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## Impact of Fadama III project on beneficiaries' productivity in Oyun Local Government Area of Kwara State, Nigeria

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### ABSTRACT

This study assessed the impact of Fadama III project on the beneficiaries' productivity in Oyun Local Government Area of Kwara State Nigeria. The study highlighted the socio-economic characteristics of the respondents, assessed the impact of the project on the beneficiaries and evaluated the socio-economic factors affecting the productivity level of the beneficiaries. Data was elicited from ninety two beneficiaries randomly selected from the study area. Descriptive statistics, double difference estimator and ordinary least square were used for data analysis. The result shows that majority of the respondent (66.30%) were male with the mean age of 44 years, mean household size of 6 persons, and a mean farm size of 1.75ha. On the average, farmers had been farming for 16 years, and had a mean annual income of ₦289,793.48. Sex, land ownership, extension contact and income significantly determined beneficiaries' productivity ( $P \leq 0.01$ ) in the study area. Fadama III beneficiaries recorded 24% overall increase in output for all crops produced and benefited most from tomatoes and groundnut production with about 43% and 66% increase in output respectively. Based on these findings, it is recommended that Fadama III beneficiaries (farmers) should focus more on crops with higher output - tomatoes and groundnut, in order to boost their annual income.

**Key words:** Fadama III project, beneficiaries, farmers, productivity, impact

### INTRODUCTION

Self-sufficiency in food production based only on rain-fed agriculture is difficult to achieve. This is particularly true for Nigeria. So, for self-sufficiency in food production, there is need to extend the farming season beyond the rainy season through irrigated agriculture (Rank, 2010). The huge potentials for irrigated agriculture in the Fadama and flood plain are unquestioned. According to Baba and Singh (1998), the Fadama lands have high potentials and agricultural values several times more than the adjacent upland.

Fadama development is a typical form of small scale irrigation practice characterized by flexibility of farming operations, low inputs requirement, high economic values, and minimal social and environmental impact and hence conforms to the general criteria for sustainable development (Akinbile *et al.*, 2006). To ensure that this laudable objective of self-sufficiency in food production is achieved, the Federal Government approved the implementation of the National Fadama Development Project (Bello, 2006).

Fadama is a Hausa name for flood plains and shallow aquifers found along Nigerian major river systems (Blench and Ingawa, 2004). The National Fadama Development Project (NFDP) is a Community Driven Development (CDD) project of the Federal Ministry of Agriculture and Rural Development. It is jointly funded by the Federal Government of Nigeria and the World Bank with counterpart funding by states and local governments.

The project is agricultural based that aim at increasing the income of Fadama lands and water resource users to reduce rural poverty, increase food security and empower rural communities through Fadama Community Associations (FCAs) and Fadama User Groups (FUGs) (Blench and Ingawa, 2004). The first phase of the project is popularly known as the National Fadama Development Project I (NFDP I). It was executed between the years 1993 and 1999, and focused mainly on the promotion of simple low-cost irrigation technologies in the bid to increase food production.

National Fadama Development Project II (NFDP II) which operated between 2004 and 2009, incorporated a Community Driven Development (CDD) approach in which various Fadama users (crop farmers, hunters, pastoralists, women, youths, vulnerable groups and so on) operating through their respective Fadama community associations, oversees the design and implementation of the project and are empowered through skills and capacity buildings to improve their livelihoods by increasing income generation activities.

In general, the midterm review (MTR) report 2007 indicated quite positive accomplishment of the Fadama II project in all the components of the project. In this regard, the World Bank's Board of Director in July 2008 approved the implementation of the third phase of the project as a follow-up to the relatively

successfully implemented Fadama II project. This is both in scope and implementation approach.

