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COMPARATIVE ANALYSIS OF THE IMPACT OF IFAD-VCDP PARTICIPATION ON NET FARM INCOME OF BENEFICIARY AND NON-BENEFICIARY RICE FARMERS IN NASARAWA STATE, NIGERIA

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ABSTRACT

The study assessed the impact of IFAD-VCDP participation on net farm income, a comparative analysis of beneficiary and non-beneficiary rice farmers in Nasarawa State, Nigeria. The study employed a multistage sampling technique to select 260 IFAD-VCDP beneficiary and 260 non-beneficiary rice farmers, using a structured questionnaire. The primary data collected from respondents were analysed using descriptive and inferential statistics. The results showed that the mean age of respondents was 42 years for beneficiaries and 45 years for non-beneficiaries, respectively, with an average educational level of 12 years for beneficiaries and 6 years for non-beneficiaries. The farming experience averaged 14 and 18 years for beneficiaries and non-beneficiaries, respectively. The average number of extension contacts was 12 times per year for beneficiaries and once per year for non-beneficiaries. The net farm income showed that the IFAD-VCDP beneficiaries had a total revenue of ₦1,765,918 and a total cost of ₦457,846, resulting in a gross margin of ₦ 1,308,072. For the non-beneficiary, the total revenue was ₦1,065,456, the total cost was ₦497,031, and the gross margin was ₦568,425. On average, IFAD-VCDP beneficiaries and non-beneficiaries made an NFI of ₦1,308,070 and ₦568,425, respectively, per hectare of rice

production. The results also revealed that IFAD-VCDP rice farmer beneficiaries had an average yield of 3.83 tons/ha, while non-beneficiaries had an average yield of 2.26 tons/ha. The results further revealed an average annual income of ₦3,014,385 for the beneficiaries and ₦1,302,135 for the non-beneficiaries, respectively. As a result of the impact of the programme on the target beneficiary, the study recommended the need to extend IFAD-VCDP intervention to cover all other rice-producing LGAs in the State, ensuring that more farmers benefit from the intervention.

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Keywords: Beneficiary, IFAD-VCDP, Impact, Net Farm Income, Non-beneficiary, Yield.

INTRODUCTION

The International Fund for Agricultural Development (IFAD) is a specialised agency of the United Nations (UN) established in 1977 as one of the major outcomes of the 1974 World Food Conference. It was resolved at the conference that an international institution be established immediately to finance agricultural development projects, primarily for food production in developing countries. The institution would focus on alleviating the poverty of rural dwellers through investment in farming activities, as agriculture is seen in developing countries as a sector with viable potential to move the rural poor out of poverty and with the capacity to feed the world. In Sub-Saharan Africa, for instance, maximising the potential of agriculture would yield faster growth in reducing poverty than investment in other sectors (IFAD, 2014).

The International Fund for Agricultural Development (IFAD) has, over the years, undertaken interventions in the rice value chain in Nigeria through its Value Chain Development Programme (VCDP). VCDP is a six-year programme of the Federal Government of Nigeria funded by the International Fund for Agricultural Development (IFAD). The programme aims to improve the yield and food security of poor rural households engaged in the production, processing and marketing of rice and cassava on a sustainable basis. VCDP was initially implemented in six states: Anambra, Benue, Ebonyi, Ogun, Niger, and Taraba. As a result of the programme's success, VCDP received additional funding in 2019 for expansion into three states: Kogi, Nasarawa, and Enugu, making a total of nine participating states in the Additional Financing 1 (AF1) phase of the programme (Sallawu *et al*., 2019). Nasarawa State is one of the states in Nigeria that is benefiting from this intervention. The programme started in 2020. The Fund covered five (5) out of the 13 Local Government Areas in the State (Doma, Lafia, Wamba, Nasarawa and Karu). The programme

strongly emphasises the development of commodity-specific Value Chain Action Plans at the local government level, which serve as the basis for rolling out sustainable activities to reduce poverty and accelerate economic growth. The objective is to enhance rural incomes and food security in a sustainable manner.

The intervention in Nigeria is focused on value chain development because of the challenges faced by small-scale farmers, such as low productivity, poor access to markets, poor processing technology, lack of adequate information, high cost of farm inputs, inadequate credit system, the vicious cycle of poverty and the recent challenge, which seem formidable, climate change (IFAD, 2013). The partnership between IFAD and the Federal Government of Nigeria focuses on small-scale farmers of cassava and rice, recognising the potential economic value of these crops. IFAD adopted the value chain approach to enhance productivity, promote agro-processing, and access to markets and opportunities, facilitating improved engagement between the private sector and farmers' organisations. The programme, through commodity-specific value chain action plans (VCAP) at different local governments in the participating states engages with actors along the chain; producers, processors, marketers and their farmer organisations as well as public and private institutions, service providers, policy and regulatory environment to deliver relevant and sustainable activities that would lead to gradual transformation of the sector and contribute to achieving food security, and expanding income-generating activities and employment opportunities (Enenchi, 2021).

