

Original article

Analysis of the Midline Impact of Fadama III Agricultural Development Project on Poverty Alleviation among Beneficiaries in Benue State, Nigeria

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Abstract

Assessment of the poverty alleviation among beneficiaries of Fadama III agricultural project was studied at midline of implementation in Benue State, Nigeria. The study focused on determining the average income of project beneficiaries and comparing with non Fadama III households based on their crop, livestock and off-farm activities as well as comparing the quality of life of Fadama users with non-users. A sample size of 314 households in 20 LGAS had a breakdown of 192 Fadama Community Associations (FCA) and 2727 Fadama User Groups (FUGs). Data was collected by ten enumerators deployed to the study area as research assistants using well-structured electronic questionnaires administered via pre-programmed computer templates for the households and community surveys. STATA software was used in cleaning raw data, matching households and community data as well as in analysis of results. The impact of Fadama III on income distribution by a Lawrence curve on income inequality, for the treatment group and the gini coefficient in the Laurence curve was 0.37830 while the concentration coefficient was 0.35921. For non-Fadama group, the non-Fadama III beneficiaries, the gini coefficient in the Laurence curve was 0.25562 while the concentration coefficient was 0.401243. Our current results show that the Fadama III treatment group displayed the lowest gini coefficient and thus confirm the highest impact of the Fadama III project on the income distribution among members of the beneficiary population studied. This study recommends that the Fadama III project should be sustained as a model for promoting poverty alleviation among rural communities in Nigeria.

Keywords: Impact, Poverty alleviation, Fadama III project, Beneficiaries, Households, Income.

Received: 10 May 2018 * **Accepted:** 19 May 2018 * **DOI:** <https://doi.org/10.29329/ijjaar.2018.141.6>

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INTRODUCTION

Fadama connotes a *Hausa* indigenous term used to describe irrigable land that covers low-lying plains which are underlined by shallow aquifers and they are prevalent along the river systems in Nigeria. Such lands are especially suitable for irrigated production and fishing, and traditionally provide feed and water for livestock. The enormous potential of this land is only very partially developed. The Fadama I and II projects successfully refined approaches for improved utilization of these lands in Nigeria. Fadama III is implementing an innovative local development planning (LDP) tool and building on the success of the community-driven development mechanisms (CDD). The cumulative impact of these earlier successful Bank-assisted projects attests to the robustness of the small-scale and community-based approach to fadama development in an environmentally sensitive manner in Nigeria.

The Fadama III Project is coordinated by the National Fadama Coordination Office (NFCO) of the NFRA, the implementing agency of the FMARD, while the day-to-day implementation took place at the state level. The national project aimed to cover an estimated 7,400 Fadama Community Associations in 37 participating states including FCT. Each new participating State was expected to implement Project activities in up to 20 Local Government Areas while the old Fadama II States implemented in 10 additional Local Government Areas.

The development objective of Fadama III Project for Nigeria is to sustainably increase the incomes of users of rural land and water resources on a sustainable basis. By increasing their incomes, the project was expected to help reduce rural poverty, increase food security and contribute to the achievement of a key millennium development goal. This study validates the millennium Development Goals which States as follow: That, MDGs has eight goals to be achieved by the year 2015 that respond to the world's main development challenges. This paper on the whole is concerned with goal one and this could be seen further in the discussion and the analysis of the paper. The Fadama III Project is anchored on the Community Development Driven (CDD) approach, and relies on facilitation for demand-driven investments and empowerment of local community groups and to improve productivity and land quality.

Objective of the study

The main aim of the study was to assess the Impact of Fadama III projects on poverty alleviation among beneficiaries as compared to the control groups. Other aims were to determine the impacts of Fadama III projects on the income distribution among the beneficiaries as well as determining the average income of fadama III project users and non fadama user households based on their crop, livestock and off farmer activities.

