## Economic Impact, Viability and Sustainability of Fadama III Small-Scale Community-Owned Infrastructure in Ondo State, Nigeria

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#### **Abstract**

The study was conducted to assess the economic impact, viability and sustainability of the Fadama Phase (III) sponsored small-scale infrastructure in different communities of Ondo State, Nigeria. Nine Local Government Areas (LGAs) were randomly selected out of the 18LGAs participating in Fadama III project on the basis of 3LGAs per senatorial district. A total of 270 respondents made up of 180 project participants and 90 non-participants constituted the sample size for the study. A set of interview schedule and pre-tested questionnaire were used for data collection. A Likert-like perception tool was used to investigate respondents' perception of sustainability of the projects. Descriptive statistics like frequency, percentage and mean score were used to analyze the data. Economic impact analysis of the projects showed that the average annual gross margin of beneficiaries (participants) had increased by 28.57% in the fourth year of project implementation. The viability analysis revealed that, the net project values (NPVs) of all the projects were positive at 26% discount factor, also, their Benefit/Cost Ratios (BCRs) were greater than 1 and the Internal Rates of Return (IRRs) were all above average. Good project location, high standard of project implementation, moderate users' fees, regular meetings of project participants and continuous capacity building/effective extension services to the participants, even after project implementation were found to have favourably affected the perceptions of both participants and non-participants of projects' sustainability. Considering the findings of the study, it is recommended that, government at all levels and even development partners should emulate or adopt the Community Driven Development (CDD) approach of Fadama III project for poverty reduction, food security and sustainable rural development in Nigeria.

**Keywords:** Fadama (III) Project, Community Development Driven, Small-scale infrastructure, economic impact, economic viability, sustainability

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#### INTRODUCTION

As a developing nation, Nigeria is plagued by the problems of underdevelopment, which include widespread illiteracy, endemic poverty, unemployment, uneven distribution of resources and incomes, low productivity, food insecurity, poor public infrastructure among

others (Ekong, 2003). The design of the National Fadama Development Projects (NFDP), was thus a strategic response by the stakeholders to alleviate the aforementioned scourges.

## **Brief History of National Fadama Projects**

Fadama areas are typically waterlogged in the rainy season but retain moisture during the dry seasons. Fadama areas are considered to be of high potential for economic development through appropriate investments in productive assets, rural infrastructure and technical assistance. The desire to harness the verse potentials of Fadama in Nigeria culminated in the design of National Fadama Development Project I, II and III. Fadama I (Phase I of the National Fadama Development Project) was implemented during the 1993-1999 period. While Fadama I focused mainly on crop production, down stream activities such as processing, preservation and marketing were largely neglected. The design did not take into cognizance of need for spatial integration of the markets (creating of physical and market infrastructure). It also failed to take into consideration other Fadama resource users such as livestock producers, fishing folks, pastoralists, hunters etc. The project did not also support post-harvest technology, which manifested in reduced crop prices and increased storage losses during the period (Momoh et al, 2007).

Some of the lessons learnt in Fadama I informed the brith of Fadama II. Fadama was targeted at dry season farming agro-processing, preservation and marketing. It also allowed for acquisition of productive assets, provision of rural infrastructure to ensure the efficient transportation of farm output to markets as well as marketing activities. The project development objective was to sustainably increase the incomes of the beneficiaries through empowering communities to take charge of their own development agenda through Community Drive Development (CDD) approach in project implementation in a socially inclusive manner. Fadama II also provides special preferences to groups of youths, women (especially widows), physically challenged, the elderly and people with HIV/AIDs (ADF, 2003).

Fadama III project is a follow-up to the Fadama II project which was assessed to have impacted the lives of rural farmers, raising their incomes by 63 percent. The project like Fadama II takes the CDD approach, which places beneficiaries in driver's seat. Local community members under the umbrella of Fadama Community Associations (FCAs and Fadama Users Groups (FUGs), oversee the design and implementation of the project and are empowered through skills and capacity building to improve their livelihoods by increasing income generating activities.

