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An Analysis of the Impact of Fadama III Project on Poverty Alleviation in Delta State, Nigeria

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Abstract: This study specifically sought to determine the average income of Fadama user and non Fadama user households based on their crop, livestock and off-farm activities as relating to project implementation and also the proportion of the Fadama user households attaining the observed average income. 152 participating households in Fadama III Project and 50 non participating households were randomly selected for this study. Data were collected by well trained enumerators through the use of well structured and pre-tested questionnaire and analyzed through the use of Descriptive and Inferential statistical tools. The Double-Difference (DD) Estimator was used to compare changes in outcome measures. Findings indicate that average age of the respondents was 52.4 years while 54.95% were males and about 68% were married with 20% possessing no formal education. (73.71%) of the respondents have household sizes ranging from 4 to 10 members. The average per capita income of the Fadama user households before the project implementation was ₦62,480.00 while that of the Fadama III non beneficiaries was ₦63,572.00. On the average, the real income of Fadama III beneficiaries increased by about 36.67% (From ₦62, 480.00 to ₦85,391.42) as a result of participation in the project. By contrast however, average real income of Fadama III non beneficiaries increased only by 11.6% from ₦63,572.00 to ₦73,743.52. The mean increase in income for participants in Fadama III was significantly different from that of non participants at p = 0.05. Appropriate policy to ensure proper education of rural populace is advocated.

Key words: Average income, double-difference estimator, fadama III project, poverty

INTRODUCTION

The issue of poverty in Nigeria has been described as "widespread and severe" (Central Bank of Nigeria, 1996). This is in spite of the country's vast resources. According to Omonona (2009) "Poverty is pervasive although the country is rich in human and material resources that should translate into better living standards". Poverty is not only a state of existence but also a process with many dimensions and complexities (Khan, 2000). According to the most recent survey (2004 National Living Standards Survey) presented by the National Bureau of Statistics, NBS (2007), about 69 million people were living in poverty, which represents 54.4% of the Nigerian population. Since the 1980s, the Nigerian poverty situation has been deteriorating. The rate of poverty during those years translated to 17.7 million poor people in 1980, 34.7 million in 1985, and not minding the drop between 1985 and 1992 (due to the implementation of the structural adjustment programme), about 39 million were poor in 1992. In 1996, however, about 67 million people were poor despite the drop in incidence between 1996 and 2004, about 69 million were poor in 2004 (Omonona, 2009; Diao *et al*., 2009).

The concern about the threat posed by poverty has led the Nigerian government to devote considerable attention to alleviating its scourge through various aid programmes, some of the time in cooperation with the civil society and donor agencies. The agricultural sector is not only the most important non-oil economic activity in Nigeria; it is also the single largest employer of labour forces (70% according to NBS, 2007). Thus the agricultural sector is often seen as important for reducing poverty (Agenor *et al*., 2004).

For the success of any poverty alleviation programme, however, knowledge of the profile of poverty in the society is essential. Studies have shown that agriculture is the locus of majority of poverty in Nigeria (World Bank, 1996). This is obvious, since agriculture remains the mainstay of Nigerian economy contributing about 40% of the total GDP, and employing about 70% of the working population. It thus became imperative that appropriate policy measures aimed at alleviating poverty must take agriculture and rural development into consideration. Findings by Ike and Uzokwe (2011) reveals that incidence of poverty in Delta State is highest among households in which the head is engaged in agriculture as the main source of livelihood and income.

One of the suggested ways of reducing poverty is "utilizing of the poor factor endowment for improved income earnings and in living standards". In other words enabling the rural poor to increase their level of

production of economic goods will help to increase their income level and thereby their living standards. An obvious way of achieving this is enabling the farming poor to increase their agricultural output, so as not only to improve their income but to lift them above the subsistence level.