The goal of the programme according to Sallawu *et al*. (2019) is to reduce poverty among the rural dwellers, increase food security and accelerate economic growth on a sustainable basis. The specific programme development objectives are to: (i) increase incomes and food security of poor rural households engaged in production, processing and marketing of rice and cassava in the targeted LGAs are enhanced on a sustainable basis. (ii) develop agricultural market access for smallholder farmers and small to medium-scale agro-processors. (iii) enhance smallholder productivity through the adoption of improved practices, thus increasing the volume and quality of marketable produce by strengthening farmers' organisations as well as supporting smallholder production.

Since the commencement of the IFAD-VCDP programme in Nasarawa State in 2020, there have been limited empirical studies examining the impact of IFAD-VCDP on the Net Farm Income of beneficiaries. It is also not ascertained if there is any significant difference in the yield and

income level of beneficiary compared to non-beneficiary rice farmers in Nasarawa state. The scarcity of these vital findings poses serious research gaps that need to be filled. This study was therefore designed to fill these identified research gaps.

The objectives of the study were to:

1. Describe the socioeconomic characteristics of IFAD-VCDP beneficiary and non-beneficiary rice farmers in the study area.
2. Estimate the Net Farm Income of IFAD-VCDP beneficiary and non-beneficiary rice farmers in the study area;
3. Determine the yield and income of IFAD-VCDP beneficiary and non-beneficiary rice farmers in the study area.

Statement of the Hypothesis

The hypothesis for this study stated in the null form is:

Ho1: There is no significant difference in the yield and income of IFAD-VCDP beneficiary and non-beneficiary rice farmers in the study area.

Ho2: There is no significant difference in the gross margin of IFAD-VCDP beneficiary and non-beneficiary rice farmers.

METHODOLOGY

The study area

The study was conducted in Nasarawa State, Nigeria. Nasarawa State is situated in the central part of the Middle Belt region of Nigeria. The State lies between latitudes 70°45' and 90°25' North of the equator and longitudes 70 ° and 90°37' East of the Greenwich meridian. It lies within the Guinea Savanna region and has a tropical climate. The State shares a boundary with Kaduna State to the North, Plateau State to the East, Taraba and Benue states to the South, and Kogi and the Federal Capital Territory to the West. The State is made up of thirteen Local Government Areas. The major tribes in the states are Afo, Agatu, Alago, Arum, Bassa, Berriberi, Ebira, Eggon, Fulani, Gade, Gbagi, Gwandara, Hausa, Kantana, Kulere, Mada, Migili, Nandu, Nyankpa, Rindre, and Tiv, among others (NADP, 2024).

The State has a climate typical of the tropical zone. It has an average temperature of 28.4 0C. Rainfall varies from place to place, with an annual average ranging from 1100 mm to 2000 mm. The State is characterised by two distinct seasons: a dry season and a rainy season. Rain falls between April and October, while the dry season starts from November to early March. The State is composed of plains and hills, reaching elevations of up to 300ft above sea level at specific points. Agriculture is the dominant source of livelihood. Mixed farming is widely practised. The State is well-suited for the production of a wide variety of crops, including rice, yams, cassava, sorghum, maise, millet, cowpeas, tomatoes, sesame, groundnuts, and bananas. Permanent tree crops planted by the farmers include orange, mango, cashew, oil palm, and guava. Farmers in the area also keep livestock such as goats, sheep, pigs, cattle, and poultry (NADP, 2024).

Sampling procedure and sample size

A multistage sampling technique was used to select the respondents for this study.

Stage 1: Three out of five participating IFAD-VCDP LGAs were selected, one from each of the state's agricultural zones, using purposive sampling. This includes Doma from the Southern Agricultural Zone, Wamba from the Central Agricultural Zone, and Karu from the Western Agricultural Zone.

Stage 2: This involves the purposive selection of four communities in each of the three selected LGAs. This was due to high participation in VCDP activities under IFAD. This resulted in a total of 12 communities being used for the study.

Stage 3: A comprehensive list of IFAD-VCDP participating farmers from the selected communities was obtained during a preliminary survey. The data indicate that a total of 750 registered IFAD-VCDP farmers were present in the selected communities of Nasarawa State. (Nasarawa State IFAD-VCDP Office, 2024).