Scope of the study

The study area is Benue State of Nigeria. Benue State is one of the 36 states of Nigeria located in the North-Central part of Nigeria. The State has 23 Local Government Areas, and its headquarters is Makurdi. Located between Longitudes 6° 35'E and 10°E and between Latitudes 6° 30'N and 8° 10'N. The State has abundant land estimated to be 5.09 million hectares. This represents 5.4 percent of the national land mass. Arable land in the State is estimated to be 3.8 million hectares. This State is predominantly rural with an estimated 75 percent of the population engaged in rain-fed subsistence agriculture. The state is made up of 413,159 farm families (BNARDA, 1998). These farm families are mainly rural. Farming is the major occupation of Benue State indigenes. Popularly known as the “Food Basket” of the Nation, the State has a lot of land resources. For example cereal crops like rice, sorghum and millet are produced in abundance. Roots and tubers produced include yams, cassava, cocoyam and sweet potato. Oil seed crops include pigeon pea, soybeans and groundnuts, while tree crops include citrus, mango, oil palm, guava, cashew, cocoa and *Avengia species*. Benue State is divided into three (3) agricultural zones *viz.*: (Zone A, Zone B and Zone C). Zone A and Zone B are made up of seven local government areas each while Zone C is made up of nine local government areas. The LGAs are Buruku, Gboko, Guma, Gwer-East, Gwer-West, Katsina-Ala, Konshisha, Kwande, Logo, Makurdi, Obi, Ogbadibo, Ohimini, Oju, Okpokwu, Oturkpo, Tarka, Ukum, Ushongo, Vandeikya

Statement of the research problem

Fadama III is implemented in all states of Nigeria including the 12 states that benefitted from Fadama II. Benue state incidentally did not benefit from Fadama II. Out of the 23 LGAs of Benue State, only 20 LGAs are currently benefitting from Fadama III.

The national framework shows seven groups made up of three treatment groups and four control groups as follows:

Treatment groups:

- a) Fadama III in Fadama II LGAs. In theory, this is likely to comprise the largest impact due to its baseline advantage of Fadama II support.
- b) Fadama III LGAs in Fadama II LGAs that is not likely to receive a spill over from Fadama II LGAs within the state.
- c) Fadama III in non-Fadama II LGAs. Assuming that all remains constant, this group will likely have the smallest impact due to having no-prior Fadama II support

Control groups:

- a) Non-Fadama III in Fadama II LGAs that received only capacity building from Fadama III. Probably due to the spillover, these LGAs will exhibit least difference with the LGAs that received full Fadama III grants.
- b) Non-Fadama III in Fadama II LGAs but in non-Fadama III LGAs. This group will also receive only capacity building support from Fadama III. These LGAs will also have some spillover from the Fadama II but the spillover will not be as large as in the case above.
- c) Non-Fadama III LGAs in non-Fadama II LGAs, who received only capacity building support.
- d) Non-Fadama III LGAs in non-Fadama II LGAs not receiving any support from Fadama III. It is expected that an assessment of this group with the first treatment group will produce the largest disparity.

The reports of the baseline survey suggested that not all groups that participated in Fadama III were identified and this needs to be noted in the midline analysis. The baseline report also suggested that during the commencement stage, Fadama III invited groups to submit applications for participation in Fadama III. These groups were required to fulfill certain conditions, including ensuring representation of women and vulnerable groups. Hence many economic interest groups (EIGs) were formed by communities as part of preparation to join Fadama III, but owing to inadequate funds, not all (EIGs) were supported to access Fadama's impact on capacity building and other outcomes that can only be accessed at group level.

Methodology

Three hundred and fourteen (314) households were selected for participation in the Fadama III Project in 20 LGAs of Benue State. The breakdown included 192 FCAs and 2727 FUGs. Data was collected by ten enumerators who were recruited based on a minimum qualification of a University degree or HND and trained specifically for this assignment. Data was collected through the use of well-structured electronic questionnaires using pre-programmed Computer templates for the Households and Community surveys. STATA software was used in cleaning data as well as matching households and community data.

