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Effect of International Fund for Agricultural Development–Value Chain Program (IFAD-VCP) on Rice Output of Cooperative Farmers in South East Nigeria

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ABSTRACT

The paper assessed the effect of International Fund for Agricultural Development - Value Chain Development Program (IFAD-VCDP) on rice output among cooperative farmers in Southeast Nigeria. The objectives were to evaluate the program interventions in access to training and market and their effects on rice output. The research design adopted is descriptive survey. The population was 16,989 cooperative rice farmers in 19 local government areas across Anambra, Enugu and Ebonyi states where rice farming activities are being carried out. 391 farmers were selected using Taro Yamane and Bowler's formulae. Data were collected through a five-point Likert type structured questionnaire while hypotheses were tested using the Panel Least Squares Regression Model with the aid of E- Views 10. Findings showed that regular workshops on innovative planting techniques, training on safe and effective agrochemical application, leveraging information technology for farm management, operation of agricultural machinery and equipment maintenance, and extension services on sustainable farming practices ($P < 0.05$), all significantly enhanced rice output. Also providing timely market trends and updates through workshops, investing in modern storage facilities, improving market infrastructure in collaboration with local authorities, and establishing partnerships with reliable off takers ($P < 0.05$) significantly enhanced rice output. However, improved transportation facilities ($P > 0.05$) did not have a significant effect on rice output. The study recommended among others that cooperative professionals and extension officers should develop sustainable training programs for continuous improvement of knowledge and skills of cooperative farmers and provide timely market information, market services improvement and stabilization to mitigate market risks and losses experienced by farmers.

INTRODUCTION

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 the most important because it constitutes the staple food in Asia, America, Europe and Africa and it is more consumed in the urban centres where evidence of rising level of income is more prominent (Lang & Fulain,2019).

The market for rice in Nigeria is large and characterized by a persistent supply gap because of low rice output. (Akpokodje, 2023). In Nigeria rice has consumption per capita of 32kg indicating 4.7% increase in the past decade making the total consumption to be 6.4 million tons in 2017 as against 3.7 million tons produced per year (Erhie *et al.*, 2018). Government resorted to importation of

milled rice to bridge the gap between domestic demand and supply. The quantity imported on an annual basis was over 300 thousand tons and given the precarious balance of payment position of the country especially in the late 1980s, rice importation became a major source of concern (Akpokodje, 2023). The study 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 on rice importation. In an attempt to boost rice production and meet the increasing demand, the Nigeria federal government allocated 1.5 billion Naira for certified seeds multiplication and distribution to rice farmers. Significant improvement in rice production in Nigeria occurred in 1980s when output increased to 1 million tons while area cultivated and yield rose to 550 thousand hectares and 1.98 tons per hectare respectively (Ahmadu 2020). However, rice importation began to decline in 1980s as a result of measures put in place to check the importation of the commodity. Throughout the 1980s rice output and yield increased but in 1990s, the yield of rice declined. In the year 2000 out of about 25 million hectares of land cultivated to various crops only about 6.37% was cultivated to rice. During this period the average national yield was 1.47 tons per hectare (Adewale, 2021). This created another cycle of supply gap in rice. It has been reported that the country spent over 356 billion Naira on the yearly importation of rice, out of which 1 billion Naira is used per day (Oyediran, 2019).

The production, processing, marketing and consumption of rice are moving towards high-value food products. The changes are creating opportunities as well as challenges in production, processing and marketing dynamics (Birthal, 2022). Rice farmers in Nigeria especially those in the South East face a lot of challenges from cultivation through processing to marketing of rice such as inadequate financial support, limited access to productive assets, lack of access to farm inputs, paucity of opportunities for value addition, inadequate support services such as extension services and research, inability to access rural financial services, inadequate markets and rural infrastructure. On the production side, rice farmers lack access to land, quality seedlings, modern farm machineries, agrochemicals, fertilizers and poor knowledge of modern farming techniques. At the stage of processing, processors lack access to the state of art facilities to process the paddy into a finished product while the marketers lack adequate market facilities, feeder roads, transport facilities, market information and very low access to finance or credit facilities to buy, store and distribute rice output. (Abubaka, Umar, Gbanguba, Dauda, Garba, Hamisu & Abubakar, 2023).