The Taro Yamane formula was applied to calculate the representative sample size from the total population of 750 beneficiaries of IFAD-VCDP in the three selected LGAs of Nasarawa state. This was because it provides a sample size that is sufficient to accurately represent the population. Through this formula, a sample size of 260 rice farmers was selected for the study. Bourley's proportional distribution was used to determine the number of participating rice farmers in each community. Selection of 34.6 % (As determined by Bourley's formula) of the beneficiaries of

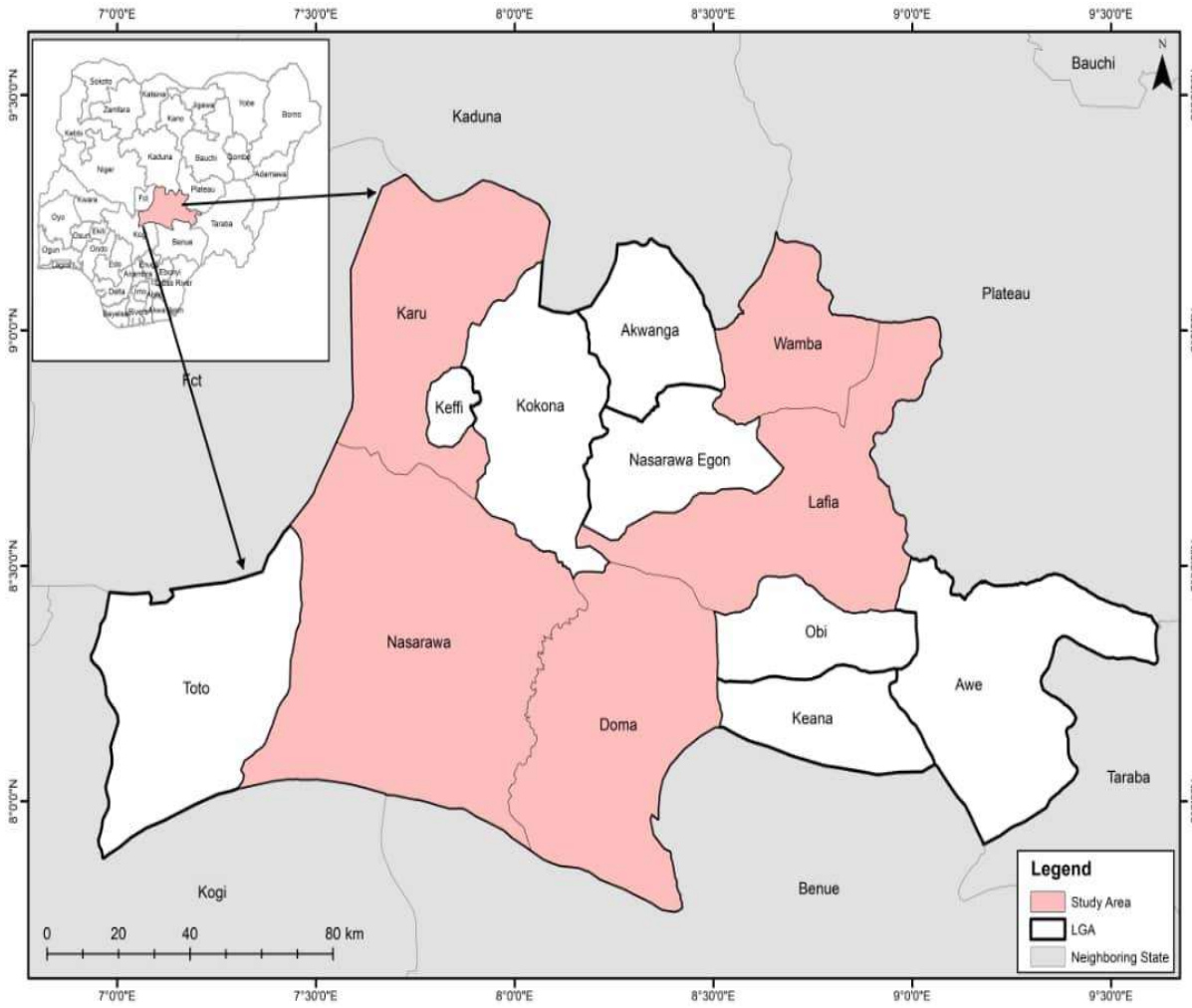

Figure 1: Map of Nasarawa State showing the IFAD-VCDP participating LGA.