Data was analyzed through the use of Descriptive and Inferential statistical tools. The single-difference (SD) and the Double-Difference (DD) Estimators were used to compare changes in outcome measures from the multiple regression analysis. Matching comparing Fadama III participants with non participants on the outcomes using 'Preferred analysis of choice by Kato when matching' was used to run the analysis. The Analysis of impacts was run considering the Homogenous impact and Heterogeneous impacts such as the Distribution of beneficiaries (female/male, poor farmers versus non-

poor farmers, youth versus middle age versus older people). The differences in outcome between baseline and midline data were now generated. The selection of the variables that will be used in the matching only considered baseline variables such as Age of household head, Value of productive assets, Education level of household head, Sex of household head, Distance to all weather roads and Distance to market. These variables were then logged and a log file of the detailed multi regression analysis was generated.

Results and discussion

The impact of Fadama III on the intermediate and ultimate outcomes

Socio economic variables

The baseline and midline surveys reported a sample size of members consisting of 192 households and 2727 FUGs. The percent of women in the FUGs was 34% of sample population as shown in Table 1.

Table 1. Number of households who participated in baseline and midline survey

Type	Number of households	Number of EIGs	% of women in EIGs
Fadama III in Fadama II state			
Type			
Treatment Group			
Fadama III in non Fadama II LGAs	192	2727	34%
Control Group			
Non-Fadama III in Non- fadama II LGA with capacity building support			
Non-Fadama III in Non- fadama II LGA ,no capacity building support			
Total treatment			
Total control	192	2727	34%
Undefined indifference			

Source: Field Survey (2013).

However, the Midline survey encountered a situation in which some of the households visited during the baseline survey could not be accessed for interview during the midline survey. These were mainly due to some communal conflicts in some areas during the survey.

The reported findings indicate that the average age of the respondents was 48 years while 66.7 were males and about 69% were married with 32% having no formal education. 76.3% of the respondents reported household sizes that ranged between 4 to 15 members.

None of the Fadama III beneficiary was recorded as being less than 20 years (Table 2).

Table 2. Impact of Fadama III on socio-economic variables

Socioeconomic variables	FIII				NON-FIII			
	Male		Female		Male		Female	
Age	Freq	%	Freq	%	Freq	%	Freq	%
<20	0	0.0	0	0.0	0	0.0	0	0.0
21 to 30	23	6.7	2	2.7	7	2.5	2	0.7
31 to 40	51	18.7	8	8.9	37	13.3	2	0.7
41 to 50	54	23.1	7	10.5	26	9.4	1	0.4
51 to 60	29	10.4	5	3.8	5	1.8	8	2.9
Above 60	34	11.5	4	5.4	5	1.8		0.0
Total	191	62.2	26	33.3	80	28.8	13	4.7

Source: Field Survey (2013).

6.7% of the male beneficiaries were between 20 to 30 years age group while the female beneficiaries in this age range category were 2.7%. 18.7% of the male beneficiaries in Fadama III were between the age bracket of 31-40 years, while the females had 8.9% participants in that age bracket. 23.1% males were between 41 to 50 years while only 10.5% of the females. The 51-60 age group recorded 10.4% males as compared to 3.8% female participants. Beneficiaries that were above 60 years were 11.5% males and 5.4% females and suggesting a fairly active male activity in farming activities at that age range.

Impact of Fadama III on the social capital

The average per capita income of the Fadama user households before the project implementation was N49,724.00 while that of the Fadama III non beneficiaries was N52,724.81. Midline evaluation however revealed that Fadama III beneficiaries earned an average income of N117,000.00. The distribution across gender and 5 income categories showed that the value of income of Fadama III beneficiaries was less than N40,000 in 7.1% male beneficiaries and 2.4% in female beneficiaries. An income of between N40,000 to N80,000 was obtained among 4.9% males and 2.4% females. Earnings of between N81,000 to N120,000 was among 7.3% males and 2.5% females while those earning between N121,000 to N160,000 were 9.2% males and 12.8% females and those earning above N160,000 accounted for the largest proportion of 47.1% males and 2.9% females (Table 3).