The Fadama III project was designed to support the financing and implementation of five main components meant to transfer financial and technical resources to the beneficiary groups in institutional and social development, physical infrastructure for production uses, transfer adoption of technology to expand productivity; improve value-addition, and conserve land quality; support extension and research provide matching grants to be made accessible to farmers for income generation and livelihood improvements. The beneficiaries of Fadama III project were involved in major crops such as maize, cassava, yam, cowpea, guinea corn, melon, sorghum, pepper, with a few people engage in trading and civil service. National Fadama Development Project III (NFDP III) is a comprehensive five years action program, commencing from the year 2008. It sought to increase income of 70% of her participants by at least 40% before completion in the year 2013. It seeks to reduce rural poverty and increase food security in the State. After five years of its operation in the State, there is need to examine the impact of the project on beneficiaries productivity so as to appreciate its effectiveness or otherwise towards achieving its set objectives. This research work therefore describes socio-economic characteristics of the Fadama III beneficiaries; assesses the impact of the project on the beneficiaries' productivity and assesses the socio-economic factors affecting the productivity level of beneficiaries' productivity in the study area.

## **METHODOLOGY**

### **Study Area**

The study was conducted in Oyun Local Government Area of Kwara State. The Local Government is located in the Southern Eastern part of Kwara State. The

Local Government Area derives its name from the popular Oyun River in the Area. It has a land area of 650 square kilometers and share boundaries with Oyo and Osun State as Irepodun, Ifelodun and Asa LGAs of Kwara State and completely encircles Offa Local Government Area. The local Government Area has its headquarter at Ilemona which is located on Latitude  $8^{\circ} 08' 56.80''$  North and Longitude  $4^{\circ} 43' 14.66''$  East.

The study area has a Southern Guinea Savannah Climate with distinct wet and dry season. The annual rainfall is between 1500mm to 2200mm which last for the period of eight (8) month from March to September with average temperature of  $25^{\circ}\text{C}$ , the dry season last from October to March. The Yorubas of the Ibolo which from the main ethnic group in the area co-exist with other tribes like Hausas, Igbos, Fulanis, Bororos, Nupes, notably most town and villages in Oyun have historical and traditional ties with the ancient Oyo empire. The occupation of Oyun people is predominantly farming which their major crops are maize, cassava, yam, cowpea, guinea corn, melon, sorghum, pepper with a few people engage in trading and civil servant.

Purposive sampling technique was employed to select five (5) out of twelve villages (12) because of their comparative involvement in the use of Fadama land for crop productivity in the study area. From the population of Fadama users 20% of the beneficiaries were randomly selected from each of the villages bringing the sample size to 92. Data elicited from ninety two beneficiaries' were used for data analysis. Descriptive statistics, double difference estimator and ordinary least square were used for data analysis.

### Double Difference Estimator

The double-difference estimator analytical tool is a quantitative method often used to measure impact assessment research. It is used to estimate and compare change in

outcome or any other means of measurement determined before and after programme for participants (Chen, et al., 2006). In order to use the estimator in question, there must be information on participants and all individuals must be observed both before and after the programme (Verner and Verner, 2006). Therefore, to estimate programme impact, Verners in their double difference estimator model version gave a model as;  
DDE =

Where

P = number of beneficiaries

$Y_{tia}$  = Average productivity of the beneficiaries at time (a) before intervention

$Y_{tib}$  = Average productivity of the beneficiaries at time (b) after intervention

### Ordinary Least Square

The estimator is used to examine the determinant of the productivity of the Fadama III project on beneficiary farmers in the study area. The model is stated below;

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, e)$

Explicit form

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e$

Where,

Y = Productivity (Output in Kg/ha)

$X_1 - X_{10}$  = Independent variables

$X_1$  = Sex (male 1, female 0)

$X_2$  = Age (years)

$X_3$  = Level of Education (years)

$X_4$  = Marital Status (single 1, married 2, widow/widower 3, separated 4, divorce)

$X_5$  = Household size (Number)

$X_6$  = Land Ownership Structure (inherited 1, purchased 2, rented, 3 gift 4)

$X_7$  = Farm Size (ha)

X<sub>8</sub>= Extent of Extension Contact  
(Frequency of visit)

X<sub>9</sub> = Beneficiaries Farming Experience  
(Years)

X<sub>10</sub>= Level of Income (₦)