Fadama III is a tripartite funded intervention by World Bank (1996), the Federal Government of Nigeria and participating States with objectives targeted towards poverty reduction. Fadama III is designed to improve the capacities of beneficiary groups: the Fadama Users Groups (FUGs) which are aggregated into Fadama Community Associations (FCAs) in the states. Specifically this study evaluated the impact of Fadama III project on poverty alleviation among the beneficiaries through:

- Examining the socioeconomic characteristics of the Fadama III beneficiary and non beneficiary groups;
- Ascertaining the income level of participants and non participants before and after the intervention programme.

METHODOLOGY

Description of the study area: The study area is Delta state of Nigeria. The was created in 1991 and has 25 local government areas which are divided into three agricultural zones of Delta north, Delta south and Delta central. The state covers a landmass of about 18,050 km^2 of which more than 60% is land. The state has a population of 4,098,391 composed of 2,074,306 males and 2,024,085 females (National Population Commission, 2006).

Delta State lies roughly between longitude 5°00′ and 6°45′ East and Latitude 5°00′ and 6°30′ North. It is bounded on the North by Edo State, on the East by Anambra State and on the South-East by Bayelsa State. On the southern flank is the Bight of Benin which covers approximately 160 km of the State's coastline. Delta state is generally low-lying without remarkable hills. The state has a wide coastal belt inter-laced with rivulets and streams which form part of the Niger-Delta.

Delta state has a tropical climate marked by two distinctive seasons. The dry and rainy or wet seasons: The dry season occurs between November and April, while the rainy season begins in May and last till October. Occasional rainfall may be experienced during the dry season. The month of July witnesses the heaviest rainfall. The average annual rainfall in the coastal areas is about 266.5 and 190.5 cm. in the Northern fringes of the state. The temperature is high, ranging between 20 and 34ºC, with an average temperature of 30ºC (80ºF).

The natural vegetation of the state varies from the mangrove swamps along the coast to evergreen forests in the fresh water forest zone and derived savannah in the north.

Study population and sampling techniques: To analyse the impact of the Fadama III project on beneficiaries, the sampling frame was divided into two strata;

- The direct project participants (i.e., Fadama III participants)
- Non Fadama III participants from non Fadama III LGAs

It is important to note that Delta State did not participate in Fadama II project; hence the only control group applicable is the Non-Fadama III LGAs not receiving any support from Fadama III. The stratification is designed to allow for estimation of the direct effects of Fadama III project by comparing Fadama III project beneficiaries to similar households in similar communities not included in the project.

Delta State has 25 LGAs, out of which 20 are participating in Fadama III. The maximum number of LGAs permitted to participate in Fadama III project per state is limited to 20. Out of the 20 LGAs participating in Fadama III project in the state, 12 LGAs have paid their counterpart funds and have had their FUGs funded as at the time of this study. These 12 LGAs were purposively selected as areas of direct project intervention. Two Fadama Community Associations (FCAs) were selected from each of the 12 LGAs and this gave 24 FCAs. Seven households belonging to different Fadama User Groups (FUGs) were randomly selected from each of the FCAs to give a total of 168 households. However, 152 properly filled questionnaire were utilized for analysis.

Selection of non-Fadama III participants from the five non-Fadama III LGAs involved a random selection of 10 households from each LGA and this gave a total of 50 households utilized as the control group. In all, 202 households were selected for this study. This study was conducted in 2011.

Data collection/analysis: Data for this study were collected through the use of well structured and pre-tested questionnaire. Data were collected by well trained enumerators. The data generated were analyzed through the use of Descriptive and Inferential statistical tools. The descriptive tools used were mean, percentages, pie charts and bar charts.