Table 3. Impact of Fadama III on the social capital contributions

Social capital contributions Value of income (Naira 000)	FIII Beneficiaries				NON-FIII Beneficiaries			
	Male		Female		Male		Female	
	Freq	%	Freq	%	Freq	%	Freq	%
<40	16	7.1	2	2.4	9	3.2	4	1.4
40 to 80	10	4.9	2	2.4	2	0.8	2	0.7
81 to 120	15	7.3	3	3.1	4	1.4	3	1.1
121 to 160	17	9.2	4	12.8	3	2.1		0.0
>160	133	47.9	15	2.9	62	22.3	4	1.4
Total	191	62.2	26	21.2	80	29.8	13	4.6

Source: Field Survey (2013)

The per capita agricultural income after project implementation was found to be N92,401.02 (Table 4) showing a 53% increase from baseline and this is an indication of an endorsement of a highly significant impact of Fadama III on social capital among beneficiaries.

Impact of Fadama III on the productive assets

The results of the group owned productive assets are shown in Table 4. The results tend to indicate that all beneficiaries got 53% increase in group owned productive assets as a result of participation in Fadama III.

Table 4. Impact of Fadama III on the group-owned productive assets

	Matching methods		% increase due to participation in Fadama III
	Kernel	10 nearest neighbors	
	Naira		
-All beneficiaries	92041.02*** (11891.69)	90493.17 ** (12122.99)	53%
Gender:			
Male beneficiaries	57211.86*** (11218.17)	60418.86*** (10921.76)	65%
Female beneficiaries	98186.9*** (18437.24)	98186.9*** (19213.47)	30%
Poverty terciles:			
Tercile 1 (Asset Poor)	89170.12*** (17211.3)	89170.12 *** (19215.9)	25%
Tercile 2	76813.83*** (15295.27)	76813.83*** (17312.97)	32%
Tercile 3 (Asset Rich)	66970.22*** (14938.98)	66769.22*** (13281.3)	41%

Source: Field Survey (2013).

Notes: *, ** and *** mean the associated ATT is respectively significant at 0.10, 0.05 and 0.01 level

Also, male beneficiaries got 65% increase in group owned productive assets as a result of participation in Fadama III as compared to their female counterparts that received a 30% increment. From these results, the female beneficiaries had lower tendency of owning group productive assets. It is however a common practice in reality to have more female dominated groups that own assets such as grinding machines. The results of this survey may however indicate that during this survey, the male dominated group assets such as irrigation or pumping machines, knapsack sprayers and cattle fattening machines were captured by the enumerators and this skewed the preponderance (65%) of the group owned productive assets in favour of the male beneficiaries.

The poverty tercile 1 for poor in assets showed an increase of 25% due to Fadama III support and the middle (tercile 2) showed a percentage increase of 32% while the tercile 3 with asset rich showed 41% increase due to Fadama III

Impact of Fadama III on the changes in savings for replacing or repairing productive asset

The saving realized for replacing or repairing productive assets is shown in Figure 1.

