)fertilizer(c)rice seed

(C) Fix cost (a) depreciation on holes& matches

(b) Cost of land

7) What is the rate of market managing between the middle men and the cooperation rice farm?

(a) Price of produce

(b) Price of input

(c) Value of production

Appendix 1

Department of Cooperative
Economics and Management
Nnamdi Azikiwe University Awka.

Dear Respondent,

LETTER OF INTRODUCTION

I am a PhD candidate of the above named institution conducting a research work on the topic “**Profitability of Rice production among members of farmers multipurpose Cooperative Society (FMCS) in South East Nigeria**”. For the award of PhD Degree in Cooperative Economics Management.

The researcher work is purely for academic purpose and your accurate information will give a credit to the work. All information will be treated with utmost secrecy and no personal implication.

Thanks for your cooperation

Yours faithfully

Uzondu, Chikodiri Scholastica

2011437004P

Appendix 2

QUESTIONNAIRE

Instruction: Tick () the appropriate that will suit your answer

Section A: Socioeconomic Characteristics of the Respondent

1. **Gender of the Rice farmers:** (a) male (b) female
2. **Age bracket:** (a) 20-39 years (b) 30 – 39 years (c) 40 – 49
years (d) 50 – 59 (d) 60 – 69 years
3. **Marital status:** (a) Single (b) Married (c) Widow (d)
Widower divorced
4. **Family size distribution:** (a) 0-5 (b) 6-10 (c) 1-15 (d) 16 –
20
5. **Occupation:**
(a) None (b) Trading (c) Farmer (d) Civil Servant
6. **Educational Qualification:**
(a) Not been to School (b) Primary School (c) Secondary School
(d) Tertiary Institution
7. **Members sources of fund to finance their business:**
 - a. Cooperative Society
 - b. Loan from Deposit Money Bank
 - c. Personal Savings
 - e. Loan from Family and Friends
 - f. State government grant
 - g. Loan from micro finance Bank
 - h. Loan from Bank of agriculture
8. **Estimated income of the member:**
(a) 100,000 – 150,000 (b) 200,000- 400,000 (c) 400,000 –
600,000 (c) 600,000 – 1, million

9. What is the actual number of the years of experience as Rice farmers:

(a) 0-3 years (b) 4-7 years (c) 7 years and above

Section B: Production Related Variables

1. Based on your experience as a member of FMCS over the years what is the estimated source of initial and additional capital for the organization.

Estimated source of initial capital and additional capital	
Capital source	
1	Cooperative society
2	Loan from deposit money bank
3	Loan from bank industry
4	Personal savings
5	Loan from family and friends
6	State government grant
7	Loan from micro finance bank
8	Loan from bank of agriculture
9	Grant and loan from international agencies

Section C: Farm Operation Variables and Rice output

1 From the under listed variables of FMCS, to what extent is the level of operational variables and Rice output.

Operational level	High	Higher	Highest	
1	Cultivation only			
2	Cultivation and processing			
3	Processing only			

- ii. **Based on your involvement in Rice production, what is the best variety of Rice produce used.**

	Varieties	Regularly used	Rarely used	Sometimes Used	Not sure	Not use at all
1	Improved					
2	Local variety					

- ii. **What is the level of Rice output among FMCS Rice farmer**

	Output per Ha	
1	Less than 10	
2.	10 – 39	
3	30 – 49	
4	50 and above	

Section D: Influence of farm inputs on Rice production

- i. **Based on your involvement in rice production among farmer multipurpose cooperative in South East Nigeria what are the effect of farm inputs on Rice output.**

	Farm input	Significant	Not significant
1	Rice seed		
2	Fertilizer		
3	Labour		
4	Farm size		

ii. What is the cost of and returns analysis of Rice production among farmers multipurpose cooperative society (FMCS)

	Cost and returns analysis	Very high Accessible	Some how Accessible	Very low Accessible	Moderately Accessible	High not Accessible
1	Land clearing					
2	Labour cost					
3	Rice seeds					
4	Fertilizer					
5	Weeding					
6	Processing cost					

ii. The Relationship that exist between Rice output and Profitability indices.

What is the nature of relationship between profitability indices of Rice output.

Profitability indices	To a very great extent	To a great extent	To some extent	To allow extent	
Gross margin					
Gross ratio					
Operation Ratio					
Return to capital invested					

Section E: The Effect of Constraints on Rice production.

Do you agree that constraints on Rice production can affect the profitability of Rice production among FMCS

	Constraints	Agreed	Disagree	Strongly agree	Strongly disagree
1	Inadequate capital				
2	Land tenure act				
3	High cost of inputs/labour				
4	Inappropriate farm management				
5	Pest and disease				
6	Persistence use of poor quality stems				
7	Poor research and extension support				

Appendix 3

Output for Data Analysis

Test Retest Approach (Reliability of Respondent)

This is used to determine the response of respondent. The idea is a response is reliable if the respondent can repeat or present almost the same response as present in the past on the same scale or item.

The correlation value can be used to determine nature and strength of relationship between variables. Correlation values less than 0.5 is an indication of weak relationship but value greater than 0.5 implies strong relationship. If the value is negative, there exist inverse relationship between variables but positive correlation implies direct relationship. Correlation value of 1 implies perfect relationship but 0 implies spurious relationship.