The Double-Difference (DD) Estimator was used to compare changes in outcome measures (i.e., change from before to after the project) between project participants and non participants, rather than simply comparing outcome levels at one point in time. The Double-Difference method, also known as Difference-in-Difference method (Duflo *et al*., 2004) has the formula:

$$DD = (Y_{p1}-Y_{p0})-(Y_{n}p_{1}-Y_{n}p_{0})$$

where,

Table 1: Distribution of respondents by age (years)

Age	Frequency	Percentage	Cumulative percentage
21-30	8	3.96	3.96
31-40	26	12.87	16.83
41-50	61	30.20	47.03
51-60	65	32.18	79.21
61-70	28	13.86	93.07
71-80	11	5.45	98.52
81-90	3	1.48	100.00
Total	202	100.00	

Survey data (2011)

Yp_1 = Outcome (e.g., income) of beneficiaries after the project started

Yp_0 = Outcome of beneficiaries before the project started

Y_np_1 = Outcome of non beneficiaries after the project started

Y_np_0 = Outcome of non beneficiaries before the project started

The advantage of the Double-Difference Estimator is that it nets out the effects of any additive factors (whether observable or unobservable) that have fixed (time-invariant) impacts on the outcome indicator (such as the abilities of farmers or the inherent quality of natural resources), or that reflect common trends affecting project participants and non participants equally such as changes in prices or weather (Ravallion, 2005).

In principle, the Double-Difference approach can be used to assess project impacts without using any other statistical tool (such as the Propensity Score Matching (PSM) method as applied by (Phillip *et al*., 2009)) as it will produce unbiased estimates of impact as long as these assumptions hold, hence the adoption of this method in this study for estimating the project impact among the Fadama III beneficiaries.

RESULTS AND DISCUSSION

Socioeconomic profiles of the respondents: The socioeconomic characteristics of the respondents were examined under the variables of age, gender, marital status, level of formal education attained and household size.

Age of respondents: The average age of the respondents from the survey is 52.4 years, while the minimum and maximum were 25 and 85 years respectively (Table 1). This indicates that youths are involved in Fadama III project in the state as well as the aged who are mostly in the vulnerable groups.

While the age category 51-60 years is the mode, it can be observed that participants aged between 41 and 60 years predominate in the project as they constitute over 62.68% of the entire respondents.

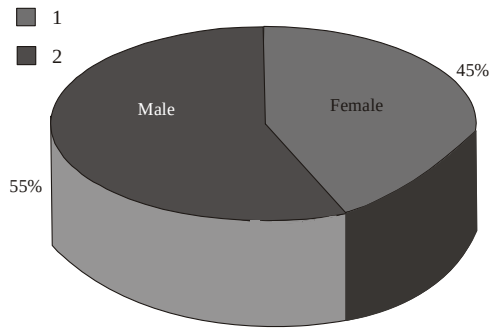

Fig. 1: Gender distribution of respondents, Survey data (2011)

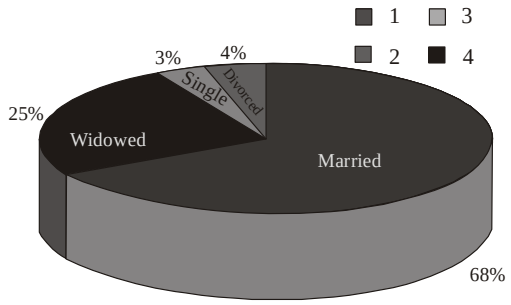

Fig. 2: Percentage distribution of respondents by marital status, Survey data (2011)

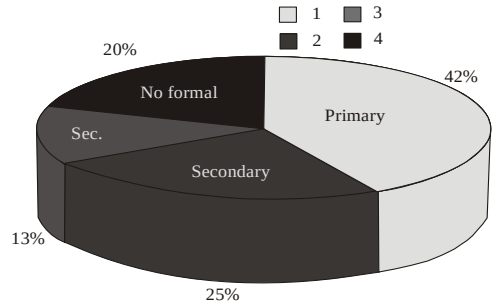

Fig. 3: Percentage level of education attained by respondents, Survey data (2011)

Gender of respondents: The distribution of respondents by gender is depicted in Fig. 1. Out of the 202 households that participated in the study, 91 of them representing 45.05% are females while 111 of them which stand for about 54.95% are males. This indicates a dominance of male folks in participation in Fadama III project activities in the area studied.