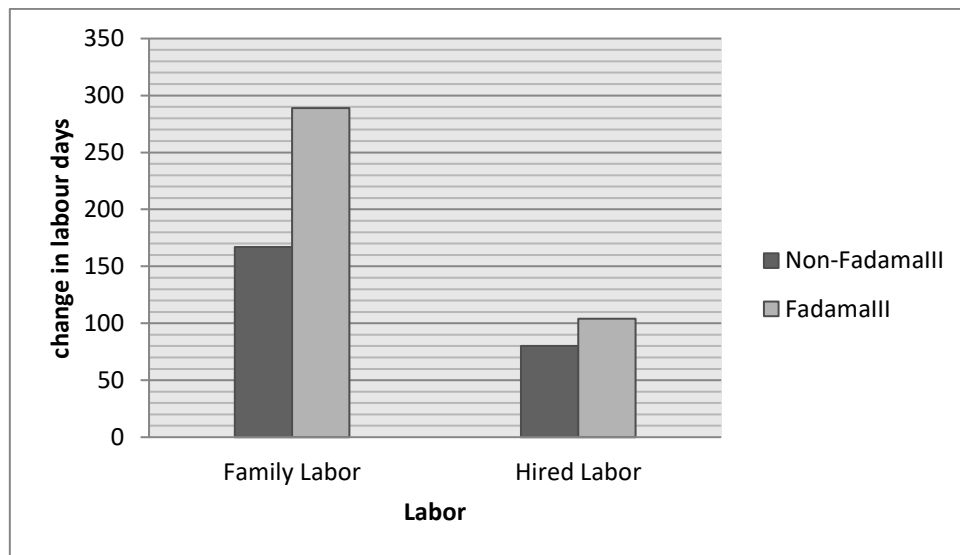


Figure 1. Impact of Fadama III project on the labour savings

Source: Field Survey (2013).

Savings of N6, 980.00 were realized between non-Fadama III and Fadama III beneficiaries. Apart from the signal that Fadama III seems to have introduced a culture of savings among beneficiaries, this is also a strong indicator of the sustainability of the Fadama III programme.

Impact of Fadama III on the poverty reduction

The poverty terciles shown in Tables 5, 6 and 7 clearly express the reduction of poverty among Fadama III beneficiaries for group owned productive assets, crop productivity and livestock income, non-farm income and household agricultural income.

Table 5. Impact of Fadama III on crop productivity and livestock income

	Crop productivity (Profit per ha)		% increase due to FIII	Profit from livestock production per household		% increase due to FIII	
			Matching methods				
	Kernel	Nearest 5 neighbors		Kernel	Nearest 10 neighbors		
	ATT	ATT		ATT	ATT		
			Naira				
-All Fadama III beneficiaries	78333.33 *** (10061.82)	78333.33 *** (10111.88)	51%	53761.23 (89649.93)	53761.23 (76563.37)	41%	
Gender:							
Male beneficiaries	71184.88 *** (11654.64)	71184.88 *** (12709.58)	23%	77597.06 (67889.34)	77597.06 (64408.51)	43%	
Female beneficiaries	70868.3*** (16834.81)	70868.3** (17839.48)	17%	21181.15 (166866)	21181.15 (154655.7)	17%	
Poverty terciles:							
Tercile1 (Asset Poor)	72947.62 *** (18698.06)	72947.62*** (16978.49)	25%	41383.86 (165374)	41383.86 (112779.1)	23%	
Tercile2	85696.64 *** (19040.35)	85696.64 ***	45%	85739.26 (128096.5)	85739.26 (121994.4)	28%	
Tercile3 (Asset Rich)	59411.88*** (21022.9)	59411.88*** (19890.59)	53%	37106.9 (87756.62)	37106.9 (78053.17)	36%	

Source: Field Survey (2013).

Notes: *, ** and *** mean the associated ATT is respectively significant at 0.10, 0.05 and 0.01 level

For the group owned productive assets, the poverty tercile 1 for poor in assets showed an increase of 25% due to Fadama III support and the middle (tercile 2) showed a percentage increase of 32% while the tercile 3 with asset rich showed 41% increase due to Fadama III. This seems to suggest that the poverty was impacted across the groups. It is clear that poverty was reduced with beneficiaries having access to group owned productive assets.