Regression Analysis

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	Fertilizer, Seeds, FarmSize, Labour	.	Enter

a. Dependent Variable: OutputNaira

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.249 ^a	.062	.052	19973.32682

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10392056239.917	4	2598014059.979	6.512	.000 ^b
	Residual	157578844753.833	395	398933784.187		
	Total	167970900993.750	399			

a. Predictors: (Constant), Fertilizer, Seeds, FarmSize, Labour

a. Dependent Variable: RiceOutput

b. Predictors: (Constant), Fertilizer, Seeds, FarmSize, Labour

Coefficients^a

Model	Unstandardized Coefficients		Standardize d Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	18768.296	7562.778		2.482	.013
1 Seeds	1.798	.423	.208	4.246	.000
1 FarmSize	303.532	3857.660	.020	.079	.937
1 Labour	1405.166	3873.501	.092	.363	.717
1 Fertilizer	.052	.026	.098	2.018	.044

a. Dependent Variable: RiceOutput

GET

DATASET NAME DataSet1 WINDOW=FRONT.

DATASET ACTIVATE DataSet1.

Descriptive Statistics

Descriptive Statistics

	N	Sum	Mean	Std. Deviation
LandClear	400	25376986.67	63442.4667	12638.09199
LabCost	400	19032740.00	47581.8500	9478.56899
Seeds	400	4758185.00	11895.4625	2369.64225
Fertiliz	400	3806548.00	9516.3700	1895.71380
Weeding	400	3460498.18	8651.2455	1723.37618
ProcessinC	400	71934490.00	179836.2250	255452.34151
TVC2	400	128369447.85	320923.6196	256680.53593
FarmEquip	400	13843100.00	34607.7500	81522.11573
Implement	400	2086500.00	5216.2500	1167.69848
FixedCost	400	39759750.00	99399.3750	221942.59098
TotalFixed	400	55689350.00	139223.3750	231944.45155
OpAdmi	400	168129197.85	420322.9946	462893.80252
TC1A	400	184058797.85	460146.9946	464216.41488
RiceRev	400	491987400.00	1229968.5000	972669.25280
GM1A	400	363617952.15	909044.8804	979681.85391
GMratio1	400	73.91	73.9080	55.67640

GMha1	400	2272.61	2272.6122	4611.23565
OpRatio	400	34.17	34.1734	8.38518
RetCapInv	400	2.83	2.8326	5.67833
Valid N (listwise)	400			

CORRELATIONS

/VARIABLES=OutputNaira GM1 GMRatio OperatingRatio Returns

/PRINT=TWOTAIL NOSIG

/MISSING=PAIRWISE.

Correlations

		RiceRev	GMratio1	OpRatio1	CapReturn
RiceRev	Pearson Correlation	1	.609**	-.466**	.848**
	Sig. (2-tailed)		.000	.000	.000
	N	400	400	400	400
GMratio1	Pearson Correlation	.609**	1	-.854**	.573**
	Sig. (2-tailed)	.000		.000	.000
	N	400	400	400	400
OpRatio1	Pearson Correlation	-.466**	-.854**	1	-.510**
	Sig. (2-tailed)	.000	.000		.000
	N	400	400	400	400
CapReturn	Pearson Correlation	.848**	.573**	-.510**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	400	400	400	400

** . Correlation is significant at the 0.01 level (2-tailed).

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT GrossMargin

/METHOD=ENTER Age Sex HouSize Educa FarmSize.

Out put

Regression Analysis

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	FarmSize, Educa, Age, HouSize, Sex ^b	.	Enter

a. Dependent Variable: GrossMargin

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.226 ^a	.051	.039	20113.31494

a. Predictors: (Constant), FarmSize, Educa, Age, HouSize, Sex

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8579998507.422	5	1715999701.484	4.242	.001 ^b
	Residual	159390902486.328	394	404545437.783		
	Total	167970900993.750	399			

a. Dependent Variable: GrossMargin

b. Predictors: (Constant), FarmSize, Educa, Age, HouSize, Sex

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	25298.009	4782.846		5.289	.000
	Age	163.168	59.795	.135	2.729	.007
	Sex	5719.050	2065.781	.138	2.768	.006
	HouSize	-555.514	354.089	-.078	-1.569	.117
	Educa	-142.690	194.167	-.037	-.735	.463
	FarmSize	1564.769	767.582	.102	2.039	.042

a. Dependent Variable: GrossMargin

Regression

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	C7, C5, C1, C4, C3, C6, C2 ^b	.	Enter

a. Dependent Variable: RiceOutput

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.373 ^a	.139	.124	5.31443

a. Predictors: (Constant), C7, C5, C1, C4, C3, C6, C2

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1793.791	7	256.256	9.073	.000 ^b
	Residual	11071.342	392	28.243		
	Total	12865.132	399			

a. Dependent Variable: RiceOutput

b. Predictors: (Constant), C7, C5, C1, C4, C3, C6, C2

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	11.729	1.333		8.801	.000
C1	-1.465	.345	-.260	-4.247	.000
C2	-1.063	.417	-.176	-2.548	.011
C3	.094	.384	.016	.246	.806
C4	.466	.358	.078	1.301	.194
C5	-.363	.375	-.056	-.968	.334
C6	.198	.450	.030	.440	.660
C7	-.241	.398	-.037	-.607	.544

a. Dependent Variable: RiceOutput