Marital status of respondents: The marital status of the sampled respondents indicate that about 136 of them (67.33%) are married and living together in the family while 50 respondents representing about 24.75% are widowed (Fig. 2). (3.74%) of the respondents are single while 4.46% are either divorced or separated. The high

Table 2: Distribution of respondents by household size

Householdx Frequency	Frequency	Percentage	Cumulative percentage
1-3	43	21.29	21.29
4-6	81	40.10	61.39
7-10	68	33.61	95.06
11 and above	10	4.95	100.00
	202	100	

Survey data (2011)

percentage of the widowed indicates a high level of the participation of the vulnerable FUG groups in Fadama III implementation in Delta state.

Level of formal educational attainment by the respondents: Most of the respondents had one form of formal education or another. Over 41% (84) of the sampled respondents completed primary education while about 25% (51) attained secondary education. However,over 19% (40) of them had no formal education (Fig. 3). This has great implication in the implementation of the Fadama III project in the area as most of the illiterate perceive the project as being more of an embodiment of paper works.

Household size of respondents: Household size is the number of persons that contribute and draw on the incomes of the household. Results show that household size ranges from 1 to 11 (Table 2). A detailed analysis shows that 43 (21.29%) have a household size of 1 to 3 members while 73.71% of the respondents have household sizes ranging from 4 to 10 members.

Large household sizes have been noted to have correlation with food insecurity and poverty especially when the household head is engaged in agriculture as the main source of livelihood and income (Ike and Uzokwe, 2011).

Categories of fadama III participant enterprise groups and non participant enterprise groups sampled: The different enterprise groups that the sampled Fadama III respondents belong to as well as the non participants is as presented in Table 3.

For the Fadama user groups, the study reveals that about 9.87% of the sampled FUGs were engaged in crop farming with 23.68% being engaged in livestock category. Poultry enterprise Groups (FUGs) dominate the livestock category with about 17.11% while goat rearers trail the rear with only 2 (FUGs) (1.32%). The agroforestry sector made up of cane rat farmers, snail rearing and bee keepers constitute only 3.29% of the entire sampled enterprises.

The vulnerable group based enterprises constitute about 23.68% of the sampled FUGs among the Fadama III user groups. Rental services dominate the vulnerable group based enterprises as they constitute (20.39%) of the entire sampled FUGs. Over 90% of the vulnerable group FUGs are composed of the female folks. The fisheries based enterprises consisting of the artisanal/capture fisheries and aquaculture including the concrete and earthen ponds constitute about 32.89% of the sampled enterprises (FUGs).

In the same vein, poultry enterprises and fisheries (including artisanal/capture fisheries and aquaculture) constituted over 50% of the non Fadama III enterprise groups sampled.

Table 3: Distribution of respondents by enterprise groups for beneficiaries and non beneficiaries

	Fadama III beneficiaries		Non beneficiaries	
Enterprise	Frequency	Percentage	Frequency	Percentage
Crop farmers:				
Cassava farmers	3	1.97	2	4.00
Yam farmers	4	2.63	2	4.00
Plantain farmers	3	1.97	1	2.00
Vegetable farmers	2	1.32	2	4.00
Pineapple farmers	2	1.32	1	2.00
Cucumber farmers	1	0.66	-	-
Livestock farmers:				
Pig farmers	8	5.26	1	2.00
Poultry farmers	26	17.11	10	20.00
Goat rearers	2	1.32	1	2.00
Agroforestry:				
Cane rat farmers	1	0.66	-	-
Snail rearing	2	1.32	-	-
Bee keeping	2	1.32	-	-
Vulnerable groups:				
Rentals 31	20.39	5	10.00	
Grinding mill	6	3.95	3	6.00
Cassava processing	6	3.95	2	4.00
Agro processing:				
Palm oil processing	3	1.97	2	4.00
Fisheries: (artisanal & aquaculture)	50	32.89	18	36.00

Survey data (2011)

Table 4: Income level of respondent households before the inception of fadama III