An increase in rice output will enhance food security, higher income and unemployment reduction, which indirectly leads to an increase in the value of rice through the rice value chain. This has been the target of the Nigerian government (whose economy is characterized by high unemployment, poverty and food insecurity) over the years. In an effort to further boost agricultural production of Nigerian farmers, Nigerian government through the Federal Ministry of Agriculture and Rural Development (FMARD) in 2014 accepted the need for the country to partner with institutions, private investors and farmer groups in order to develop end to end value chain solutions. This resulted in the establishment of International Fund for Agricultural Development-Value Chain Development Program (IFAD-VCDP) in Nigeria.

The partnership between IFAD and the Federal Government of Nigeria introduced innovations into farming as there was a focus on rice and cassava smallholder farmers, knowing the potential economic value of these staple crops if every challenge is removed from planting through harvesting to consumption. These chains will receive facilitated movement support as they make deep commitments to engaging new generation of farmers, improve supply of specialized fertilizers and protection chemicals, as well as wider scale use of high yielding seeds. The IFAD rice value chain development program which started operating fully in Nigeria in the year 2015 strongly emphasizes the development of commodity-specific Value Chain Action Plans at the local

government level, which serves as the basis for rolling out sustainable activities to enhance food production, reduce poverty and accelerate economic growth. The objective is to sustainably enhance rural incomes and food security with emphasis on rice and cassava (FMARD 2016).

The IFAD support to the Nigerian government's food security and poverty reduction program in rural areas is essentially people-centered with its target groups being the poor landless, marginal and small holder farmers in communities around the country (IFAD,2013). IFAD-VCDP intervened through the provision of farm inputs, improved market access, linkage to extension services, participation in trainings, promotion of agro-processing among others. This was seen as the way out of shortage of staple foods like rice by the Nigerian government.

The International Fund for Agricultural Development (IFAD) over the years has been undertaking interventions in the rice value-chain in nine (9) states of Nigeria through its Value Chain Development Program (VCDP). In south east Nigeria, Anambra, Enugu and Ebonyi States are among the states that are benefiting from these interventions. The choice of these South East states for the VCDP lies in their huge potentials for rice production as they have an ecological advantage in rice production due to their vast arable and fertile land network. Also, research from all regions of the federation and the agricultural sector report indicate that Anambra, Enugu and Ebonyi state are among the largest rice-producing states in the country with an annual production of 705,000 metric tons (Sanusi, Singh & Muhammad, 2023).

Based on the great potential of South East Nigeria in rice production and the huge investment in the rice value chain by IFAD, Federal and State governments in support of the laudable objectives of the VCDP to increase food output, income and access to market of the targeted farmers, it is expected that the program would have enhanced rice output in South East Nigeria over the years thereby increasing the availability and affordability of rice to the citizens. This is where an investigation into the IFAD Value Chain Development Program and rice output becomes imperative in order to assess if the IFAD-VCDP has actually led to an increase in rice output among cooperative farmers in South East, Nigeria.

Statement of the Problem

The neglect of agricultural activities has been a very serious problem affecting both producers and marketers of agricultural produce in Nigeria. In Africa, the agricultural sector provides employment for more than 80% of the population made up of mainly small scale farmers who could not produce up to 70 percent of the staple food needed by the population. In Nigeria, small scale farmers make up 85 percent of the farming population which represent 14 million households (Middelberg, 2016). The implication is that production is largely at subsistence level which could not provide enough food for the country's teeming population. The concern over the alarming rate of food shortage and the need for a boost in agricultural production as means of enhancing the living standard of the people has led to the conceptualization and implementation of various agricultural development programs including IFAD-VCDP.