IFAD-VCDP from each of the twelve (12) selected communities using a simple random sampling method by balloting. This totals 260 participating rice farmers. To have accuracy and not to introduce bias in the evaluation, an equal number (260) of non-beneficiaries of IFAD-VCDP rice farmers were also randomly selected, giving a total of 520 farmers who served as the respondents for the study.

Taro Yamane formula

$n = N/1+N(e)^2$

Where ,

n = the required sample size from the population under study

N = the whole population under study

e = the precision or sampling error which usually 0.05

Bourley's proportional distribution formula:

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

Where,

n_h= sample size for the stratum h

N_h= population size for the stratum h

N= total population

n = total sample size

Table 1: Sample outlay of IFAD-VCDP beneficiary and non-beneficiary rice farmers in the study area.

LGA	Community Beneficiary	Number of Selected (34.6 %)	Sample Selected	Non-beneficiary
Doma	Rutu	75	26	26
	Doma	82	28	28
	Iwashi	77	27	27
	Yelwa	52	18	18
	Total	**286**	**99**	**99**
Karu	Karu	71	24	24
	Panda	68	24	24
	Karshi	63	22	22
	Gitata	46	16	16
	Total	**248**	**86**	**86**
Wamba	Wamba	61	21	21
	Sisimbaki	55	19	19
	Gbude	53	18	18
	Mararaba	47	16	16
	Total	**216**	**75**	**75**
Total	**12**	**750**	**260**	**260**

Source: Nasarawa State IFAD-VCDP, 2024

Method of data collection

Primary data were used for the study. The data were collected using a structured interview schedule, which was administered to the sampled respondents. The data collected include the socio-economic characteristics of IFAD-VCDP beneficiary and non-beneficiary rice farmers, as well as the net farm income of IFAD-VCDP beneficiaries and non-beneficiaries, and the yield and income of IFAD-VCDP beneficiaries and non-beneficiaries in the study area.

Method of data analysis

The data obtained were analysed using both descriptive and inferential statistics. Descriptive statistics, such as frequency, percentage, and mean scores, were used for the study.

Model Specification

Z - statistics

Z-statistics were used to test whether there are significant differences in the yields and income among IFAD-VCDP beneficiary and non-beneficiary:

Z-value was calculated using the formula below:

$$Z = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where,

m1 = mean of beneficiary,

m2 = mean of non-beneficiary,

sd1 = standard deviation of beneficiary,

sd2 = standard deviation of non-beneficiary,

n1 = number of beneficiaries and

n2 = number of non-beneficiaries.

Net farm income

Net farm income was used to assess the profitability of rice production among IFAD-VCDP beneficiary and non-beneficiary rice farmers.

The net farm income model was expressed as follows:

GM = TR – TVC

NFI = GM - TC

Where:

GM = Gross Margin (₦/ha)

NFI = Net Farm Income (₦/ha)

TR = Total Revenue (₦/ha)

TC = Total Cost (₦)

TVC = Total Variable Cost (₦)

TFC = Total Fixed Cost (₦)

TC = TVC+ TFC

RESULTS AND DISCUSSION

Socioeconomic characteristics of IFAD-VCDP beneficiaries and non-beneficiaries

Table 2 shows that the majority of IFAD-VCDP beneficiaries (48.08%) were within the 40-59 years age range, 37.31% were aged 20-39 years, 10.38% were 60 years and above, while 4.23% were under 20 years. For non-beneficiaries of the IFAD-VCDP intervention, 64.23% of the respondents were within the age range of 40-59 years, 19.61% were within the age range of 20-39 years, 11.15% were 60 years and above, and 5.00% were less than 20 years. The mean age of beneficiary rice farmers was 42, and that of non-beneficiary rice farmers was 45 years. This implies that most rice farmers were middle-aged, resourceful, and energetic during their economically active years. The results on sex showed that 53.08% of the IFAD-VCDP beneficiaries were male and 46.92% were female, while for the non-beneficiaries, 59.62% were male and 40.38% were female. The study also revealed that 37.31% of the IFAD-VCDP beneficiaries had a secondary school education, 30.00% attended tertiary education, 22.31% had primary education, and 10.38% had no formal education. For the non-beneficiaries, the results

showed that 34.23% had no formal education, 33.84% had primary education, 24.62% attended secondary school, and 7.31% participated at the tertiary level. The average educational level of the beneficiary was 12 years, while that of the non-beneficiary was 6 years. These results were similar to those of Dooember ***et al.*** (2020) in their study, which reported that the majority (43.1%) of the IFAD-VCDP beneficiaries had a secondary school education in Yewa North and Ijebu North-East, Ogun State, Nigeria.