Table 6. Impact of Fadama III on non-farm income

	Matching methods		% increase due to participation in Fadama III
	Kernel	10 nearest neighbors	
	Naira		
-All beneficiaries	26212.36*** (10896.13)	26212.36*** (8214.28)	225%
Gender:			
Male beneficiaries	17296.26 (13281.20)	17296.26 (13013.05)	212%
Female beneficiaries	34852.71 (28213.28)	34852.71* (19519.5)	2461%
Poverty terciles:			
Tercile 1 (Asset Poor)	5567.31*** (2377)	5567.31 *** (2516.466)	2971%
Tercile 2	27292.72 ** (17975.33)	27292.72 ** (14687.31)	120%
Tercile 3 (Asset Rich)	87504.23 (85274.98)	87504.23 (92370.93)	39%

Source: Field Survey (2013).

Notes: *, ** and *** mean the associated ATT is respectively significant at 0.10, 0.05 and 0.01 level

The poverty tercile for crop productivity profit per hectare for the poor group of Fadama III farmers increased by 25% and by 45% for the middle poor category and by 53% among the rich farmer beneficiaries. The poverty tercile for profit from livestock among the poor also increased by 23% and by 28% for the middle poor category and by 36% among the rich beneficiaries. The average treatment effect on the treated (ATT) for both the crop productivity profit per hectare and the livestock profit were all significant at 0.1, 0.05 and 0.01% suggesting a reduction in poverty as a result of Fadama III impact.

Table 7. Impact of Fadama III on the household agricultural income (Naira)

	Matching methods		% increase due to participation in Fadama III
	Kernel	10 nearest neighbors	
	Naira		
-All beneficiaries	79693.7 * (6785.83)	79693.7 * (4217.70)	41%
Gender:			
Male beneficiaries	42231.00 * (7514.32)	42231.00 * (7976.56)	35%
Female beneficiaries	93478.9* (16123.74)	93478.9* (17876.21)	56%
Poverty terciles:			
Tercile 1 (Asset Poor)	98334.4* (12381.1)	98334.4* (16887.12)	33%
Tercile 2	98334.4* (16236.65)	98334.4* (13799.05)	42%
Tercile 3 (Asset Rich)	91008.7* (11868.12)	91008.7* (8342.71)	33%

Source: Field Survey (2013).

Notes: *, ** and *** mean the associated ATT is respectively significant at 0.10, 0.05 and 0.01 level

The poverty terciles of the asset poor for non-farm income was 2971% and highly significant at 0.01% (1%), showing that poverty reduced. The poverty terciles of the middle group (tercile 2) increased by 120% and was significant only at 0.05 (5%) whereas the poverty terciles of the asset rich (tercile 3) was 39% but not significant.

The poverty terciles of the asset poor for household agricultural income recorded a 33% increase due to participation in Fadama III whereas the tercile 2 group was 42% and the asset rich group was 33% increment due to Fadama III influence. All these were significant only at 10% of associated ATT.

It is a fact that beneficiaries' capacity was improved and built to enhance management skills through some of the Fadama III pre disbursement and post disbursement capacity building, advisory and extension services.

Farm education remains a key and dynamic factor to the reduction of rural poverty in general irrespective of whether the household heads are male or female. The welfare levels of households increase when educational attainment increases. Household heads with no education remain the poorest among rural farming households. This study recommends that there is a need for improved adult literacy programme in Benue State so that Fadama III participants and other farmers in general can improve their educational exposure.

To be able to sustain income generation and development among the Fadama III beneficiaries and user groups, it is important that the Federal Government should sustain Fadama III project beyond the current timeline. The mutual success of Fadama III from this study is an appealing strength towards the inspiring of other people to uplift their earning potentials, thereby reducing the high level of poverty in the state.

Conclusion

This study has shown that the evaluated Fadama III components in Benue state have favorable impact on the key outcomes of alleviating poverty such as income, productive assets and farm inputs. The component of sustainable land management practices such as the use of organic fertilizers, mulching, green manure is known to increase crop productivity and is readily available and cheap. These are some key indicators to ensuring profitability in the farm sector.

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