This low output is assumed to be due to several challenges encountered by farmers in their farming activities. Generally, rice farmers lack access to agricultural finance and training to enable them build their capacity in modern farming techniques and innovations. On the production side, farmers lack access to land, quality seedlings, modern farm machineries, agrochemicals and fertilizers. At the stage of processing, there is lack of access to the state of art facilities to process the paddy into a finished product. Marketers on the other hand lack access to market infrastructure and facilities to buy and store rice. They equally lack access roads to convey the paddy to the market and distribute rice (Abubaka, Umar, Gbanguba, Dauda, Garba, Hamisu & Abubakar, 2023). If these challenges are not properly identified and articulated through direct involvement of the farmers and

other stakeholders, the right and adequate interventions might not be provided. This will eventually cause any program towards boosting agricultural productivity not to achieve the desired results. This is assumed to have been the reason for the failure of previous agricultural programs.

The prime motives of IFAD/VCDP program are to help cooperative farmers overcome the challenges they encounter in their farming activities, enhance the food security and the living standard of the targeted population through income enhancement by encouraging them to take advantage of value addition which means adding innovative non-farm activities to their usual and conventional core farm activities. IFAD-VCDP is anchored on technical support, training, capacity building, linking farmers with input sources, providing access to financial services and linking farmers to output markets to achieve the program program's set goals. IFAD-VCDP is expected to work with and through rice cooperative farmers in South East Nigeria to increase output of rice by increasing farmers' access to farm inputs and financial services, trainings and linkage to market for their output.

IFAD-VCD Program on rice has been in operation for about ten (10) years in South East Nigeria (2015–2024), providing interventions to smallholder farmers in farm inputs, agricultural finance, training on new agronomic practices and market enhancement along the value chain in rice production, processing and marketing. Ten (10) years is a long period of time suitable enough for IFAD-VCDP to enhance rice output over and above the demand of the teeming consumers in South East Nigeria with the excess being sold to other regions or even exported to other countries. However, it is not yet certain whether the farmers have been able to access the provided interventions and utilize them in their farming activities thereby making a paradigm shift in their scale of production and boosting output. Therefore, it is still doubtful whether the program has achieved increase in rice yield in South East Nigeria considering the level of availability and affordability of rice in the area. This situation prompted this research which aims at assessing if IFAD-VCDP interventions have enhanced rice output of cooperative farmers participating in the program in South East, Nigeria.

Objectives of the Study.

1. To examine the extent to which IFAD-VCDP intervention in access to training (capacity building) has affected rice output of cooperative farmers in South East Nigeria
2. To determine the extent to which IFAD-VCDP intervention in access to market has influenced rice output of cooperative farmers in South East Nigeria.

Hypotheses of the Study

H_{o1}: IFAD-VCDP intervention in access to training (capacity building) has not significantly affected rice output of cooperative farmers in South East Nigeria.

H_{o2}: IFAD-VCDP intervention in access to market has no significant influence on rice output of cooperative farmers in South East Nigeria.

REVIEW OF RELATED LITERATURE

The International Fund for Agricultural Development (IFAD) is a specialized 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 poverty of rural dwellers through investment in agricultural 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 (United Nations,1977).

International Fund for Agricultural Development (IFAD)-Value Chain Development Program (VCDP) has been providing interventions to enhance the output of rice among farmers. The value chain concept is known for enhancing output and has gained global attention due to its numerous impacts across different sectors of the economy. The main idea underlying the value chain framework globally is that it describes the linkages of participants and their value-creating ability that enhance the movement of goods and services from production, processing and marketing to the end users, the number and conduct of participants along the chain determine the efficiency, pricing and returns accruing to each participant at each stage (Global Value-Chain Initiative, 2021).

Sanusi, Singh and Muhammad (2023) stated that VCD program takes a holistic and demand-driven approach to addressing constraints along the rice value chains which it does through an inclusive strategy, strengthening the capacity of actors along the chain including producers and processors as well as public and private institutions, service providers, policy-makers and regulators.

Abubaka, Umar, Gbanguba, Dauda, Garba, Hamisu and Abubakar (2023), stated that VCDP seeks to reduce rural poverty, increase food security and accelerate economic growth on a sustainable basis through farmers' cooperatives.