Regarding household size, 85.38% of the beneficiaries had fewer than 5 members in their household, and 14.62% had more than 5 persons. For the non-beneficiaries, 58.85% had 5-10 persons actively participating in rice production, 40.77% had fewer than 5 persons, and 0.38% had more than 10 persons actively participating. The beneficiary had an average household size of 3 persons, while the non-beneficiary had an average household size of 5 persons. These results show that the non-beneficiaries had larger household members in rice work than the beneficiaries of IFAD-VCDP. The size of a household directly affects the labour supply for farming, as larger households can provide more labour for rice production. A larger household size is believed to provide cheap labour that assists in rice production activities (Omoare and Oyendiran, 2017). The findings in Table 2 also showed that 74.62 % of the beneficiaries had 10-19 years of experience, 13.46 % had 1-10years of experience, 7.31 % had 20-29 years of experience, 3.46 % had 30-39 years of experience, and 1.15 % had more than 40 years of rice farming experience. For the non-beneficiaries of the IFAD-VCDP intervention, 49.23% had 20-29 years of experience, 41.92% had 10-19 years of experience, 8.46% had less than 10 years of experience, and 0.38% had more than 40 years of experience in rice farming. The average number of years of experience in rice production was 14 years for the beneficiaries and 18 years for the non-beneficiaries, respectively. Results from the extension contact survey showed that 100.00% of the beneficiaries had contact with extension agents in a year, and 42.31% of non-beneficiaries had access to extension agents in the same period. This implied that 57.69% of non-beneficiaries did not have access to extension agents. Regarding the number of contacts with extension agents, 68.46% of the beneficiaries had between 10 and 20 contacts in a year, 19.23% had fewer than 10 contacts in a year, and 12.31% had more than 20 extension contacts in a year. For IFAD-VCDP non-beneficiaries, 57.69% had fewer than 5 contacts in a year, and 2.31% had more than 5 contacts. The average number of extension contacts was 12 times per year for the beneficiary and once for the non-beneficiary. The

results showed that beneficiaries of IFAD-VCDP had better access to extension agents than non-beneficiaries.

Furthermore, the results showed that all (100%) of the IFAD-VCDP beneficiary rice farmers were members of cooperative societies. In comparison, 52.69% of the non-beneficiary rice farmers did not belong to any farming associations. The average years of membership for the cooperative association were 7 and 2 for beneficiaries and non-beneficiaries, respectively. This showed that IFAD-VCDP beneficiaries had more years of membership in cooperative associations compared to non-beneficiaries, likely due to the programme requirement of membership in a cooperative association to qualify for IFAD-VCDP benefits. It implies that as rice farmers become involved in cooperative societies/associations, it increases their chances of participating in the IFAD Value Chain Development Programme.

Net farm income of rice production among IFAD-VCDP beneficiaries and non-beneficiaries

The various costs incurred for the resources used and the benefits (profit) received from the sales of the products were estimated based on the market price during the period under consideration (2024/2025 farming season) and are presented in Table 3. These include the cost of seed per hectare, the cost of agrochemicals per hectare, the cost of fertiliser per hectare, the cost of transportation, and the cost of labour. The production costs incurred were both variable and fixed costs, as shown in Table 3. The costs and returns of the two groups of farmers were analysed using gross margin (GM).

The results in Table 3 indicated that the gross margin for IFAD-VCDP beneficiary rice farmers was ₦1,386,093 per hectare, while the non-beneficiary rice farmers obtained ₦670,275 per hectare. This was obtained by subtracting the total variable costs (TVC) from the total gross revenue. The total variable costs were obtained by the summation of the average price of seeds, pesticides, herbicides, fertilisers, labour and transportation separately for both IFAD-VCDP

Table 2: Socioeconomic characteristics of IFAD-VCDP beneficiary and non-beneficiary rice farmers.

Characteristics	Freq.	Percent	Mean	Freq.	Percent	Mean
	Beneficiary			Non-Beneficiary		
Age						
Less than 20	11	4.23	**42 years**	13	5.00	**45 years**
20-39	97	37.31		51	19.61	
40-59	125	48.08		167	64.23	
61 above	27	10.38		29	11.15	
Sex						
Male	138	53.08		155	59.62	
Female	122	46.92		105	40.38	
Education level						
No formal education	27	10.38	**10 years**	89	34.23	**6 years**
Primary	58	22.31		88	33.84	
Secondary	97	37.31		64	24.62	
Tertiary	78	30.00		19	7.31	
Household size						
1-5	222	85.38	**3 persons**	106	40.77	**5 persons**
6-10	38	14.62		153	58.85	
11 and above	0	0.00		1	0.38	
Farm size						
<1	0	0.00	**2.7 ha**	15	5.77	**1.9 ha**
1-4	228	87.69		245	94.23	
5 and above	32	12.31		0	0.00	
Farming experience						
Less than 10	35	13.46	**14 years**	22	8.46	**18 years**
10-19	194	74.62		109	41.92	
20-29	19	7.31		128	49.23	
30-39	9	3.46		1	0.38	
40 and above	3	1.15		0	0.00	
Access to credit						
Yes	126	48.08		27	10.38	
No	134	51.12		233	89.62	
Extension visits						
1-10	50	19.23	**12 times**	104	40.00	**1 time**
10-19	178	68.46		0	0.00	
20 and above	32	12.31		0	0.00	
Cooperative Membership						
Member	260	100.0		123	47.31	
Not member	0	0.00		137	52.69	