## RESULTS

### Socio-Economic Characteristics of the Respondents:

Table1 presents the socio-economic characteristics of Fadama III beneficiaries. Majority of the respondents (66.30%) were male. Majority of the beneficiaries' farmers (67.39%), were within the age brackets of 31-60 years, and only about (20.65%) are below 30 years of age with a mean age of 44 years. Further analysis shows that 86.96% of the beneficiaries are educated in the study. Most of the respondents (69.57%) were married while 30.43% fell in the categories of those who

are either widowed, divorces, singles and separated. Respondents had household size of 6-15 persons with a mean of 6 persons. Result shows that almost half 47.83% of the Fadama III beneficiaries inherited their farm land, 19.60% rented, 18.50% purchased and 14.10% through gift. Respondent in the study area had a mean of 1.75ha, Results shows that more than half of the respondents 52.17% have farming experience of 1-10 years with a mean years of farming experience of 16 year. About one- third ( 29.37%) of the Fadama III beneficiaries' farmers had no contact with extension workers throughout the growing season in the study area, while a total of 70.63% had contacts with extension agents and had on the average three contact period during the season. Findings showed that Fadama III beneficiary's farmers recorded a mean income of ₦ 289,793.48.

**Table1:** Socio-economic characteristics of Fadama III beneficiaries (farmers)

Socio-Economic Variables	Frequency	Percentage (%)	Mean
<b>Sex</b>			
Male	61	66.30	
Female	31	33.70	
<b>Age</b>			
21 - 30	19	20.65	
31 – 60	62	67.39	
			44.1
61 - 70	7	7.61	
71 – 80	4	4.35	
<b>Education</b>			
None	12	13.04	
Primary	10	10.87	
Secondary	14	15.22	
Polytechnic	13	14.13	
NCE	7	7.61	
Tertiary	36	39.13	
<b>Marital Status</b>			
Married	64	69.57	
Widowed	6	6.52	
Single	18	19.57	
Separated	2	2.17	
Divorce	2	2.17	

<b>Household size</b>			
1 - 5	45	48.91	
6 - 15	47	51.09	
			5.92
<b>Land Ownership</b>			
Inherited	44	47.83	
Rented	18	18.50	
Purchased	17	19.60	
Gift	13	14.10	
<b>Farm Size</b>			
0.5 - 1	42	45.65	
1.5 - 2	35	38.04	
2.5 - 3	10	10.87	
			1.75
3.5 - 4	1	1.09	
4.5 - 5	4	4.35	
<b>Farming experience</b>			
1 -10	48	52.20	
11 - 20	16	17.40	
21 – 30	16	17.40	
			16.10
31 - 40	6	6.50	
41 and above	6	6.50	
<b>Extension Visit</b>			
None	27	29.37	
Weekly	4	4.35	
Twice a week	5	5.43	
Thrice in a week	5	5.43	
			3.04
Monthly	13	14.13	
Twice a month	16	17.39	
Thrice in a year	22	23.19	
<b>Level of Income (₦)</b>			
100,000 – 199,999	41	44.60	
200,000 – 299,999	14	15.22	289,793.48
300,000 – 399,999	15	16.30	
400,000 and above	22	23.90	

### Impact of Fadama III on Beneficiaries' Productivity.

Table 2 presents result of the impact of Fadama III beneficiaries' on their output. Result shows that beneficiaries benefitted greatly from the Fadama III project for all the crops

cultivated. Result revealed that there was increase in output of maize, groundnut, beans cassava, yam tomato and okra by 26.39%, 65.79%, 25.89%, 20.64%, 28.02%, 42.84% and 27.97% respectively after Fadama III intervention.

**Table 2:** Result of double difference estimation on the impact of Fadama III beneficiaries' on their productivity level (kg/ha)

Crop Produced	Before	After	Std. D	Differences	Percentage
Maize	1813.6	2292.2	732.4	478.6	26.39
Cassava	31780	38340	10090	6560	20.64
Okra	224.5	287.3	166.1	62.8	27.97
Yam	19950	25550	8000	5590	28.02
Tomatoes	620	885.6	178	265.6	42.84
Groundnut	658.5	1091.5	525	433	65.79
Beans	635.5	800	811.5	164.2	25.89
Total	55,682.1	69,246.6	20503	13554. 2	24.34

Result from table 3 shows,  $R^2$  (0.579) which indicates that the independent variables explains 57.9% of the variations in the dependent variable. The results of the least square analysis indicate that land ownership ( $X_6$ ), extension contact ( $X_8$ ) and

income ( $X_{10}$ ) had positive coefficient and are significant at 1% level respectively while sex ( $X_1$ ) had a negative coefficient and is significant at 1% level.

