



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

An Analysis of Poverty Status of Fadama II and Non Fadama II Beneficiaries in Rural Oyo State, Nigeria

Oni, O. A^{1*}; O.T. Olaniran¹

¹Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.

Abstract

This paper analyzes the poverty status of Fadama II and non-Fadama II beneficiaries in rural Oyo State, Southwestern Nigeria. The sample survey data were collected from 450 rural households comprising of purposively selected 150 beneficiaries of Fadama II, 150 non-beneficiaries within Fadama II local government and 150 non-beneficiaries outside the local government. Propensity Score Matching technique was used to select comparable observations which reduced the sample size to 412 observations. The prevalence of poverty was found to be highest among the non-beneficiaries within fadama II LGA (73%), followed by non-beneficiaries outside fadama (69%) and Fadama II beneficiaries (38%). Key factors that influence poverty were household size, educational status, credit utilization and being a Fadama II beneficiary. To reduce poverty, this study suggests that the project should be extended to the non-benefiting communities since findings have shown that being a beneficiary reduces the probability of being poor. There is also a need to promote birth control programme among respondents since findings have shown that higher household size increases the probability of being poor, while acquiring formal education should also be promoted among respondents.

Key words: *Rural households Propensity Score Matching, Fadama, Poverty, Southwest Nigeria*

**Correspondence E-mail: waleoniayo@yahoo.com; Telephone number: +234-8060261419*

Introduction

The study of economic history provides us with ample evidence that an agricultural revolution is a fundamental pre-condition for economic development (Eicher and Witt, 1964; Oluwasanmi, 1966). The agricultural sector has the potential to be the industrial and economic springboard from which a country's development can take off.

Indeed, more often than not, agricultural activities are usually concentrated in the less-developed rural areas where there is a critical need for rural transformation, redistribution, poverty alleviation and socio-economic development (Stewart, 2000).

However, in Nigeria the agricultural sector suffered neglect during the hey-days of the oil boom in the 1970s. Ever since then Nigeria has been witnessing

extreme poverty and insufficient food supply. Historically, the roots of the crisis in the Nigerian economy lie in the neglect of agriculture and the increased dependence on a mono-cultural economy based on oil. Increasing reduction in productivity has continued to characterize Nigerian agricultural sector thereby limiting the ability of the sector to perform its traditional role in economic development. In order to break this cycle and improve the performance of the agricultural sector, the Nigerian government over the years introduced and implemented several policies and programme aimed at revamping the sector (Ajibefun and Aderinola, 2004). These programmes and project include: Directorate of Food; Roads and Rural Infrastructure (DIFFRI) and the World Bank-assisted National Fadama Development Projects. Their main aim was to ameliorate the suffering of the people through provision of employment, infrastructure and enhanced access to farming asset facilities.

The World Bank-assisted National Fadama Development Project (basically initiated as wetland farming) was first implemented on pilot basis (1993-1999). The main thrust of Fadama II, is to sustainably increase the incomes of the Fadama users through empowering communities to take charge of their own development agenda. This study is therefore interested in ascertaining whether the Fadama II project has actually been able to improve the income (i.e. reduce their poverty status) of its beneficiaries compared to its non beneficiaries.

Poverty is the inability to adequately meet the basic human necessities of food, clothing and shelter. It is a broad, multidimensional, partly subjective phenomenon often viewed as both the cause and symptom of achieving underdevelopment. It is manifested in

many ways, including the lack of capability by individuals or groups to function and feed well in the society. The alleviation of Poverty is an important development agenda for developing countries for the improvement of overall social and economic conditions. Without social and economic programmes to alleviate poverty, society will continue to be caught in a vicious economic cycle of underdevelopment. The growth in income per capita is the main source of reduction in poverty in most countries. This has been supported by the work of Dollar and Kray (2002); Ravallion and Datt (1996); Bhagawati (2001); and Datt and Ravallion (1992).