Source: Field Survey, 2025

beneficiary and non-beneficiary rice farmers. The results show that the estimated total revenue realised by the IFAD-VCDP beneficiary rice farmers was ₦1,765,918, while the revenue obtained by the non-beneficiary rice farmers was ₦1,065,456.

The results in Table 3 further show that the total variable cost incurred by the IFAD-VCDP beneficiary rice farmers was ₦379,825. The non-beneficiary rice farmers incurred a total variable cost of ₦395,181. The total fixed cost incurred by the IFAD-VCDP beneficiary and non-beneficiary rice farmers was ₦78,021 and ₦101,850, respectively. The total revenue was obtained by multiplying the average price (p) by the average quantity of output (q). The net farm income was calculated by subtracting the average total fixed cost from the average gross margin. The IFAD-VCDP beneficiary rice farmers had a net farm income of ₦1,308,070, while the non-beneficiary rice farmers had ₦568,425.

The gross margin ratio for IFAD-VCDP beneficiary and non-beneficiary rice farmers was 78.50% and 62.90%, respectively. This implies that for every ₦1 of revenue generated from rice farming, beneficiaries retain ₦0.7850 and non-beneficiaries retain ₦0.6290 as gross profit after covering the operating costs. This implies that both IFAD-VCDP beneficiary rice farmers and the non-beneficiary rice farmers made a profit from the rice enterprise. Hence, rice farming is a profitable enterprise. However, IFAD-VCDP beneficiary rice farmers made more profit compared to the non-beneficiary rice farmers. This may be due to the incentives given to IFAD-VCDP beneficiary rice farmers. This finding is similar to that of Iordekighir ***et al.*** (2025), who also reported the gross farm income per hectare before the IFAD-VCDP intervention to be ₦551,007.20. After the intervention, it stood at ₦1,046,217.72. This shows a significant increase (difference) of ₦495,210.52 after the intervention, implying that the rice farmers in the study area earned more income as a result of participating in the programme. Similarly, Alabi ***et al.*** (2024) also reported that the gross margin ratio for programme beneficiaries and non-beneficiaries was 74% and 60%, respectively. This implies that the profitability of IFAD-VCDP beneficiary rice farmers was higher compared to non-beneficiaries in Niger State.

Table 3: Net farm income of one hectare of IFAD-VCDP beneficiary and non-beneficiary rice farmers

Items	Beneficiary Unit Price (₦)	Quantity	Amount (₦/ha)	Non-Beneficiary Unit Price (₦)	Quantity	Amount (₦/ha)
Revenue(R)			**1,765,918**			**1,065,456**
Variable Costs						
Seed	386/Kg	30 Kg	11,580	366 Kg	30 Kg	10,980
Herbicide	2840/L	9 L	25,560	3,691 /L	7 L	25,837
Fertilizer	518 /Kg	253 /Kg	131,054	539 /Kg	218 Kg	117,502
Pesticide	2510/L	4 L	10,040	3,209/L	3 L	9,627
Labour	2039/Manday	89Manday	181,471	2,397/Manday	88Manday	210,936
Transportation	20120	1	20,120	20,299	1	20,299
Total variable cost (TVC)			**379,825**			**395,181**
Gross Margin (R-TVC)			**1,386,093**			**670,275**
Fixed Cost (FC)						
Machineries	35,181	1	35,181	55,850	1	55,850
Rent on Land	42,840	1	42,840	46,000	1	46,000
Total Fixed Cost (TFC)			**78,021**			**101,850**
Total Cost (TC)			**457,846**			**497,031**
Net Farm Income (GM-TFC)			**1,308,070**			**568,425**
Gross Margin Ratio (GMR) = GM x 100 R			**78.50 %**			**62.90 %**