	Fadama III beneficiaries		Non Fadama III beneficiaries	
Level of income (N)	Frequency	Percentage	Frequency	Percentage
N1.00-N50,000	63	41.44	24	48.00
N51,000-N100,000	39	25.66	11	22.00
N101,000-N150,000	26	17.11	7	14.00
N151,000-N200,000	16	10.53	8	16.00
N201,000-N250,000	7	4.60	-	-
N251,000-N300,000	1	0.66		
Total	152	100.00	50	100.00

Survey data (2011)

Table 5: Distribution of fadama fadama III enterprise groups and non fadama III enterprise groups according to income level before project implementation

	Fadama III beneficiaries		Non fadama III beneficiaries	
Enterprise category (FUG)	Income level (₦)	Av. income by ent. group	Income level (₦)	Avg. income level by ent. group
Crop farmers:				
Cassava farmers	84,450.00		86,700.00	
Yam farmers	96,960.00		91,500.00	
Plantain farmers	68,752.00		70,280.00	
Vegetable farmers	45,543.00		42,600.00	
Pineapple farmers	35,620.00		38,900.00	
Cucumber farmers	41,253.00		-	
		62,096.00		65,996.00
Livestock farmers:				
Pig farmers	106,286.00		99,520.00	
Poultry farmers	178,557.00		158,790.00	
Goat rearers	92,780.00		71,250.00	
		125,874.00		113,186.67
Agroforestry:				
Cane rat farmers	39,687.00		-	
Snail rearing	37,262.00		-	
Bee keeping	41,472.00		-	
		39,473.00		-
Vulnerable groups:				
Rentals	38,380.00		40,250.00	
Grinding mill	26,560.00		28,600.00	
Cassava processing	29,600.00		25,500.00	
		31,513		31,450.00
Agro processing:				
Palm oil processing	114,906.00	114,906.00	121.070.00	121.070.00
Fisheries: (artisanal & aquaculture)	197,782.00	197,782.00	184,271.00	184,271.00

Survey data (2011)

Income level of beneficiary and non beneficiary households before the implementation of fadama III project: Analysis of the data generated indicate that the average per capita income of the Fadama user households before the project implementation in the state was ₦62,480.00. Similarly, the non Fadama III beneficiaries had an average per capita income of ₦63,572.00 prior to the inception of Fadama project in the state. The range of income of different households prior to Fadama III project is as shown in Table 4.

The findings indicate that over 41% of the sampled households participating in Fadama III project have an average income of not more than ₦50,000.00, while only 8 respondent households (5.26%) have income level of between ₦201,000.00 to ₦300, 000.00.

Comparatively, 48% of the sampled non beneficiaries are within the income range of ₦50,000.00 while the highest income was between ₦151,000.00 and N200,000.00.

Income level of beneficiary and non beneficiary households before the implementation of fadama III project disaggregated by enterprise groups: As already indicated, the average per capita income for the Fadama III beneficiaries prior to project implementation was ₦62, 480.00 while that of non Fadama III beneficiaries was ₦63,572.00. These findings are not significantly different from the baseline survey income of ₦61,382.60 reported for households participating in the Fadama III project in Delta State. However, when disaggregated on enterprise basis, the fisheries based enterprises has the highest average income of ₦197,782.00 for the beneficiaries and ₦184,271.00 for the non beneficiary groups. This is followed by the poultry sub sector with an average income of ₦178,557.00 for the beneficiaries and ₦168,790.00 for the non Fadama III beneficiaries (Table 5).