The Second National Fadama Development Project supported by the World Bank is one of the recent efforts towards boosting production and enhancing farmers' welfare. Studies have been conducted on Poverty, Fadama and also on both topics in Nigeria. This includes Babatunde *et al* (2008), Nkonya *et al.*, (2007), Kudi *et al.*, (2008), Oni *et al.*, (2007) and Yusuf *et al.*, (2008). However the present study differs from the above related studies in terms of methodology and scope. It adopted a new approach to analysis of poverty status of groups compared (i.e. beneficiaries and non beneficiaries) called Propensity Score Matching (PSM). This approach eliminates the problem of selectivity bias (or selection on observable) to make sure that the characteristics of beneficiaries and non beneficiaries being compared are the same. Propensity Score Matching is a method of sampling from a large reservoir of potential controls in which the goal is to select a subset of the control sample that has covariate values similar to those in the treated group. One can attempt to match on all covariates, but this may be difficult to implement when the set of covariates is large. In order to reduce the dimensionality of the matching problem,

Rosenbaum and Rubin (1983) suggested an alternative method which is based on matching on the propensity score $p(X)$.

Though this study centers on Fadama project, it is different in scope and methodology compared to related study since it combines the use of propensity score matching, FGT, and Probit model as its analytical tool. It therefore seeks to analyse the poverty status of the beneficiaries of Fadama II with those of non-beneficiaries as well as identifying specific factors driving the poverty status of respondents in rural Oyo state. Specifically, this paper will (1) examine the poverty profile of Fadama II beneficiaries and non-beneficiaries and (2) determine the factors influencing their poverty status using rural Oyo state as a case study.

2. Theoretical framework

Needs may be relative to what is possible and are based on social definition and past experience (Sen, 1999). The extent of absolute poverty is defined as the number of people who are unable to command sufficient resources to satisfy basic needs. They are counted as the total number of people living below a specified minimum level of real income—an international poverty line. That line knows no national boundaries, it is independent of the level of national per capita income, and takes into account differing price levels by measuring poverty as anyone living on less than one dollar per day. Absolute poverty exists everywhere regardless of country or continent.

Relative poverty is the inability to attain a given minimum contemporary standard of living and identifies those individuals that are the poorest within the overall pattern of income distribution within a given society (D'Silva and by south, 1992 and Oduosla, 1997). The

proponents of the concept of relative poverty assert that the position of an individual in relation to the other members of his society with respect to degree of satisfaction determines whether he is poor or not. If the average levels of household resources are considered as an indicator of the standard degree of satisfaction in the society concerned, then the households whose resources are less than a specified percentage of this average are considered poor because they do not have enough to take part in the average living experience of that society. Various authors emphasize the change of stress from the absolute poverty lines to the relative poverty lines. [Fuchs (1965); Rainwater (1969); Rein (1974); Lansley (1980); O' Higgins and Jenkins (1990) and Teekens and Zaidi (1990)], all proposed that the poverty line should be linked to an indicator of the average standard of living in the society. A lot of models have also been designed to measure poverty. This include the Sen Index (Sen 1976) Pa weighted poverty measure (Foster *et al*, 1984), UNDP, 1990), the food security index (FSI), Integrated poverty index (IPI), Basic needs index, and relative welfare index (IFAD, 1993).

In measuring poverty, Sen (1976) put forward three axioms which a good poverty measure must satisfy. These are: the focus or proportionality, monotonicity and transfer axioms. Later the decomposability axiom was introduced. These characteristics of poverty are multidimensional, encompassing various aspects of a household's economic and social status. Capturing these dimensions requires both qualitative and quantitative indicators. In development practice, three major types of poverty assessment methods are generally used. These include: Construction of a poverty line and computation of various poverty measures that take into account the way in which actual household expenditures fall

short of the poverty line (Ravallion 1994; Foster, Greer, and Thorbecke 1984; Moser *et al.* 1994, Streeten 1994); Rapid appraisal and participatory appraisal methods in which households are ranked with respect to their wealth by community members themselves, and Construction of a poverty index using a range of qualitative and quantitative indicators (Hatch and Frederick 1998; Chung *et al.* 1997). For the purpose of this study the poverty decomposition method that takes in to account the way in which household expenditure falls relatively (i.e. Foster, Greer, and Thorbecke 1984) the below the poverty line will be adopted.

