International Fund for Agricultural Development (IFAD) Value Chain Development Programme and Rice Yield: A Study of Members of Rice Farmers Cooperative in Anambra State, Nigeria

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Abstract: *This work examined International Fund for Agricultural Development (IFAD) Value Chain Development Programme and its impact on Rice Yields of Farmers Cooperative in Anambra State, Nigeria, as the broad objective, accompanied by two specific objectives. The study adopted a survey research design. The population of the study was made up of 320 Farmers Cooperatives that are into rice production and that are registered with the Value Chain Development Programme in Anambra State. Taro Yamani formula was used to arrived at a sample size of 384. Structured questionnaire was used to solicit data from the respondents. Data was analyzed using descriptive statistics tools and Ordinary Least Square Method (OLS) Regression Analysis was used for testing the hypotheses, at 5% level of significance. The findings revealed that IFAD–Value Chain Development Programme farm machines have a statistically significant influence on rice yield and that IFAD–Value Chain Development Programme farm inputs have a statistically significant influence on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria. Hence, it was concluded that the output of rice farmers cooperative in Anambra State is tied to the efficacy of service of IFAD in discharging their mandate, as the more they are effectiveness in these duties of theirs, the better the output/yield of the benefitting farmers and cooperatives. Among others, it was recommended that management of IFAD should try to make the farm machines and inputs to get to more farmers, so as to increase their rice yield.*

Keywords: International Fund for Agricultural Development, Value Chain Development Programme, Rice Yield, Farmers Cooperative and Anambra State

INTRODUCTION

Prior to the discovery of oil, the Nigerian economy was reliant on the agricultural sector, which was seen as the nation's mainstay and a primary driver of growth and development (Sertoglu, Ugural and Bekun, 2017). The agricultural sector is an important economic sector in Nigerian economy sub-divided into four sub-sectors (crop production, fisheries, animal production and forestry) capable of employing over 70% of the country's population especially in the rural areas (Onugu, Obinaefo and Anumba, 2019). This agricultural sector is undergoing a series of reforms that will aid in the country's food security and stabilization; proof of this is the Nigerian government's border closure, which is intended to encourage farmers, particularly rice farmers, to increase production while also forcing consumers to demand more domestic food products (Obinaefo, Osuafor, Anumudu and Ezeano, 2020).

Rice (Oryza sativa) is one of Nigeria's fastest-growing food commodities, with the potential for continued growth. Its rise in demand is linked to rapid population growth, urbanization, and consumers' preference for rice as a convenience food, but it is the main cereal crop severely impacted by climatic factors in Anambra state and Nigeria as a whole (Obinaefo et al, 2020). Rice production in Nigeria is mainly in the hand of small-scale rice growers, cultivating about 0.5 to 3 hectares, these small-scale farmers supply about 80% of rice produced in Nigeria (IRRI, 2013). In an attempt to increase rice production in Nigeria, Many agricultural programmes which were established years back in order to improve rice production in Nigeria lacked value chain. The Nigerian government has realized the importance of value chains in the agricultural industry. The Nigerian government partnered with the International Fund for Agricultural Development (IFAD)-assisted Value Chain Development Programme (VCDP) to alleviate limitations in the rice value chain and boost production, particularly among smallholder farmers (Agwuncha, 2018). The federal government loaned out N43 billion to 293,000 rice farmers in the year 2017 discovering the need for value chain which in turn produced rice that was sold at N193 billion (Ogbeh, 2018). This noble gesture of the federal Government increased rice paddy output from 5 million metric tons (MT) in 2015 to 17 million metric tons (MT) in 2018. The effort is aimed at increasing the international potential of the rice out growers and food security in the country.

The Anambra State Ministry of Agriculture keyed into the International Food and Agricultural Development Programme as part of providing solution to the issue of Food Security in Anambra State. The Value Chain Agricultural Development Programme in 2014 thus, was introduced. The Value Chain Development Programme aims to increase the incomes and food security of poor rural households in Anambra, Benue, Ebonyi, Niger, Ogun, and Taraba States that are involved in the production, processing, and marketing of rice and cassava on a long-term basis. The major target group is poor rural households involved in the rice and cassava

value chains, which includes smallholder farmers. The IFAD assisted VCDP in Anambra State from 2014 to date, has been actively involved in teaching rice farmers on numerous improved agricultural practices, to double their yields and enable them improve their income and livelihood. The VCDP aims to increase the income and food security of disadvantaged rural households, with a focus on women and youth involved in rice production, processing, and marketing (Madubueze, Dike and Okpalibekwe, 2018).