Ogundele, Lancon, Olaf, Akande (2023) stated that these cooperatives are formed by small farmers to work jointly and thereby enjoy the benefits of large scale farming. The program utilizes a market-led approach that hinges on private sector participation to leverage investment and knowledge to drive improved productivity in rice cultivation while continuing to promote commercially oriented smallholder farming practices. IFAD-VCDP intervened through the provision improved market access, linkage to extension services, participation in trainings, promotion of agro-processing among others.

Nwafor, K., & Ezeh, E. (2021), posited that the program has provided training and capacity building for farmers, extension workers, and other stakeholders involved in the rice value chain. This includes training on modern farming techniques, post-harvest handling, marketing, and entrepreneurship skills.

FMARD (2022), posited that IFAD-VCDP supports research and development activities aimed at improving rice production technologies, developing new varieties, and addressing specific challenges faced by rice farmers in Nigeria. The program collaborates with research institutions and agricultural experts to identify and disseminate best practices in rice farming.

Agwu & Chukwu 2022, opined that in the bid to help farmers shift from their old, conventional farming practices to new ones, the program facilitates knowledge sharing and extension services to disseminate best practices, innovations, and technical know-how among rice farmers. This is done through the use of demonstration plots, farmer field schools, and information campaigns to promote the adoption of new technologies and practices. Through IFAD interventions, farmers are trained in post-harvest handling techniques, setting up small-scale processing facilities such as rice mills or threshers, and storage facilities to capture more value along the value chain.

According to Okoli & Okiwe, 2021, the program ensures that farmers have access to profitable markets for their produce as it facilitates linkages between farmers and markets, including local markets and off-takers. In partnership with state governments, rural roads and storage facilities are also provided to improve access to markets and reduce post-harvest losses.

METHODOLOGY

The research design adopted for the study is descriptive survey. The area of the study is South East Nigeria with special emphasis on the nineteen (19) local government areas in Anambra, Enugu and Ebonyi states involved in IFAD-VCDP on rice. These local government areas are eight (8) in Anambra, three (3) in Enugu and eight (8) in Ebonyi. They include; Ayamelum, Anambra East, Anambra West, Awka North, Orumba North, Orumba South, Ihiala and Ogbaru for Anambra state, Aninri, Isiuzo and Nkanu East for Enugu state and Ikwo, Ohaozara, Izzi, Afikpo South, Ohaukwu, Ezza North, Ishielu and Ivo for Ebonyi state. The choice of these areas is because rice cultivation, processing and marketing are extensively carried out there. The population of the study is 16,989 cooperative rice farmers made up of 7192, 2931 and 6866 from Anambra, Enugu and Ebonyi states respectively. A sample size of 391 respondents which comprised 166, 67, and 158 from Anambra, Enugu and Ebonyi states respectively was selected using Taro Yamane and Bowler formulae. The instrument for data collection was a structured five-point Likert-type questionnaire with a reliability co-efficient of 0.8 using Cronbach's Alpha reliability test. The five-point scale are: To a Very High Extent (VHE), To a High Extent (HE), Neutral (N), To a Low Extent (LE) and To a Very Low Extent (VLE) with their respective weights of 5,4,3,2 and 1. 391 copies of the questionnaire were administered and collected through the assistance of IFAD field officers in the various LGAs and the leaders of the cooperative farmers. Hypotheses were tested using Panel Least Squares Regression Model with the aid of E-Views 10.

The econometric models of the regression for the study are expressed as thus

Model 1: IFAD-VCDP Intervention in Access to Training (Capacity Building) and Rice Output

$$RO_i = \beta_0 + \beta_1 IPP_i + \beta_2 AA_i + \beta_3 ICT_i + \beta_4 OMME_i + \beta_5 AES_i + \varepsilon_i$$

Access to Training (Capacity Building): (IPP =Innovative Planting Practices, AA =Agrochemical Application, ICT =Information Communication and Technology, OMME =Operation and Maintenance of Machineries and Equipment).

Model 2: IFAD-VCDP Intervention in Access to Market and Rice Output

$$RO_i = \beta_0 + \beta_1 MI_i + \beta_2 MSF_i + \beta_3 ITF_i + \beta_4 MI_i + \beta_5 AO_i + \varepsilon_i$$

Access to Market: (MI =Market Information, MSF =Modern Storage Facility, ITF =Improved Transportation Facilities, MI =Market Infrastructure, AO =Assurance of Off-takers).