Fadama III project established standardized procedures and steps to guide the local people on how to take part in the decision-making process. It established platforms for participation, such as local consultation meetings to identify and select the needed infrastructure to be funded by the project. Beneficiaries (participants) were trained to identify the needed infrastructure, execute and manage small-scale development projects in their communities. Community people through the FUGs and FCAs were designated to be the executing agencies of local development projects. Capacity building activities were conducted to ensure that they have the ability to manage the different aspects of project implementation including financial management, procurement management and quality control at a level acceptable to the project.

According to International Development Agency (IDA, 2010), the project was designed to focus on increasing the incomes of rural poor, the project will help reduce rural poverty,

increase food security and contribute to the achievement of a key Millenium Development Goal (MDG).

Financing of Fadama III project is comprised of US\$ 250million from the World Bank through International Development Agency (IDA) credits and \$200 million counterpart contribution from Nigeria's federal, state and local governments and beneficiaries (World Bank, 2010).

## Fadama III Project has six main components:

- Capacity building, local governance and communication
- Small-scale community-owned infrastructure
- Advisory service and input support development
- Support to the Agricultural Development Programmes, (ADPs) sponsored research and on-farm demonstrations
- Asset acquisition for individual Fadama Users Groups (FUGs) / Economic interests.
- Project management, monitoring and evaluation

## **Small-Scale Community-Owned Infrastructure**

Although Fadama III Project has six main components as highlighted above, the focus of this study is on the second component i.e small-scale community-owned infrastructure. Web dictionary defines rural infrastructure as basic physical and organizational structures needed for the operations of a community or society or the service and facilities necessary for an economy to function. Rural infrastructure refers to a set of investments that include rural roads, water supply and sanitation, energy and telecommunication (Olaolu et al, 2013).

Poor people in isolated rural communities have greater economic opportunities and well-being as a result of improved infrastructure services. Infrastructure can help catalyze development in rural communities, and as well reduce poverty by taking away some of these burdens and hardships of life in isolated areas.

#### **Problem Statement**

For a long time, top-down planning was seen as the way to implement political choices in efforts to improve living standards in Nigeria. However, this had mainly led to the development of infrastructure that failed to match community needs and thus, unable to impact on socio-economic well-being of the rural dwellers, largely as a result of weak administrative capacity, lack of transparency and accountability in the use of public funds, the disconnect between the decision-makers and beneficiaries and the lack of community-based project planning. Since Fadama III project was designed to tackle these shortcomings in a sustainable manner, it was considered pertinent to assess the economic impact of the small-scale infrastructure funded by Fadama III on beneficiaries and as well determine the viability and sustainability of the projects.

In achieving the above main objectives, some pertinent questions were addressed and they include:

- 1. What are the socio-economic characteristics of the project beneficiaries (participants)?
- 2. What are the small-scale rural infrastructure projects executed in the study area?
- 3. What are the economic impacts of the projects on both the project participants and non-participants?
- 4. How economically viable are the projects?

5. What are the sustainability perceptions of both participants and non-participants of the projects?

#### **METHODOLOGY**

**Study Area:** The study was conducted in Ondo State, Nigeria. Ondo State is located in the south-western part of Nigeria. It has a surface area of approximately 15,317km<sup>2</sup> and a population of about 4.6million people. The main occupation of the rural dwellers is agriculture (farming and fishing). Well over 60% of the women engage in one form of marketing activities or the other, either as a primary occupation or to compliment agriculture. Fadama III implemented small-scale infrastructure projects in all the eighteen (18) Local Government Areas (LGAs) in Ondo State, out of which nine (9) LGAs were randomly selected on the basis of three (3) LGAs per senatorial district. The nine (9) LGAs selected where the study was carried out are: Akoko North-East, Akoko South-East and Owo representing the Northern senatorial district; Akure South, Ifedore and Ondo West from the central senatorial district; and Irele, Ile-Oluji/Oke-Igbo and Okitipupa representing the southern senatorial district.