In Anambra State, IFAD–VCDP has registered about 7,825 farmers and Cooperatives in the state, while the State Government has paid over N280 million as counterpart fund since the programme started (Agwuncha, 2018). Currently, the number of registered farmers has increase to 11,730 while Cooperatives have also increased to 940(Agricultural Development Programme IFAD-VCDP office, 2020). Rice Farmers Cooperatives in Anambra state have gained a lot from VCDP. They were given equipment and things to improve the efficiency of their manufacturing, processing, and sale of items in the hopes of monetarily and economically benefiting members. Receiving agricultural machinery, farm supplies such as fertilizer, pesticides, and extension services, as well as attracting government backing, are all examples. (2014, Okafor) The extent to which these aids given to farmers have impacted on their rice output or yield of members of rice farmers cooperative in Anambra State Nigeria is yet to be empirically ascertained in Anambra State, hence, necessitating this study.

The broad objective of the study focuses on IFAD–Value Chain Development Programme and Rice Yield among Members of Rice Farmers Cooperative in Anambra State Nigeria. Specifically, the objectives are to:
1.   Determine the influence of IFAD-Value Chain Development Programme farm machines on rice yield.
2.   Evaluate the influence of farm input of IFAD-Value Chain Development Programme on rice yield.

REVIEW OF RELATED LITERATURE

International Fund for Agricultural Development

The International Fund for Agricultural Development (IFAD) is a United Nations (UN) specialized agency that was founded in 1977 as an international financial institution as one of the primary outcomes of the 1974 World Food Conference. It was decided that "an International Fund for Agricultural Development should be formed as soon as possible to finance agricultural development initiatives of the highest priority. One of the most important takeaways from the meeting was that the root causes of food insecurity and famine were not so much failures in food production as structural difficulties with poverty and the fact that the bulk of the poor people in the developing countries lived in rural areas.

The International Fund for Agricultural Development (IFAD) is dedicated to ending rural poverty in developing countries. 75% of the world's poorest people - 1.4 billion women, children, and men - live in rural areas and rely on agriculture and related industries for a living. IFAD focuses on country-specific solutions, such as boosting poor rural people's access to financial services, markets, technology, land, and other natural resources, through working with poor rural people, governments, funders, non-governmental organizations, and a variety of other partners.

IFAD Strategic Framework

IFAD's actions are driven by its Strategic Framework, which aims to help impoverished rural people improve their food security and nutrition, increase their incomes, and build resilience. The IFAD mandate of investing in rural people and allowing inclusive and sustainable development of rural areas, particularly through smallholder agriculture-led growth, is clearly demonstrated in Agenda 2030. After several years of growth and reform, IFAD is renowned for its experience, knowledge, and performance in this area; it is poised to have a stronger effect and is well positioned to assist nations in achieving their Agenda 2030 priorities.

The mission of the International Fund for Agricultural Development (IFAD) is to empower disadvantaged rural women and men in developing nations to attain higher earnings and enhanced food security. Poor rural people will have improved access to, and the skills and organization they need to take use of:

I. Natural resources, including secure access to land and water, as well as enhanced natural resource management.
II. improved agricultural technologies and efficient production services.
III. Resource management and conservation practices.
IV. A diverse set of financial services.
V. Agricultural inputs and produce markets that are transparent and competitive.
VI. Rural off-farm employment and enterprise development opportunities.

All IFAD decisions are made with these values and objectives in mind, including regional, country, and thematic initiatives, poverty reduction strategies, policy dialogue, and development partners. IFAD is committed to achieving the Sustainable Development Goals, as stated in its Strategic Framework.

IFAD – Value Chain Development Programme in Nigeria

According to Tenabe (2018), IFAD's VCDP in Nigeria adopts a comprehensive and demand-driven strategy to overcoming limitations in the rice and cassava value chains. It accomplishes so through an inclusive strategy that builds the capacity of all participants in the supply chain, including producers and processors, public and private institutions, service providers, policymakers,

and regulators. Simultaneously, the program places a heavy emphasis on local governments developing commodity-specific Value Chain Action Plans, which serve as the foundation for implementing long-term initiatives to decrease poverty and accelerate economic growth. The goal is to increase rural incomes and food security in a sustainable way. 15,000 smallholder agricultural households, 1,680 processors, and 800 traders are among the target groups.