**Table 3:** Determinants of the level of productivity among Fadama III beneficiaries

Model	B	Std.Error	T	Sig
(constant)	3.067	0.269	11.406	.000
Sex $X_1$	-.357	0.092	-3.880	.000***
Age $X_2$	.006	.004	1.334	.186 <sup>NS</sup>
Educational level $X_3$	-.005	.008	-.648	.515 <sup>NS</sup>
Marital status $X_4$	.083	.074	1.120	.266 <sup>NS</sup>
Household size $X_5$	-.030	.020	1.467	.146 <sup>NS</sup>
Land ownership $X_6$	.129	.041	3.161	.002***
Farm size $X_7$	-.028	.049	-.572	.569 <sup>NS</sup>
Extension contact $X_8$	.051	.019	2.676	.009***
Farming experience $X_9$	.080	.047	1.708	.092*
Income $X_{10}$	.214	.040	5.389	.000***
Adjusted $R^2$	0.579			

Field Survey 2017. \*\*\* Significant at 0.01, \*\* significant at 0.05, \* significant at 0.10, NS not Significant

## DISCUSSION

The study revealed that most of the respondents were male (66.30%) while (33.70%) were female. This shows that, male generally show more interest in activities that entails farming than women. Some of the women in the study area deliberately avoided some agricultural activities because they regarded it as been too stressful and time demanding. This under representation of women in project of this nature has been reported by Ike (2012) in his study of an analysis of the impact of Fadama III project on poverty alleviation in Delta State, Nigeria.

Majority of the beneficiaries' farmers (67.39%), were within the age brackets of 31-60 years, and only about (20.65%) are below 30 years of age with a mean age of 44 years. This implies that men and women of active and productive age are still predominant in farming activities in the study area. Farming in the study area is embraced predominantly by middle-aged men. The role of age of farmers is very critical in agricultural production as it has effects on their performance. This is in line with the findings of Udoh and Nyienakuna, (2008) on the socioeconomic characteristics and adoption trend of artisanal fishers in Akwa Ibom State, Nigeria. Farmers within the active age groups are able to withstand stress and put more time in various farming operations. Further analysis shows that 86.96% of the beneficiaries are educated in the study area educational level of the farmers is known to affect their farming activities. Education would significantly enhance farmers' ability to make accurate and meaningful management decisions; it could also enhance the knowledge of improved techniques such as how to read and interprets recommended packages. The level of awareness and adoption of agricultural innovations are affected by the literacy status of farmers. Those who are literate are expected to be more innovative because of their ability to get information

more quickly and their ability to take more risk. Oluwatayo *et al.* (2008) in their studies on resource use efficiency of maize farmers in rural Nigeria observed that the more educated a farmer is, the more the chances that the farmer will adopt innovations than the uneducated ones.

Most of the respondents (69.57%) were married while 30.43% fell in the categories of those who are either widowed, divorces, singles and separated. Respondents had household size of 6-15 persons with a mean of 6 persons. This implies that farming households have a good source of family labour for the farming business. This is a positive indication that there would be more availability of family labour for farm work and therefore, a need to increase farm size. Amos (2007) in his study of productivity and technical efficiency of smallholder cocoa farmers in Nigeria found that family size was a significant variable which greatly influenced the technical efficiency of farmers. According to him, farmers keep large family members to increase farm labour during peak season.

Result shows that almost half 47.83% of the Fadama III beneficiaries inherited their farm land, 19.60% rented, 18.50% purchased and 14.10% through gift. This implies that majority of the Fadama III beneficiaries inherit their farm land, which makes farming work more convenient and profitable for them. Respondent in the study area had a mean land size of 1.75ha; this indicates that Fadama III beneficiary's farmers are small scale farmers. Small farm size is an impediment to agricultural mechanization because using farm machineries like tractors to control weeds will be difficult. More than half of the respondents 52.17% have farming experience of 1-10 years with a mean farming experience of 16 year. Adebayo (2006) observed that the longer a person stays on a particular job, the better the job performance tends to be.