Sampling Techniques and Sampling Size: In order to evaluate the economic impact, viability and sustainability of Fadama III sponsored rural infrastructure in the study area, a multistage sampling technique was used to select thirty (30) respondents per LGA, thus making a sample size of two hundred and seventy (270) respondents. The sample size consisted of twenty (20) project participants (FCAs/FUGs) members who were purposively selected per LGA to elicit first hand and documented primary information. Four (4) out of the twenty (20) selected project participants from each selected LGA were purposively selected to be female while sixteen (16) were male to ensure gender balancing. Ten (10) non-project participants used as respondents were made up of traditional rulers, community and opinion leaders from each of the selected LGAs. They were randomly selected as key informants to obtain independent information, which were needed to cross-check some of the information volunteered by the project participants used as respondents. Data were collected with the aid of a well-structured and pre-tested interview schedule, which fully reflected the study objectives.

**Fadama III Projects Assessed:** A total of seven (7) different small-scale community owned projects, which were mostly replicated in the participating communities were evaluated in nine (9) communities. They are:

- 1. Open market stalls with toilets and incinerators
- 2. Lock-up market stores with toilets, deep well with overhead tanks and incinerator
- 3. Manual mono pump borehole
- 4. Reticulated borehole
- 5. Box culverts
- 6. Access roads
- 7. Irrigation projects

**Data Analysis:** All quantitative and qualitative data were analyzed using standard statistical procedures for data entry, filled questionnaires were cross-checked in the field to detect and correct or remove inconsistencies or improper administration of instruments. The quantitative data were entered and analyzed using primary descriptive statistics. Cost analysis ratios were calculated using average values of variables of projects in all benefiting communities in each

of the selected LGA. The average of variables for each of the LGAs were then pooled together to obtain variables' values for the entire study area.

**Economic Viability Analysis**: The analysis of measures of the worth of projects (cost analysis ratio) is very critical to the evaluation of economic viability of any project. It is a measure of a projects' financial attractiveness (Glittinger, 1972). These are economic decision rules used to analyze the financial feasibility of investment opportunities. The measures evaluated in this study are:

1. **Net Present Value (NPV)**: This shows all the returns over the life span of the infrastructures which is assumed to be 20 years. All these returns are expressed in their present values. The net present values of the projects were determined using the relationship:

$$NPV = \frac{\sum Bt^{n} - ct}{t = 1 (1 + r)^{n}}$$

Where Bt = Benefit

Ct = Cost

r = interest rate (assumed to be 26%)

2. **Benefit-Cost Ratio** (**BCR**): This is the ratio of discounted costs to discounted revenue. The BCRs were determined using the relationship:

$$BCR = \sum_{t=1}^{n} \frac{Bt}{1(1+r)^{n}}$$

$$\frac{\sum_{t=1}^{n} \frac{c t}{1(1+r)^{n}}}{\sum_{t=1}^{n} \frac{c t}{1(1+r)^{n}}}$$

3. **Internal Rate of Return (IRR):** This is the rate of return that is being earned on capital tied up while it is tied up, after allowing for recoupment of the initial capital. It is also called the yield of an investment. IRR was determined for each infrastructure using the following relationship:

**Sustainability Test**: Sustainability of the projects were measured through a 5-items / 5-point Likert-like perception tool administered on the respondents.

#### RESULTS AND DISCUSSION

#### **Respondents' Socio-Economic Characteristics**

Table 1 reveals that, majority of the respondents (53.7%) were male while 46.3% were female. This might not be unconnected with the fact that the selection of respondents for the study skewed towards male and that is because more male participated in Fadama III projects. This shows that, male generally show more interest in activities that entails community involvement

and participation. This is in agreement with the earlier finding of Ajayi (2008) that, male rural dwellers in the south-western Nigeria are generally easier to mobilize for adoption of innovations and community development activities.