Source: Field Survey, 2025

Yield and income of IFAD-VCDP beneficiary and non-beneficiary rice farmers

Yield is a critical indicator of agricultural productivity among the IFAD-VCDP beneficiary and non-beneficiary rice farmers. The results on rice yield obtained by the respondents are presented in Table 4. The results showed that 46.54 % of the beneficiary had yield of 3.1 to 4.0 tons/ha, 25.38 % had yield of 2.1 to 3.0 tons/ha, 18.46 % had yield of 4.1 to 5.0 tons/ha, 6.15 % had yield of 1.1 to 2.0 tons/ha, 1.92 % had yield of 1.0 tons/ha and below, 1.54 % had yield of 5.0 tons/ha and above. The results for IFAD-VCDP non-beneficiary revealed that 40.38 % had yield of 2.1 to 3.0 tons/ha, 30.00 % of the non-beneficiary had yield of 1.1 to 2.0 tons/ha, 17.31 % had yield of 3.1 to 4.0 tons/ha, 7.31 % had yield of 1.0 tons/ha and below and 1.15 % had yield of 5.0 tons/ha and above. The average yield for IFAD-VCDP beneficiaries and non-beneficiaries was 3.83 tons/ha and 2.26 tons/ha, respectively. From this result, it is evident that the IFAD-VCDP intervention had a positive impact on beneficiary yield, resulting from the adoption of good agronomic practices, such as improved seed varieties, timely transplanting, fertiliser and herbicide application, and support services. This research aligns with the findings of Oruonye *et al.* (2021), who reported higher yields among beneficiaries of the IFAD-VCDP programme both before and after the intervention in Taraba State.

Ho1: Since the calculated Z-value (3.627) was greater than the tabulated Z-value (1.96) at $P<0.05$, the null hypothesis was rejected, and it was concluded that there was a significant difference in the mean yield of IFAD-VCDP beneficiary and non-beneficiary rice farmers. This suggests that the IFAD-VCDP intervention had a significant impact on rice farming in the study area.

The results in Table 4 further show that among the IFAD-VCDP beneficiary rice farmers, 42.69 % had income of ₦1,000,000-₦1,900,000, 31.18 % of the respondents had income of ₦2,000,000-₦2,900,000, 14.62 % of the respondents had income of less than ₦1,000,000, and 11.54 % had income of ₦3,000,000 and above. The response on income of non-beneficiary of IFAD-VCDP intervention indicates that majority (51.15 %) of the respondents had income of ₦1,000,000-₦1,900,000, 37.69 % of the respondent had income of less than ₦1,000,000, 9.62 % of the non-beneficiary of IFAD-VCDP intervention programme had income of ₦2,000,000-₦2,900,000 and 1.54 % of the respondents had income of ₦3,000,000 and above. This finding aligns with Abdullahi's (2016) study, which reported that the respondents' income before the IFAD-VCDP intervention was poor compared to their income after the intervention, as indicated by an increase in the number of bags harvested and a corresponding rise in income in Niger State,

Nigeria. The finding was also similar to Adi *et al.* (2020), who reported a significant difference between the yields and income of the beneficiary before and after joining the IFAD-VCDP in Taraba State, Nigeria, with a yield difference of 4.10 tons after the programme, and their income changed from ₦259,891.30 to ₦597,989.14 before and after the programme. This indicates that IFAD-VCDP has had a positive impact on the livelihoods of farmers in the study area.

Ho1: Since the calculated Z-value (13.31) was greater than the tabulated Z-value (1.96) at P<0.05, the null hypothesis was rejected, and it was concluded that there was a significant difference in the mean income of IFAD-VCDP beneficiaries and non-beneficiary rice farmers.

Table 4: Yield and Income of IFAD-VCDP Rice Farmers Beneficiary and Non-Beneficiary in Nasarawa State

Yield

Yield (Tons/ha)	Frequency Beneficiary	Percent	Mean	Frequency Non-Beneficiary	Percent	Mean
1.0 and below	5	1.92	**3.83**	19	7.31	**2.26**
1.1 to 2.0	16	6.15		78	30.0	
2.1 to 3.0	66	25.38		105	40.38	
3.1 to 4.0	121	46.54		45	17.31	
4.1 to 5.0	48	18.46		10	3.85	
5.1 and above	4	1.54		3	1.15	
Calculated Z-value		**3.627**				
Tabulated Z-value		**1.96**				
P<0.05						

Income

Income (₦)	Freq Beneficiary	Percent	Mean	Freq Non-Beneficiary	Percent	Mean
Below 1000000	38	14.62	2,844,230	98	37.69	
1,325,673						
1000000-19000000	81	31.18		133	51.15	
2000000-29000000	111	42.69		25	9.62	
3000000 and above	30	11.54		4	1.54	
Calculated Z-value		**13.31**				
Tabulated Z-value		**1.96**				
P<0.05						

Source: Field Survey, 2025

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CONCLUSION AND RECOMMENDATIONS

The study's findings revealed that the IFAD-VCDP intervention had a positive impact on rice farming in the study area. The results of the Z-statistic indicate a significant difference in the yield and income of rice farmers who benefited from the IFAD-VCDP compared to those who did not.