3. Methodology

3.1. Study area and data

The data for this paper was collected on beneficiaries and non-beneficiaries of Fadama II project in Oyo state, Southwest zone of Nigeria. The state is bounded in the west by Benin republic in the south by Ogun State, in the East by Osun State and in the North by Kwara State. It has a population of about 5.6 million people by the provisional population figure of National Population Commission (2006). Oyo State has thirty-three local Government Areas (LGAs) out of which only 10 is currently participating in Fadama II project. These include Akinyele, Iddo, Olorunsogo, Ona- ara, Orire, Oyo- west, Surulere, Egbeda, Ibarapa- North, and Iwajowa. Like other states in the Southwestern region of Nigeria, Oyo State experiences two seasons, the dry harmattan and the wet rainy seasons. The state weather favors the growth of a variety of food and cash crops. The food crops grown in the state include yam, maize, cassava, cowpea, sorghum, soybean, okra, pepper, groundnut, guinea corn, melon and rice

while cash crops include cocoa and oil palm.

A multi-stage sampling technique was adopted to select respondents'. The state was first stratified into two including areas (Local government areas; LGAs) participating in Fadama II project and those not participation. Five local government areas (Iddo, Akinyele, Ona- ara, Egbeda and Ibarapa North) out of the ten participating in the Fadama II project were randomly selected. Similarly five local government areas (Oluyole, Lagelu, Ibarapa East, Ibarapa Central, and Afijio) where Fadama II project was not executed were also randomly selected. The second stage involved the selection of fifteen Fadama Community Association (FCAs) each from the benefitting LGAs. As for the non-benefitting populations, samples were drawn from five villages each of the Fadama communities and non- Fadama communities. Lastly respondents from the three groups (beneficiaries and two groups of non-beneficiaries resident in Fadama communities and non-Fadama communities) selected based on proportionate sampling. In all, 450 farmers consisting of 150 Fadama II beneficiaries, 150 Fadama II non-beneficiaries within Fadama area and 150 non-beneficiaries outside Fadama area were selected. However, for the matching analysis only 412 samples were found suitable. Data on socio economic characteristics income and expenditure were collected using structured questionnaire and interview schedule. Descriptive, Foster, Greer and Thorbecke (FGT) poverty decomposition model and probit model were used to analyse.

3.2. Analytical methods

Propensity score matching (PSM) was used to assess the impact of the Fadama II project on the beneficiaries. PSM in its simplest form involves predicting the

probability of treatment on the basis of observed covariates for both the treatment and the control group samples. This probability, (the propensity score) is then used to match treated and untreated observations – for example, through nearest neighbour matching. The difference in mean outcomes between the two groups is used as a reasonable estimate of the impact. The advantage of this method is that it reduces dependence on parametric assumptions and it also reduces problem of comparing non-comparable observations. The drawback is that imperfect matching may result in bias and it is often difficult to find comparable non-participants.

The Matching method does the following: 1) Assume that all relevant differences between the groups (i.e. Fadama II beneficiaries and non beneficiaries) are captured by their observables X : 2) Select from the non-treated pool a control group (Non beneficiaries) in which the distribution of observed variables is as similar as possible to the distribution in the treated group (Beneficiaries). According to Nkonya *et al.*, (2007), impact assessment studies face interrelated challenges in establishing a viable counterfactual in predicting outcome in the absence of the intervention—that is, what would have happened to the beneficiaries had they not participated in the project; for example if the project's outcome indicator is household expenditure, the average impact of the project on its beneficiaries referred to in the impact assessment literature as the average effect of the treatment on the treated [ATT] is defined as the difference between the expected expenditure by project beneficiaries while participating in the project and the expected expenditure they would have received if they had not participated in the project:

$$ATT = E(Y_1|p = 1) - E(Y_0|p = 1) \dots\dots (1)$$

where ATT = Average impact of Treatment on the Treated; $p = 1$ participation in the project, or non=participation); Y_1 = expected outcome (household expenditure, in this example) of the project beneficiary after participation in project; Y_0 = expected outcome (expenditure) of the same beneficiary if he or she had not participated in the project.