Results of the analysis of the ages of the respondents in the study shows that majority of them were within the age brackets of 30-39 years and 40-49 years (55.2%) while those in the age ranges of 50 years above are 38.5%, and those below 30 years are 6.3%. This implies that men and women of active and productive age are still preponderance in the rural area of Ondo State. This could be due to the inherent nature of an average Ondo State person who would prefer to stay back in the rural communities farming than to migrate to the cities searching for in menial jobs or non-profitable ventures.

As shown in table 1, respondents were mostly married (64.1%) while those widowed are 14.80%, the divorces are 1.8% and the single ones are 19.3%. This further reinforced the earlier finding of Iwala (2007) that the rural area of Ondo State is populated mostly be married people with the attendant implication that such married people would have more people in their households to benefit from infrastructural development of their communities.

The greater portion (81.1%) of the respondents had one form of formal education or the other while only 18.9% of them never had opportunity of formal education. Education has been discovered to be a great factor in understanding the need for involvement and participation in interventionist programmes towards community development. it is also seen as a very critical variable that could enhance the sustainability of infrastructural projects in the rural communities (Farrington, 1997).

Table 1 also reveals that majority of the respondents (51.9%) engaged in farming/fishing activities, 20% are traders, while the rest 28.10% are either serving or retired civil servants, artisans and those engaged in other enterprises. This confirms that the main occupation in the study area remains agriculture followed by trading which is mostly in agricultural produce and products. Such a predominantly agrarian society with inherent potentials of enhancing the nation's food security, providing job opportunities and raw materials for the industries can hardly maximize its potentials without the presence of rural infrastructure which could make life more abundant for the rural folks.

## Impact of Fadama III Projects on Beneficiaries' Average Annual Net Benefit

This section discusses the economic impact of the rural infrastructures funded by Fadama III project. Table 2 shows that, the 2009 average annual net benefit for beneficiaries of all selected projects ranged from N54,034.81 to N93,657.46 before and N70,466.32 and N125,861.50 after full project implementation. This shows that the projects had positively and significantly impacted on the incomes of the beneficiaries. The average annual net profit had also generally increased by about 28.57%. This value which was achieved in the fourth year of the project is already above the goal of 20% increase which Fadama III get to achieve for 50% of beneficiaries after the sixth year of operation. The result of this study also reveals that, both Fadama III participants and non-participants have benefited from the positive spill over benefits of the project. Beneficial effects of down stream Fadama III rural infrastructure such as modern markets, boreholes, box culverts, access roads and irrigation packages have created sustainable commercial outlets for both Fadama III participants and non-participants alike. The

presence of market-related infrastructure (especially rural access roads) not only reduced delivery costs but also made it easy for traders to reach farmers in rural areas. This invariably will enhance farmers' bargaining power. For example, the non-participants benefit from both access roads and culverts constructed by the project and road is one infrastructure that is expected to have wider spill over benefits on even non-participating communities. Rehabilitated rural roads exert positive impact on the waiting time for vehicles, waiting time for motorcycles, access to farm land, easy transportation of goods, easy access to market, easy access to community, reduced spoilage of farm produce, reduction in transportation cost, access to social amenities, increase sales and increased patronage.

Table 1: Distribution of respondents by selected socio-economic characteristics

Respondents (N=270)

Household characteristics	Frequency	Percentages
Sex		
Male	145	53.7
Female	125	46.3
Age (Years)		
Less than 30yrs	17	6.3
30 - 39	36	13.3
40 - 49	113	41.9
50 – 59	87	32.2
60 and above	17	6.3
Marital Status		
Single	52	19.3
Married	173	64.1
Widowed	40	14.8
Divorced	5	1.8
Level of Education		
No formal education	51	18.9
Primary school attempted/completed	75	27.8
Secondary School attempted	40	14.8
Secondary school completed	60	22.2
OND/NCE	20	7.4
HND / First Degree	15	5.6
Post Graduate	9	3.3
Occupation		
Farming / Fishing	140	51.9
Trading	54	20.0
Serving / retire civil servants	47	17.4
Artisans	23	8.5
Others	6	2.2