The program focuses on the following topics:

 1) Increasing market access for smallholder farmers and small to medium-scale agro-processors by developing agricultural markets.

2) Increasing the volume and quality of marketable output through strengthening farmers' organizations and promoting smallholder production.

The VCDP grew out of the IFAD Country Strategic Opportunities Programme (COSOP), which ran from 2010 to 2015. The suggestions of the Country Programme Evaluation (CPE) conducted by the Federal Government of Nigeria (FGN) and the International Fund for Agricultural Development (IFAD) in 2008/2009 April 2009 informed this COSOP. The CPE advised that future IFAD agricultural assistance be focused on improving production and market access.

The VCDP follows the CPE recommendations and expands on ongoing value chain (VC) interventions in Nigeria, which are supported by the government, development partners (DPs), and the business sector. The VCDP is fully compatible with the Nigerian government's National Agricultural and Food Security Strategy, National Policy on Integrated Rural Development/Rural Development Sector Strategy, and National Agricultural Investment Plan (NAIP).

The program is in line with the Agricultural Transformation Agenda (ATA), the new government's goal for agricultural growth, which calls for the agricultural sector to be developed through a commodities value chain strategy. The program will focus on two of the priority commodities specified in the ATA, cassava and rice, in order to take advantage of current market possibilities and solve limitations along the value chain, as part of the continuing COSOP. The program will focus on two of the priority commodities specified in the ATA, cassava and rice, in order to take advantage of current market possibilities and solve limitations along the value chain, as part of the continuing COSOP. Based on the CPE's advice, the program would concentrate its efforts in six of the country's 36 states (Anambra, Benue, Ebonyi, Niger, Ogun, and Taraba) in order to maximize impact and learn for future expansion (Nwalieji, Uzuegbunam & Okeke, 2015).

The goals are to empower disadvantaged rural people, particularly women, by boosting their access to resources, infrastructure, and services, as well as to encourage local communities to manage land, water, and common property, so assisting in the fight against environmental degradation. Erosion and soil fertility loss, as well as coastal zone natural resource management, are among the concerns addressed by IFAD-supported programs and initiatives.

Since 1985, IFAD has funded nine programs and projects in Nigeria, totaling about US$232.2 million in loan commitments. Currently, the country receives more than 40% of the IFAD's financial resources for Western and Central Africa Smallholders, women, small business owners, poor fishing communities, young people, and landless people were all addressed in all of the programs and 12 projects. The organization also promotes commodity-based interventions that provide technical and financial assistance across a variety of value chains, including cattle, rice and other grains, roots and tubers, vegetables, and agroforestry products (Tenabe, 2018).

Value Chain

Ugonna, Jolaoso and Onwualu (2015) state that value chain is the chain that connects the many stages of a product's life cycle, from production to processing to distribution to the end user. Ugonna et al (2015) went further to explain that in value chain system, Farmers are connected to the demands of consumers, collaborating closely with suppliers and processors to manufacture specialized items in response to market demand.

 Similarly, customers are linked to the needs of farmers through the flow of information and products. Farmers' returns can be boosted and livelihoods improved using this strategy and continual innovation. Rather than focusing solely on profit at one point in the value chain, players at all levels can benefit.

Zamora (2016) emphases that value chain is a series of actions and services that go from the idea of a product or service to its eventual disposal after use. Input providers, producers, processors, and purchasers are all part of the value chain. A variety of technical, business, and financial service providers assist them. The value chain approach has been used by both development practitioners and researchers to capture the interactions of more dynamic markets and to investigate the interrelationships between various actors involved at all stages of the marketing channel.

Furthermore, value chain analysis provides for an assessment of the links between productive activities by extending beyond firm or activity-specific analysis. As a result, the method provides a framework for examining the nature and determinants of competitiveness in value chains where small farmers might participate. It also gives them the foundation they need to build and implement appropriate development programs and policies to help them participate in the market. (Ugonna, et al., 2015).