RESULTS AND DISCUSSION

Objective 1: Examine the extent to which IFAD-VCDP intervention in access to training (capacity building) has enhanced rice output of cooperative farmers in South East Nigeria.

Table 1: Distribution of Responses on Famers' Access to Training (Capacity Building)

S/N	Various Ways of Accessing Training	VHE	HE	N	LE	VLE
1	Knowledge of innovative planting practices has helped rice farmers to produce more	209	177	2	1	1
2	Ability to apply agrochemicals correctly has reduced farm losses	126	132	101	32	0
3	Farmers access and use of ICT has widened their knowledge on rice production	154	141	79	0	0
4	Ability to operate and maintain simple farm machineries and equipment has made rice production process easier	167	100	23	18	83
5	Services and encouragement rice farmers get from extension officers boosts their commitment to rice production	192	198	1	0	0

Source: Field Survey, 2024

Test of Hypothesis 1

H_{o1}: IFAD-VCDP intervention on access to training (capacity building) has not significantly enhanced rice output of cooperative farmers in South East Nigeria.

Accept the null hypothesis if the P-value of the output is greater than 0.05, otherwise, reject.

Table 2: Analysis of Farmer Access to Training (Capacity Building) and its significance on Rice output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IPP	0.410497	0.046095	8.905505	0.0000
AA	0.294338	0.033853	8.694639	0.0000
UICT	0.243155	0.054610	4.452543	0.0000
OMME	0.167384	0.025626	6.531804	0.0000
AES	0.126188	0.057984	2.176256	0.0301
C	0.706047	0.165895	4.255980	0.0000
R-squared	0.850597	Mean dependent var		2.460358
Adjusted R-squared	0.848657	S.D. dependent var		0.662427
S.E. of regression	0.257703	Akaike info criterion		0.141206
Sum squared resid	25.56812	Schwarz criterion		0.202107
F-statistics	438.3854	Durbin-Watson stat		0.125003

Source: Field Survey, 2024

The table 2 above presents an analysis of the effect of various IFAD-VCDP training interventions on rice output among cooperative farmers using the Least Squares method. The coefficients for each variable indicate the contribution of specific training programs to rice output. Regular workshops on innovative planting techniques (coefficient: 0.410497, p-value: 0.0000), training on safe and effective agrochemical application (coefficient: 0.294338, p-value: 0.0000), leveraging information technology for farm management (coefficient: 0.243155, p-value: 0.0000), operation of agricultural machinery and equipment maintenance (coefficient: 0.167384, p-value: 0.0000), and

extension services on sustainable farming practices (coefficient: 0.126188, p-value: 0.0301) all significantly enhance rice output. These results emphasize the importance of IFAD-VCDP training interventions in enhancing rice production among farmers, with each training area contributing positively to the overall output. Given the p-values for all variables are less than 0.05, we reject the null hypothesis for all IFAD-VCDP training interventions.

This indicates that all the specified IFAD-VCDP training interventions significantly enhance rice output among cooperative farmers. Thus, the findings support the hypothesis that access to training significantly influence rice production, with each type of training contributing to increased output. These results align with studies by Ezihe and Ezeanya (2020) and Chukwu and Umeh (2018), who found that agricultural training programs significantly enhance productivity.

Objective 2: Determine the extent to which IFAD-VCDP intervention in access to market has affected rice output of cooperative farmers in South East Nigeria.

Table 3: Distribution of Responses on Farmer's Access to Market

S/N	Various Ways of Farmer Access to Market	VHE	HE	N	LE	VLE
1	Access to real time and forecast market information to farmers at the right time has affected rice output	350	10	3	1	0
2	Provision of modern storage facilities has reduced post-harvest losses	154	178	2	57	0
3	Improved transport facilities for moving rice to buyers has increased output	134	165	79	13	0
4	Construction of properly sited, well planned, managed and retained rice markets has helped to increase rice output	49	102	86	22	2
5	The assurance that off-takers will buy their rice encourages farmers to produce more.	201	182	2	2	4

Source: Field Survey, 2024

Test of Hypothesis 2

H_{o2}: IFAD-VCDP intervention on access to market has no significant influence on rice output of cooperative farmers in South East Nigeria.