Source: Field Survey, 2014

Table 2: Impact of Selected Fadama III projects on Beneficiaries' Annual Average Net Benefit before and after (2009 and 2013) Fadama Intervention

S/N	Infrastructure	Community	Average Annual Net Benefit ( <del>N</del> )		Actual Difference between Average Annual Benefit	Percentage Difference between
			2009	2013	Amidai Benerit (₦)	Average Annual Net Benefit
1.	16 open markets stalls	Erinla, Ondo West, LGA	73,284.6	104,650.13	31,365.53	29.7
2.	8 Rooms lock-up market stores	Uso, Owo LGA	90,352.13	125,861.50	35,509.37	28.21
3.	Manual Mono pump borehole	Ugbe, Akoko North-East LGA	57,785.22	70,466.32	12,681.10	18.0
4.	Reticulated borehole	Owena Barracks, Akure, Akure South LGA	54,034.81	73,568.44	19,533.63	26.55
5.	Box Culvert	Eyingu, Ile- Oluji/Oke-Igbo LGA	65,398.25	98,250.77	32,852.52	33.44
6.	13km Access Road	Sogbon/Idobi Layo Okitipupa LGA	85,728.32	113,483.65	27,775.33	24.46
7.	Cross FCA Irrigation Project	Elemo, Ifedore LGA	69,892.95	105,735.86	35,842.91	33.90
8.	7km Access Road	Oyemewa, Akoko South LGA	93,657.46	129,895.25	36,237.79	27.90
9.	16 Open Market Stalls	Akotogbo, Irele LGA	59,575.18	91,208.51	31,633.33	34.68

Source: Field Survey, 2014

## **Economic Viability of Selected Fadama III Sponsored Small-Scale Rural Infrastructure**

Table 3 shows the summary cost analysis ratio of selected community-owned small-scale rural infrastructure sponsored by Fadama III project in the study area. The table reveals that the Net Present Values (NPVs) of the projects ranged between N137,369.59 and N270,406.15 at 26% discount factor. The table further shows that the Benefit-Cost Ratios (BCRs) of the projects ranged from 1.3 to 1.69 while the Internal Rates of Returns (IRRs) ranged between 51.85% and 58.15%. The implications of the results of the analysis as presented is that all the projects are economically viable since all the NPVs are positive, all the BCRs are greater than 1 and all the IRRs are above average (50%). The result of this analysis is also a positive indication to sustainability of the projects.

Table 3: Summary Cost Analysis Ratio of selected Fadama III sponsored Small-Scale Rural Infrastructure

S/N	Infrastructure	NPV (N)	BCR	1RR %
1.	Open market stall	206,025.18	1.3	51.9
2.	Lock-up market stores	200,673.76	1.6	55.5
3.	Manual mono pump borehole	224,947.40	2.1	51.85
4.	Reticulated borehole	270,465.15	2.7	54.19
5.	Box culvert	137,369.59	2.07	55.21
6.	Rehabilitation of Access Roads / 5km	162,247.881	2.69	56.25
7.	Irrigation Project	175,004.75	1.54	58.15

NPV = Net Present Value, BCR = Benefit / Cost Ratio, IRR = Internal Rate of Return Source: Field Survey, 2014