IFAD – Value Chain Development Programme in Anambra State

The Anambra State Ministry of Agriculture went into partnership with the International Food and Agricultural Development Programme as part of providing an African solution to the issue of Food Security in Africa and particularly in Nigeria. The Value Chain Agricultural Development Programme in 2014 thus, was introduced. The Value Chain Development Programme aims to increase the incomes and food security of poor rural households in Anambra, Benue, Ebonyi, Niger, Ogun, and Taraba States that work in rice cultivation, processing, and marketing on a long-term basis. The major target demographic is poor rural households involved in the rice value chain, which includes smallholder farmers growing up to five hectares of land and small-scale processors.

The International Fund for Agricultural Development (IFAD) assisted Value Chain Development Programme (VCDP) in Anambra State from 2014 to date and has been actively involved to teaching rice farmers on numerous improved agricultural practices, to double their yields and enable them improve their income and livelihood. The VCDP works to improve the income and food security of poor rural households with particular attention to women and youth engaged in production, processing and marketing of rice (Madubueze, Dike & Okpalibekwe ,2018).

Activities of IFAD – VCDP to Increase rice production in Anambra State

Agwuncha (2018) posits that Anambra State Government has commissioned over N27million seed and soil laboratory equipments procured by IFAD- Value Chain Development Programme. The laboratory would assist to strengthen the quality of farm produce in the State.

- IFAD-VCDP provided seven irrigation centers in the State in order to help boost rice production both in the raining and dry season.
- IFAD-VCDP constructed 11major roads leading to various agrarian communities in order to reduce drudgery on the farmers.
- IFAD-VCDP provided to rice farmers over N600million worth of agricultural inputs and machineries. Some of them are power tillers which were distributed to youth Cooperative group in terms of providing employment for them.
- IFAD-VCDP trained rice farmers on how to use the improved rice nursery to achieve a maximum rice yield.

Agricultural Cooperative

Okafor (2014) posits that farmers pool their resources in certain areas of activity to form an agricultural cooperative. Okafor further explain that Agricultural cooperatives are divided into two types: agricultural service cooperatives, which provide various services to their individual farming members, and agricultural production cooperatives, which pool production resources (land, machinery) and farm together. In English, the default meaning of agricultural cooperative is usually an agricultural service cooperative, which is the world's most common form. Agricultural service cooperatives are divided into two categories: supply cooperatives and marketing cooperatives. Seeds, fertilizers, and mechanical services are among the inputs that supply cooperatives provide to their members for agricultural output. Farmers form marketing cooperatives to handle transportation, packaging, distribution, and marketing of farm products.

Nwankwo and Akonu (2019) state that Agricultural cooperatives are type of cooperative created by farmers or agriculturalists who pooled their resources to produce and market their products. They also receive equipment and products to improve the efficiency of their manufacturing and sale of the items in the hopes of monetarily and economically benefiting members. Receiving loans, farm inputs such as fertilizer, expert advice, financial education, saving mobilization, extension services, credit management, and attracting government help are some of these.

Mc Donnell (2012) asserts that Agricultural cooperatives provide the services required to transport a product from the site of production to the point of consumption. Planning production, growing and harvesting, grading, packaging, packing, shipping, storage, food processing, distribution, and sale are all part of agricultural cooperatives. Furthermore, the aims and goals of agricultural cooperatives are very widely to provide useful service where none exists especially one that could be uneconomic for individual ownership to reduce excessive costs of middlemen, to help farmers get a share of the national income, to direct agriculture towards the goals of national economic planning and generally to improve the social and economic conditions of the rural people.

Okafor (2014) opines that Agricultural cooperatives have been shown to be an important institution for promoting social and economic development and achieving a more equal distribution of revenue. The track records for success in this area are uneven. There have been countless occasions where they have proven successful and capable of exerting the development influences that many governments had hoped for.

IFAD-VCDP farm machine and Rice Yield

Farm machines are those machines that are applicable in the farm to enhance agricultural production. It has become the major power source for precisely and timely completion of different farm operations viz seed bed preparation, sowing and planting operation, spraying operation, harvesting and threshing operation etc (Jagvir, 2016). Examples of farm machines are power tillers, which can

be used in almost all agricultural operations that demand large amount of labour. It improve timeless of farm operations and reduce drudgery. Rice threshing machine can be used to remove the seeds from the stalks and husks. It does so by beating the plant to make the seeds falls out. Knapsack sprayer is used for application of herbicides to remove weeds, fungicides to minimize fungus diseases, insecticides to control insect pests. Irrigation / water pump are machines for moving water. They play a fundamental part in Agriculture as they move water from river, dam or borehole through pipes to the farm for the speedy survival of the crops.
 In Anambra state, IFAD-Value Chain Development Programme has really impacted positively on the lives of rice farmers cooperative by distribution of power tillers to youth Cooperative groups in terms of providing employment for them. Also seven irrigation centers were developed in order to help and boost rice production both in the raining and dry season. (Agwuncha, 2018).