About one- third ( 29.37%) of the Fadama III beneficiaries' farmers had no contact with extension workers throughout the growing season in the study area, while a total of 70.63% had contacts with extension agents and had on the average three contact period during the season . Umar et al., (2007) observed that higher extensions contact would increase adoption of improved farm production technologies. They further observed that the frequency of extension contact is very essential as it guides the farmers from awareness to the adoption stage.

Findings showed that 44.60% of the Fadama III beneficiary's farmers made less than ₦ 200,000 from their farming activities annually. On the other hand, 31.50% of the respondents make between ₦200,000 and ₦399,999. It was also observed that 23.90% made above ₦400,000 annually and recorded a mean income of ₦ 289,793.48 among beneficiaries in the study area.

Result of the impact of Fadama III beneficiaries' on productivity shows positive impact of the intervention on the yield of the arable crops produced in the study area, the mean yield of maize (2292.2kg), groundnut (1091.5kg) and beans (800kg) after benefiting from Fadama III project was higher than average output obtained for maize (1813.6kg) groundnut, (658.5kg) and beans (635.5kg) before benefiting from the project with 26.39% , 65.79%, and 25.89% respectively .This agrees with the finding of Tijani et al., (2014) on impact of the Fadama II intervention on rural households in Kogi and Kwara States, Nigeria. Result obtained from the average yield of cassava (38340kg) and yam (25550kg) after Fadama III intervention was higher than the mean yield of cassava (31780kg) and yam (19950kg) before Fadama III project with 20.64% and 28.02 %. This is in line with the findings of Folorunsho, (2013) on impact of Fadama III on productivity, food

security and poverty status of tuber farmers in central states of Nigeria. Averagely the yields of tomatoes and okra increased with 42.84% and 27.97% after benefiting from Fadama III project intervention. Thus indicating that, Fadama III Project impacted positively on beneficiaries' productivity in the study area.

The study revealed that land ownership ( $X_6$ ), extension contact ( $X_8$ ) and income ( $X_{10}$ ) had positive coefficient and significant at 1% level respectively. Sex ( $X_1$ ) had a negative coefficient and is significant at 1% level. The negative relationship implies that decrease in the number of male beneficiaries leads to increase in the level of output and vice versa. Against a priori expectation, it was expected that the increase in the number of male will translate to increased output. The study agrees with the finding of Ajayi and Ugwu, (2008) on impact of adverse health on agricultural productivity of farmers in Kanji Basin North-Central Nigeria, who found that the negative sign of sex is contrary to a prior expectation. The positive relationship of Land ownership implies increase in productivity of beneficiaries as land is readily available to them. This is in line with the study of Gershon, 2007 on land ownership, security and farm productivity evidence from Thailand. He found out that land ownership in less developed countries can increase productivity significantly. The positive relationship with extension contact implies that information is readily available to them as such increasing their productivity. The finding collaborates that of Mallam *et al.* (2014) where extension contact positively affect the efficiency of beneficiaries (rice farmers) in Niger State, Nigeria. The positive coefficient of income implies that increase in income of the beneficiaries increases the productivity of beneficiaries in the study area.



## CONCLUSION

It can be concluded from the study that Fadama III project impacted positively on the beneficiary farmer's productivity in the study area. The beneficiaries were small scale farmers who cultivated maize, groundnut, cowpea, yam, cassava, okra and tomatoes. The impact of Fadama III project on beneficiaries output was higher for groundnut and tomatoes compared to other crops cultivated in the study area. Land ownership, extension contact, income level and sex significantly determined the output level of the beneficiary farmers. Based on these findings beneficiary of Fadama III project should focus on the cultivation of groundnut and tomato on a larger scale this would increase their productivity and by extension their income. The frequency of extension visit should be increased in the study area. This would positively impact on productivity in the study area.

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