We however cannot observe the counterfactual expenditure of the beneficiaries had they not participated in the project— $E(Y_0|p = 1)$. Simply comparing expenditure of households participating in the project with those not participating could result in serious biases, because the two groups may be quite different and thus likely to have different expenditure regardless of their participation in the project. For example, adding and subtracting $E(Y_0|p = 0)$ on the right side of equation (1) results in the following:

$$ATT = [E(Y_1|p = 1) - (E(Y_0|p = 0))] - [E(Y_0|p = 1) - (E(Y_0|p = 0))] \dots\dots\dots(2)$$

The first expression (within the first set of square brackets) is observable because it is the difference between the expenditure of the beneficiaries and non-beneficiaries. The second expression is unobservable because $E(Y_0|p = 1)$ is unobservable and thus represents the bias resulting from estimating ATT as the first expression. There exist two common sources of bias. (1) Project placement or targeting bias, in which the location or target population of the project is not random and (2) Self-selection bias, in which households choose whether or not to participate and thus may be different in their experiences, endowments, and abilities. The most accepted method to address these biases is to use an experimental approach to construct an

estimate of the counterfactual situation by randomly assigning households to treatment (beneficiary) and control (no beneficiary) groups. Experimental approach makes it possible to choose groups that are statistically similar (i.e., drawn from the same distribution) in both observable and unobservable characteristics, thus avoiding project placement and self-selection biases. Such an approach is not feasible in the present study because project placement and participation decisions were used before the design of the study and were not random. The notion of random assignment also conflicts with the nature of the Community Driving Development (CDD) project (of which Fadama project is one), in which communities and households make their own decisions about whether to participate and what activities they will pursue. Therefore the random or experimental design cannot be used for this project.

According to Nkonya *et al.*, (2007) various quasi-experimental and non-experimental methods have been used to address the bias problem. The most commonly used quasi-experimental methods is propensity score matching (PSM), which make use of project beneficiaries and non-beneficiaries who are as similar as possible in terms of observable characteristics expected to affect project participation as well as outcomes. The difference in outcomes between the two matched groups is normally interpreted as the impact of the project on the beneficiaries.

The PSM method matches project beneficiaries with comparable non-beneficiaries using a propensity score, which is the estimated probability of being included in the project. The PSM choose only beneficiaries and non-beneficiaries with comparable propensity scores used to estimate the ATT. Those who do not have comparable propensity

scores are dropped from the comparison groups. In this study, 38 out of 450 observations were dropped, while 412 matched. Therefore, we used only the matched observations to analyze the poverty status of beneficiaries and non-beneficiaries. However, it should be noted that PSM is subject to the problem of “selection on unobservable” meaning that the beneficiary and comparison groups may differ in unobservable characteristics, even though they are matched in terms of observable characteristics (Smith, and Todd, 1998). In this study, we address the problem of selection on unobservable by combining PSM with the use of the double-difference (DD) estimator. The double-difference estimator compares changes in outcome measures (i.e. change from before to after the project) between project participants and nonparticipants, rather than simply comparing outcome levels at one point in time.

The advantage of the DD 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 nonparticipants equally (Nkonya *et al.*, 2007). Thus, for example, if project participants and nonparticipants are different in their asset endowments (mostly observable) or in their abilities (mostly unobservable), and if those differences have an additive and fixed effect on outcomes during the period studied, such differences will have no confounding effect on the estimated ATT.

By combining PSM with the DD estimator, controls for differences in pre-project observable characteristics can be established. There however exist some shortcomings in the use of PSM which are

common to all non-experimental methods of impact assessment. Therefore the use of PSM and DD methodology is not as perfect as when impact assessment study uses experimental approach.

The propensity scores were computed using binary probit regression models. The explanatory variables used in computing the propensity scores are those expected to jointly determine the probability to participate in the project and the outcome. This study makes use of variables such as age, gender, household size, farm size, education, state and primary occupation as explanatory variables.

The Foster, Greer and Thorbecke (FGT) poverty decomposition model was used to estimate the poverty head count (Incidence), poverty depth and poverty severity. The Foster, Greer and Thorbecke (1984) weighted measure of poverty is based on income or expenditure of the household and it is a class of parametric poverty measure that satisfies Sen's transfer axiom which requires that when income is transferred from poor to the richer household, it induces an increase in the poverty measure. It includes factors that are sensitive to changes in inequality among the poor, changes in income shortfall and changes in the number of the poor. It is expressed as:

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^{\alpha} \left[\left(z - \frac{y_i}{z} \right) \right]^{\alpha} \dots\dots\dots(3)$$

Where n = total number of households
 y_i = Income or expenditure of the i^{th} household.

Z = Poverty line (using 2/3 of mean per capita monthly Household expenditure)

α = the degree of poverty aversion.