IFAD-VCDP Farm Input and Rice Yield

Rice farm inputs are agricultural inputs use in production of rice. They are as follows; rice seed, fertilizer, herbicides, pesticides and insecticides etc (Xiaoming, Bo Zhang, Yong & Yanni, 2013). Rice seed is the foundation of any rice crop. It must be grown, harvested and processed correctly for best yield and quality results. Fertilizers are used to provide additional nutrients to the plants and also to improve the yield of the rice crops. Herbicides are used to control undesired plants on rice farmers. Insecticides and pesticides are chemicals used to control weeds, insects and diseases by killing them or preventing them from engaging in undesirable or destructive behaviours.

In Anambra State, IFAD-VCDP has established many rice seed multiplication centers in order to ensure standardization of its produce and to boost rice production in the State. The procurement of agricultural inputs and machineries by IFAD-VCDP has made the rice farmers cooperative, who made between 1and 3 tons per hectare now make 7.8 tons per hectare and on the average of 5.8 tons on rice yield (Agwuncha, 2018)

Empirical Review

Obinaefo,Osuafor, Ezeano & Anumudu (2020) studied on mediation effect of adopting good agronomic practices on rice productivity in Anambra State, Nigeria. The study used a well-structured questionnaire and face to face interview to elicit information from randomly selected 384 rice farmers. After the data sorting and filtering, only 337 was found valid and used for the analysis. A combination of descriptive statistics and structural equation modelling were used to achieve the study objectives. Finding shows that of all the 26 items of good agronomic practice chosen, 10 have been successfully adopted. Also, the cluster mean of 4.05 is an indication that the farmers agreed that being innovative, technical, responsive, scientific and economic were the variables that influence productivity.

Adi, Simon, Aminu & Danji (2020) examined the impact of Value Chain Development Programme (VCDP) on farmers in Ardo–kola Local Government area of Taraba State. The data was acquired using a structural questionnaire from 90 randomly selected respondents and evaluated using frequency, percentage, and the t-test. The majority of the respondents (96.7 percent) were youth, (77.8%) were men, and (72.2 percent) were married, according to the socio-economic characteristics analysis. The vast majority (94.4 percent) received some type of education. The majority (77.8%) were small-scale farmers, with 83.4 percent having a household size of less than 11 people. The impact of the VCDP on farmers' livelihoods demonstrates that the VCDP has a considerable influence on farmers' livelihoods in the research area. This was based on t – calculated value (3.18) which was greater than t – tabulated value (2.048). This implies that through VCDP the yield and income of the farmers has been increase, also the farmer has acquired more assets such as (house, motorcycle, tricycle, and land e.t.c).

Obinaefo (2019) conducted an economic analysis of adopting good agronomic practices among rice farmers in Value Chain Development Programme, Anambra State. The objectives primarily is to identify the farmer's socioeconomic characteristics, determine the extent of adoption of the good agronomic practices, calculate the net gain from rice farming, estimate the efficiency of rice farmers, and to find out the factors militating against the adoption of the good agronomic practices among rice farmers in the programme. The study suggested that male (63%) are more involved in rice farming in the programme, the mean age and farming experience were 42 years and 15 years respectively. The study shows that majority (34.7%) of the farmers attended secondary school, the mean farm size was 2.42ha, while the output was 4.813 tons/ha as against the baseline report of 2.6 tons/ha in 2014.

Tenabe (2018) assessed the effect of IFAD value chain development programme on welfare of smallholder rice and cassava producers in Anambra State Nigeria. The major goal of this research was to see how VCDP affected the welfare of smallholder farmers (income and other services). Well-structured questionnaires were used to collect primary data. A total of 358 people were chosen at random and questioned. In order to analyze the data, descriptive statistics (means and frequencies) and inferential statistics were used (analysis of variance). The findings revealed that the VCDP has improved the economic welfare of smallholder rice and cassava farmers in Anambra State. Farmers' wellbeing has also improved since they joined the VCDP, according to the report, in terms of productivity growth, income, physical and financial assets, and access to markets and social services.