The research also showed that rice production was a profitable venture for both IFAD-VCDP beneficiaries and non-beneficiaries. However, the programme had a significant positive impact on the profitability of the beneficiary rice farmers. Based on the findings of the study, it was recommended that;

1. IFAD/FGN need to expand the programme to reach all other rice-producing LGAs in the State, ensuring that more farmers benefit from the programme.
2. The State and Federal governments should complement the efforts of IFAD-VCDP by initiating and executing similar value chain development programmes aimed at enhancing rice yield and income in Nasarawa State, in particular, and Nigeria at large

REFERENCES

Abdullahi, A. J., Atala. T. K., Akpoko. J. G. & Sanni, S. A. (2016). Factors influencing development project in *Katsina State. Journal of Agricultural Extension*. 19 (2):93-105.

Adi, S. S., Simon, B. P., & Aminu, S. (2024). Impact of Value Chain Development Programme (VCDP) on the farmers in Ardo-kola Local Government Area of Taraba State, Nigeria." IOSR *Journal of Agriculture and Veterinary Science*, 13(3), 08-11.

Alabi, O. O., Sunday, G. A., Ebukiba, E. S., Aluwong, J. S., & Atteh, P. A. (2024). Economic impact analysis of Value Chain Development Programme (VCDP) on net farm income of rice farmers in Niger State, Nigeria. *Manas Journal of Agriculture Veterinary and Life Sciences*, 14(1), 54-63.

Dooember, V. I. Olawale. O and David. O. (2020). Effect of value chain development programme (VCDP) on income and food security of rice farmers in North and Ijebu North-East, Ogun State, Nigeria. Retrieved https://infoguidenigeria.com.on 20/12/2024

Enenchi, T. & Ojiagu, N (2021). International Fund for Agricultural Development (IFAD)value chain development programme and rice yield: A study of members of ricefarmers cooperative in Anambra State. Nigeria. *International Journal of Academic Management Science Research*. 5(8): Pp. 76-86.

International Fund for Agricultural Development (2013), Improving young rural women's and men's livelihoods, the most sustainable means of moving to a brighter future. Paper Review published in Center for Alleviation of Poverty through Sustainable Agriculture (CAPSA) Newsletter. (31): 1:9. April 2014.

International Fund for Agricultural Development (2014). IFAD Fund for Value Chain Development Programme to link small farmers to markets in Nigeria. www.ifad.org/newsroom/press_release/past/tags/y2014/1901910.

International Fund for Agricultural Development (2024) Value Chain Development Programme (VCDP) Supervision report. Main report and apprentices. West Cnetral Africa Division Programme Management Department. Obtained on 25-09-2024 from Nasarawa State IFAD-VCDP head office.

Iordekighir, A. A; Biam, C. K; Abu, G. A, & Ezihe J.A.C (2025) Economic impact of IFAD-Value Chain Development Programme on rice farmers in North Central Zone, Nigeria. *Applied Science Environment and Management,* 29 (1) 71-77

Omoare, A.D. and Oyendiran, W.O. (2017) Assessment of factors affecting rice value chain (RVC) in Ogun and Niger States. *Global Journal of Agricultural Research*.5(4) 43 - 59.

Oruonye, E. D., Tukura Ejati Danladi, J. M. & Wilson-Osigwe, M. U. (2021) The impact of IFAD-value chain development programme to rice yield and income among smallholder farmers in Ardo-Kola LGA, Taraba State, Nigeria. *Journal of Agricultural Science and Food Technology*, 7(4): 66-74.

Sadiq, M. S., Singh, I. P. & Ahmad, M. M. (2020). Resource use efficiency of rice farmers participating in value chain development programme (VCDP) in Niger state of Nigeria. *Economic Affairs*, 65(2): 129-136.

Sallawu, H., Nmadu , J. N., Coker , A. A. A. & Mohammed , U. S. (2016). Expolatory Analysis of Constraints to Livelihood Diversification among IFAD-VCDP Farmers in Benue State, Nigeria. *Asian Journal of Agricultural Extension, Economics & Sociology,* 11(4), 1-11.