# Respondents' Perception of Sustainability of Selected Fadama III Sponsored Small-Scale Rural Infrastructure

This section assesses respondents' perception of sustainability of the projects implemented in various benefiting communities. In table 4, item 1 states that the projects were sited in good locations. The respondents were largely favourably disposed to the locations of the projects (mean = 3.72). This clearly shows that the projects were sited in centralized and convenient locations. Favourbale location of projects like market stalls and borehole will engender regular patronage. Also, good access roads and culverts and even siting irrigation projects in a location where more than one community can benefit will engender higher patronage which will expectedly enhance project sustainability. Item 2 states that the quality of projects was not too good. This item attracted unfavourable response as shown in table 4 (mean = 2.05). This implies that the projects were of high standard and implemented to specifications. This might not be unconnected with the intensive capacity-building given to the beneficiaries coupled with the freehands given to the FCAs/FUGs to fully take charge of the supervision and monitoring of service providers during implementation. The response to item 3 which states that users' fees i.e. amount charged for the usage of the projects by the FCAs was on a high side was not favourable (mean = 2.25). This implies that the fees charged for using the projects by both participants and non-participants were very moderate. Affordable users' fees is expected to encourage full and regular patronage which will inturn guarantee regular income, part of which will be needed for regular project maintenance to enhance sustainability. Item 4 states that, since the full execution of the projects, the project participants (FCAs & FUGs) were no more holding their regular meetings. The respondents' did not agree with this statement. The mean value for their response was 1.59. This shows that the project participants were still holding regular meetings, even after the fourth year of project completion. This might be as a result of the fact that, the other five components of Fadama III project were still on-going. Regular meeting of beneficiaries would afford them the opportunities to regularly know the physical or functional states of the projects for the purpose of maintenance. Also, regular participants' meeting will encourage regular payment of the token levies expected to be paid to the coffers of the FCAs/FUGs. Fines are also imposed on every member like absentees, late comers and donations could also be collected at such meetings which are usually used to compliment users' fees and banked for future need such as project maintenance, to ensure sustainability. The response to item 5, which states that Fadama III State Project Office (FSPO) has always availed project participants the opportunities of capacity building and extension services to guarantee projects' sustainability was favourable (mean = 3.96). This reveals that the first main component of Fadama III projects which is capacity building, local governance and communication was being effectively carried out to enhance projects' sustainability in the state.

Table 4: Respondents' perception of Sustainability of selected Fadama III Small-Scale Rural Infrastructure

Item	SA	A	$\mathbf{U}$	D	SD	$\overline{\mathbf{X}}$
1	150(55.60	95(35.2)	5(1.8)	12(14.4)	8(3.0)	3.72
2	9(3.3)	15(5.60	2 (0.7)	124 (45.9)	120 (44.5)	2.5
3.	-	-	25 (9.3)	10 (3.7)	235 (87.0)	2.25
4.	-	4 91.5)	20 (7.40	127 (47.0)	119 (44.1)	1.59
5.	68(25.20	65 (24.1)	80 929.6)	22 (8.1)	35 913.0)	3.96

<sup>\*</sup> Percentages in parenthesis

SA = Strongly agreed; A = Agreed; U = Undecided; D = Disagreed

 $SD = Strongly disagreed; \overline{x} = mean value$ 

Source: Field Survey, 2014

## CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, the following conclusions were made: the project has profound economic impact on the beneficiaries as it had significantly increased their average annual gross margin by about 28.57% in the fourth year of full implementation. This feat has inturn greatly reduced poverty and significantly improved the socio-economic well-being of the beneficiaries. Non-Fadama III participants have also significantly benefited from the positive spill over effects of these projects in the areas of accessible rural roads, culminating in reduced waiting time for vehicles and motorcycles, reduced travel time and reduced cost of transportation. They have also enjoyed conducive marketing environment and potable water at affordable costs. Economic analysis of the projects revealed that, they were all economically viable and the perception assessment clearly revealed that, all the projects were sustainable.

The study recommended Fadama III approach as worthy of emulation by government at all levels and every development partners in their quest for poverty reduction and rural development. It is further recommended that no efforts should be spared by federal, state, LGAs and indeed, the beneficiaries from promptly payment of their respective counterpart funds to forestall unnecessary delays in project execution and smooth running of supervising agencies.

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