Accept the null hypothesis if the P-value of the output is greater than 0.05, otherwise, reject.

Table 4 presents an analysis of the effect of various IFAD-VCDP interventions on cooperative farmers' access to market on rice output among cooperative farmers. Each variable's coefficient measures its contribution to rice output, with corresponding standard errors, t-statistics, and p-values indicating the statistical significance of each effect. Notably, providing timely market trends and updates through workshops (coefficient: 0.485866, p-value: 0.0000), investing in modern storage facilities (coefficient: 0.159145, p-value: 0.0000), improving market infrastructure in collaboration with local authorities (coefficient: 0.133521, p-value: 0.0000), and establishing partnerships with reliable off takers (coefficient: 0.479749, p-value: 0.0000) significantly enhance rice output. However, improved transportation facilities (coefficient: 0.022624, p-value: 0.5781) does not have a significant impact on rice output, suggesting that other factors may be more crucial for market efficiency and fresher produce. These results underscore the critical role of IFAD-VCDP and farmers' cooperatives partnership in providing timely information, investing in infrastructure, and establishing stable market outlets to boost rice production among farmers. Given the p-values for most variables (except transportation logistics) are all 0.0000 (which are less than 0.05), we

reject the null hypothesis for these variables. For the variable "Improved transport facilities for moving rice to buyers," with a p-value of 0.5781 (which is greater than 0.05), we fail to reject the null hypothesis.

Table 4. Analysis of Farmer Access to Market and its significance on Rice output

Variable	Coefficient	Std. Error	tStatistic	Prob.
AMI	0.485866	0.056627	8.580089	0.0000
MSF	0.159145	0.030769	5.172305	0.0000
ITF	0.022624	0.040643	0.556651	0.5781
AMI	0.133521	0.028445	4.693951	0.0000
AO	0.479749	0.046456	10.32689	0.0000
C	1.793401	0.180083	9.958766	0.0000
R-squared	0.843500	Mean dependent var		2.457584
Adjusted R-squared	0.841457	S.D. dependent var		0.662995
S.E. of regression	0.263988	Akaike info criterion		0.189477
Sum squared resid	26.69111	Schwarz criterion		0.250612
Log likelihood	30.85323	HannanQuinn criter.		0.213713
F-statistics	412.8565	Durbin-Watson stat		0.149708

Source: E-view, 10

Thus, the researcher concludes that IFAD-VCDP interventions in access to market have significant effect on rice output of cooperative farmers in South East Nigeria, except for the improvement in transportation facilities and logistics, which does not show a statistically significant effect. The results support the findings of Okoli & Okiwe, 2021, that IFAD-VCDP interventions enhance farmers' access to profitable markets for their produce as they facilitate linkages between farmers and markets, including local markets and off-takers, provide rural roads and storage facilities in partnership with state governments and reduce post-harvest losses.

CONCLUSION

The study on International Fund for Agricultural Development-Value Chain Program (IFAD-VCP) on rice farmers' cooperatives in South East Nigeria reveals several critical factors that significantly influence rice output such as access to training, and market. These findings highlight the multifaceted approach needed to support rice farmers in South East Nigeria, emphasizing the interplay between training, and market elements in driving agricultural productivity.

RECOMMENDATIONS

The study recommends the following;

1. Extension officers should develop comprehensive educational programs aimed at improving the knowledge and skills of cooperative members with focus on modern farming techniques, effective farm management practices, and the benefits of advanced agricultural technologies to boost productivity.

2. Cooperative professionals should foster stronger collaboration among cooperative members to enhance collective bargaining power, share resources, and disseminate information on best practices. This can be facilitated through regular cooperative meetings, workshops, and the establishment of cooperative networks.

3. Government agencies, non-governmental actors, agricultural economists should invest in agricultural market infrastructure, provision of timely market information, market services improvement and stabilization to mitigate market risks and losses experienced by farmers.

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