Amurtiya, Tashikalma & Chinda (2018) investigated the agricultural inputs subsidy in Nigeria with an overview of the growth enhancement support scheme (GESS) in Nigeria. The study reviewed scholarly articles and other secondary data from government sources on the scheme. Findings from the study revealed that the Scheme was able to deliver subsidized agricultural inputs to small-scale farmers with relative ease and at affordable rate which was able to boost farm output. However, the scheme was affected majorly by its politicization, the inability of the governments to release funds to agro-dealers leading to late delivery of inputs and the lack of support service (extension) to farmers. Based on these findings, it was advised that adequate synergy be built amongst all government collaborating agencies participating in the plan to ensure adequate funding, timely disbursement of farm supplies, and the provision of appropriate support services to farmers.

Anigbogu & Uzondu (2018) examined the determinants of output performance of cooperative farmers in Anambra State, Nigeria using econometric regression model of the Ordinary Least Square (OLS) and a production function of the Cobb-Doughl as type. Agricultural cooperatives provide farm inputs, loans, and extension services to help farmers succeed in their farming operations. Except for household size, all of the inputted variables – crop output, total credit, credit from cooperative, fertilizer use, cooperative experience, farm size – were determined to be significant at the customary 5% level. As a result of the findings above, it is suggested that the government supplement cooperative efforts by providing: Adequate agricultural education and extension services to cooperative farmers in order to help them enhance their food output. To boost their food output, they need adequate input supplies, improved crop types, and good storage facilities, among other things. Agriculture should be mechanized to increase output. A cooperative-based, supervised agricultural credit plan.

METHODS

The research work used survey research design to carry out the study. The reason for using survey research design is to enable proper study of the variables involved in the study. The areas of study is Anambra State Nigeria. The population of the study is made up of 320 Rice Farmers Cooperative that are into rice production, registered with the Value Chain Development Programme in Anambra State which includes Anambra East, Anambra West, , Ayamelum, Orumba North and Orumba South local government areas with a total population of 9,600 farmers. Taro Yamani formulae was used to arrived at a sample size of 384. The researcher used both primary and secondary sources of data for the study. The researcher relied more on primary data. Structured questionnaire was used to solicit data from the respondents. The research instrument was validated using a translational validity so as to ensure face and content validity. In order to ensure the reliability of the instrument, the Test-retest method was adopted, to achieve this, selected 10 respondents were administered with the questionnaire twice at an interval of 14days, the correlation of the two sets of scores (0.870) was determine using Pearson correlation coefficient. Data was analyzed using descriptive statistics tools and ordinary least square method (OLS) was used for testing dependent (Rice Yield) and independent (IFAD-Value Chain Development Programme) variables.

DATA PRESENTATION AND ANALYSIS

Hypotheses One

There is no significant influence of IFAD – Value Chain Development Programme farm machines on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria.

Table 1: Regression Result for hypothesis one

Dependent Variable: RICEYIELD
Method: Least Squares
Date: 15/07/21   Time: 13:30
Included observations: 310

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	201.5205	0.552101	15.44101	0.0000
TRESH	2.174990	0.044615	61.56641	0.0000
POWER	1.254970	0.024515	40.95645	0.0000
PUMP	0.174990	0.001515	1.333645	0.3120
SPRAYER	1.155990	0.026355	43.94535	0.0000
WEEDING	2.874823	0.034515	52.95645	0.0000

R	0.897452	Mean dependent var	22.07546
R-squared	0.827234	S.D. dependent var	8.235345
Adjusted R-squared	0.837342	Akaike info criterion	6.547827
S.E. of regression	4.354821	Schwarz criterion	5.563826
Sum squared resid	3456.768	Hannan-Quinn criter.	5.772030
Log likelihood	981.1341	Durbin-Watson stat	2.673823
F-statistic	4566.937		
Prob(F-statistic)	0.000000		

Source: Field Survey, 2021

Keys:

TRESH: Threshing Machine

POWER: Power Mill

PUMP: Water Pump

SPRAYER: Knapsack Sprayer

WEEDING: Farm Weeding Machine

Table 1 shows the regression result for hypothesis one which states that there is no significant influence of IFAD Value Chain Development Programme farm machines on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria. The results obtained from the analysis are as follows:

RICEYIELD = 201.5205C + 2.174990TRESH + 1.254970POWER + 0.174990PUMP + 1.155990SPRAYER + 2.874823WEEDING

The Constant term obtained is = 201.5205 and it is statistically significant with a p-value of 0.0000 (p-value < 0.05).
The coefficient of Threshing Machine is 2.174990 and it is statistically significant with a p-value 0.0000 (p-value < 0.05).
The coefficient of Power Mill is 1.254970 and it is statistically significant with a p-value 0.0000 (p-value < 0.05).