On the average, the livestock sub sector has an income level of ₦125,874.00 with the poultry enterprises

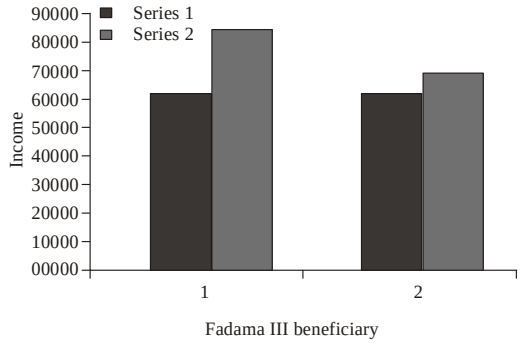

Fig. 4: Impact of participation in Fadama III on household income of beneficiaries compared with control group Survey data (2011)

Fig: 6: Achievement of target increase in income among fadama iii beneficiaries

	% change in real income before and after project started		
Treatment type	20% and bellow	25-50%	>50%
Fadama III beneficiaries	47.20	45.43	7.37
Non Fadama III beneficiaries	77.65	18.40	3.95

Survey data (2011)

(FUGs) topping the list with an average income of ₦178,557.00 for Fadama user groups prior to Fadama III implementation.

Impact of fadama III project on household income: Figure 4 shows that the average annual household income since the implementation of Fadama III project in the state for all type of respondents ranged from ₦52,893.00 to ₦237,658.00. On the average, the real income of Fadama III beneficiaries increased by about 36.67% (From ₦62, 480.00 to ₦85,391.42) as a result of participation in the project. This is based on the result of the Double-Difference Estimation. This is a little below the target of 40% increase in average real income by at least 75% of the Fadama III User households as set by the project. This difference in level of performance however, could be attributed to the fact that most of the Fadama III projects in the state have just received their funding within the six months of this study. It is expected that by the time the funded projects run their full circle, output will improve which will lead to increase in income.

By contrast however, average real income of Fadama III non beneficiaries increased only by 11.6% from ₦63,572.00 to ₦73,743.52. The mean increase in income for participants in Fadama III was significantly different from that of non participants at $p = 0.05$.

Considering the income of beneficiaries before and after the project (without controlling for other reasons for income to change), about 45.43% of the beneficiaries increased their incomes by at least 25% in the first year of Fadama III operation (Table 6). By contrast the share of non beneficiaries who increased their incomes by at least 25% was only 18.4%. Although the percentage includes the effect of other factors that influence income changes over time, it is clear that Fadam III has achieved considerable success in the first year of operation.

CONCLUSION

This study has been able to establish the average income of Fadama user households based on their different enterprise activities. It has also been able to determine the proportion of the Fadama user households attaining the observed average income. The real income of Fadama III beneficiaries increased by about 36.67% (From ₦62, 480.00 to ₦85,391.42) as a result of participation in the project. About 45.43% of the beneficiaries increased their incomes by at least 25% in the first year of Fadama III operation.

POLICY RECOMMENDATIONS

In order to ensure sustained income generation and progression among the Fadama III user groups it is important that agricultural policies must endure and outlive the governments that formulated them. The practice of changing macroeconomic policies with successive federal governments is inimical to long-term investment in agriculture. Thus, it is important that the federal government continues with Fadama projects even if the World Bank withdraws from the programme.

The state government should make it mandatory for all the 20 LGAs participating in Fadama III project to pay their counterpart funds. Payment of counterpart fund is a precondition for receiving of the World Bank assistance. As at the last count only 12 LGAs have paid their counterpart funds. This is impeding on the good objectives of the prograame as rural farmers in the affected LGAs are not benefiting from the project.

The project should entrench proper measures towards ensuring that service providers execute projects to specification. Particularly of note are the service providers who procure low quality materials to the unsuspecting rural farmers. The breakdown of the equipments almost immediately after supply was a common complaint by majority of the respondents.

Education is a key factor in reduction of rural poverty in general, whether the households are headed by men or women. Welfare levels increase as educational attainment increases. Household heads without any formal education are always the poorest among the rural farming households. Hence, there is the need for improved adult literacy programme in the state so that the Fadama participants and others alike can improve themselves.

Also, larger household sizes have been found to have correlation with poverty, especially where the household

head engages in agriculture for livelihood and income. Hence, there is the need for efforts at further sensitizing the populace on the need to control birth and to remove all cultural beliefs that tend to lead to overpopulation should be encouraged through proper advocacy.

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