The coefficient of Water Pump is + 0.174990 but it is not statistically significant with a p-value 0.3120 (p-value > 0.05).

The coefficient of Knapsack Sprayer is 1.155990 and it is statistically significant with a p-value 0.0000 (p-value < 0.05).

The coefficient of Farm Weeding Machine is 2.874823 and it is statistically significant with a p-value 0.0000 (p-value < 0.05).

The correlation coefficient (R) is 0.897452 signifying that a positive relationship exists between the variables.
The coefficient of determination (R^2) obtained is 0.827234 which indicates that an 83% change in rice yield (dependent variable) is accounted for by changes in the independent variables (Threshing Machine, Power Mill, Water Pump, Knapsack Sprayer and Farm Weeding Machine) among members of Rice Farmers Cooperative in Anambra State, Nigeria

The F-statistics as seen in the table is 4566.937 and the sig (p-value) is .000000. This signifies that the relationships observed between the variables are cumulatively statistically significant. This is because the P-value obtained is less than the significant value used (0.05). The study, therefore, state that there is a statistically significant influence of IFAD – Value Chain Development Programme farm machines on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria

Decision: Accept the alternate hypothesis.

Hypotheses Two

There is no significant influence of IFAD – Value Chain Development Programme farm input on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria.

Table 2: Regression Result for hypothesis two
 Dependent Variable: RICEYIELD

Method: Least Squares
Date: 15/07/21   Time: 13:30
Included observations: 310

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	111.3456	0.789273	17.83562	0.0000
FERTILIZER	4.345621	0.124345	78.87321	0.0000
HERBICIDE	3.782419	0.088836	46.83624	0.0000
INSECTICIDE	1.563527	0.011726	1.345728	0.0020
PESTICIDE	3.846283	0.049746	33.52686	0.0000
NURSERY	2.874527	0.004805	32.87456	0.0000

R	0.828846	Mean dependent var		12.64526
R-squared	0.807746	S.D. dependent var		6.774526
Adjusted R-squared	0.804438	Akaike info criterion		5.565411
S.E. of regression	3.864528	Schwarz criterion		4.755628
Sum squared resid	3256.768	Hannan-Quinn criter.		4.756862
Log likelihood	909.5662	Durbin-Watson stat		3.672583
F-statistic	2300.942			
Prob(F-statistic)	0.000000			

Source: Field Survey, 2021

Key:

NURSERY: Improve Rice Nursery

Table 2 shows the regression result for hypothesis two which states that there is no significant influence of IFAD – Value Chain Development Programme farm input on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria. The results obtained from the analysis are as follows:

RICEYIELD = 111.3456C + 4.345621FERTILIZER + 3.782419HERBICIDE + 1.563527INSECTICIDE + 3.846283PESTICIDE + 2.874527 NURSERY

The Constant term obtained is = 111.3456 and it is statistically significant with a p-value of 0.0000 (p-value < 0.05).
The coefficient of FERTILIZER is 4.345621 and it is statistically significant with a p-value 0.0000 (p-value < 0.05).
The coefficient of HERBICIDE is 3.782419 and it is statistically significant with a p-value 0.0000 (p-value < 0.05).

The coefficient of INSECTICIDE is 1.563527 and it is statistically significant with a p-value 0.0020 (p-value > 0.05).

The coefficient of PESTICIDE is 3.846283 and it is statistically significant with a p-value 0.0000 (p-value < 0.05).

The coefficient of Improve Rice Nursery is 2.874527 and it is statistically significant with a p-value 0.0000 (p-value < 0.05).

The correlation coefficient (R) is 0.828846 signifying that a positive relationship exists between the variables.
The coefficient of determination (R^2) obtained is 0.807746 which indicates that an 81% change in rice yield (dependent variable) is accounted for by changes in the independent variables (FERTILIZER, HERBICIDE, INSECTICIDE, PESTICIDE and NURSERY) among members of Rice Farmers Cooperative in Anambra State, Nigeria

The F-statistics as seen in the table is 2300.942 and the sig (p-value) is .000000. This signifies that the relationships observed between variables are cumulatively statistically significant. This is because the P-value obtained is less than the significant value used (0.05). The study, therefore, state that there is a significant influence of IFAD – Value Chain Development Programme farm input on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria.

Decision: Accept the alternate hypothesis.

Discussion of Findings

The hypotheses of the study were analyzed using linear regression, and empirical findings were got. The findings will be discussed here so as to compare them with earlier findings to know if they are in agreement with previous findings or not. The first objective was to determine the influence of IFAD-Value Chain Development Programme farm machines on rice yield and the hypothesis was that there is no significant influence of IFAD – Value Chain Development Programme farm machines on rice yield, after the analysis, was discovered that there is a statistically significant influence of IFAD – Value Chain Development Programme farm machines on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria. This result implies that the machines provided by of IFAD – Value Chain Development Programme are of significance to the rice yield of Farmers Cooperative in Anambra State. That is, the more IFAD – Value Chain Development Programme provides threshing machine, water pump, Power tiller, Knapsack Sprayer and Farm weeding machine, the more it improves the yield of the farmers because the machines helps the farmers in becoming be effective and efficient in their activities. This study relates to the study of Obinaefo, Osuafor, Ezeano and Anumudu (2020) who studied mediation effect of adopting good agronomic practices on rice productivity in Anambra State, Nigeria. The finding shows the farmers agreed that being innovative, technical, responsive, scientific and economic were the variables that influence productivity. Part of being technical and innovative is the application and or the adoption of machines, like those provided by IFAD – Value Chain Development Programme to farmers, which improves farm field.

The second objective was to determine the influence of IFAD-Value Chain Development Programme farm input on rice yield and the hypothesis was that there is no significant influence of IFAD – Value Chain Development Programme farm input on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria. After carryin out the analysis, it was observed that there is a statistically significant influence of IFAD – Value Chain Development Programme farm input on rice yield among members of Rice Farmers Cooperative in Anambra State, Nigeria. This result signifies that the input provided by IFAD – Value Chain Development Programme to farmers helps them in improving on their rice output. That is, the Fertilizer, Herbicide, Insecticide, Pesticide, Improve rice nursery and Farmer education provided for farmers helps them in galvanizing their activity, thereby, making them more productive in their farming activities. This result relates to the study of Tenabe (2018) who assessed the effect of IFAD value chain development programme on welfare of smallholder rice and cassava producers in Anambra State Nigeria. The findings revealed that the VCDP has improved the economic welfare of smallholder rice and cassava farmers in Anambra State. Farmers' wellbeing has also improved since they joined the VCDP, according to the report, in terms of productivity growth, income, physical and financial assets, and access to markets and social services. Similarly, the study of Anigbogu and Uzondu (2018) who examined the determinants of output performance of cooperative farmers in Anambra State, Nigeria came out with a related findings. They discovered that all of the variables – crop yield, total credit, cooperative credit, fertilizer use, cooperative experience, and farm size – were significant in determining output in the study. The point of relation to the present study is fertilizer, which formed part of the input provided by IFAD – Value Chain Development Programme as pinpointed by this study to have influence on rice yield of rice farmers cooperatives.

Conclusions

Farming is a veritable tool for improved income generation, better leaving standard and employment generation. The scale of production is important in farming activity, so also is the output. Many things influence the output of farmers, part of which include the sophistication of machines used, the input into the farm and the techniques and competency of the farmer. All these are part of the mandate of IFAD, of which if they are effective and efficiency in discharging this mandate of theirs, it will help in boosting the yield output of farmers. This study therefore concludes that the output of rice farmers cooperative in Anambra State is tied to the efficacy of service of IFAD in discharging their mandate, as the more they are effectiveness in these duties of theirs, the better the output/yield of the benefitting farmers and cooperatives.

Recommendations

Following the findings of this study, it is recommended that:
1. The management of IFAD should try to make the farm machines to get to more farmers so as to increase their yield
2. Management of IFAD needs to provide more farm input for members of Rice Farmers Cooperative in Anambra State as it will help in improving their rice yield and makes for better leaving standard for the members.

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