The poverty line was arrived at using the mean per capita estimate of

respondent to partition them into being poor and non-poor.

The socio-economic factors that influence poverty status were also investigated with probit model. The household based on FGT measures were classified to poor and non-poor. Using this type of data, the ideal model will be probit model since Ordinary Linear Regression will give biased estimate due to violation of some basic assumptions of econometric model: The probit model was used to analyse how socioeconomic /demographic variables influence the probability of being poor. The probit model uses the cumulative normal function to model the probability of occurrence of an event. The dependent variable represents a Yes/No outcome. Given the regressors x_i , the goal is to describe $P(y_i = 1 / x_i)$ as full conditional distribution. The estimated model is stated as:

$$P_i = B_0 + \beta_i X_i + e_i \dots\dots\dots(4)$$

Where $P_i = 1$ if the household is poor and 0 if otherwise.

X_i = Vector of explanatory variables

β_i = Slope or coefficients, $i = 0, 1, 2, \dots$

e_i = Independently distributed error term

i = number of households = 1, 2, 3.....412

The probability of being in poverty is related to the following independent variables explicitly stated as:

X_1 = Sex of household head (1) if male, 0 if otherwise)

X_2 = Age of household head (in years)

X_3 = Educational status of household head (Years)

X_4 = Household Size (Number)

- X_5 = Occupation of household head (1 if farming, 0 if otherwise)
 X_6 = Value of assets owned (Naira)
 X_7 = Years of farming business experience (Years)
 X_8 = Credit utilization (1 if household utilizes credit; 0 if otherwise)
 X_9 = Beneficiary status (1 if beneficiaries; 0 if non beneficiaries)

4. Results

4.1. Socioeconomic characteristics

The characteristic of the beneficiaries and non beneficiaries of Fadama II is presented in Table 1. The vast majority (not less than 60%) of the respondents are male which invariably means that the male dominates agricultural production and agricultural related activities. The percentage of married is not different across the three observations with the Fadama beneficiaries recording a relatively high percentage of the widowed (38.5%). This is in line with the policy of Fadama aimed at encouraging the less privileged in the rural sector. The non-beneficiaries within Fadama recorded the lowest percentage of those that are less than 40years, while Fadama beneficiaries recorded a higher percentage. Those above 60years were not different across the three groups. The mean age of Fadama beneficiaries is 47years, non-beneficiaries outside Fadama 47years, non-beneficiaries inside Fadama 48years. These result

shows that the mean age is not different across the three groups and that the farmers and those involved in agricultural related activities are at the peak of their productive years. This therefore necessitates the need to encourage the youth to participate in agriculture. The mean household size for the Fadama II beneficiaries is approximately 6 members, non-beneficiaries also has 6 members as the mean household size, while the same goes for the non-beneficiaries inside Fadama. This invariably means that the mean household size is not different across the three groups. Fadama II beneficiaries recorded a higher percentage (46.7%) among the groups that attended a higher institution of learning. The mean years of schooling among Fadama II beneficiaries is approximately 9years, while non-beneficiaries both outside and inside Fadama spent approximately 8years in school. There is an increase in income earned by the Fadama II beneficiaries because the mean monthly income among the Fadama II beneficiaries is ~~N~~72,337.35/month, while for the non-beneficiaries outside Fadama N32,463.48/month, and the mean income among the non-beneficiaries within Fadama is ~~N~~32,504.65/month. Out of the total of sampled respondents, 287 are directly engaged in farming activities such as crop production, fisheries, and livestock farming while the remaining are engaged in agriculture related activities like processing and marketing of farm products. Among the groups that

Table 1: Socioeconomic characteristics of respondents

Characteristics	Ben¹ (percentage)	Non-ben. in² (percentage)	Non-ben. out³ (percentage)
Gender			
Male	70.3	64.5	64.2
Female	29.7	35.5	35.8
Household size			
1-6	37.5	30.3	32.2
7-9	27.1	31.8	41.1
More than 9	35.4	37.9	26.7
Age Group			
Less than 40	37.2	29.2	33.6
41-60	33.7	32.9	33.3
Above 60	29.1	37.9	33.1
Marital Status			
Married	33.9	32.3	33.9
Single	27.6	35.9	35.3
Widowed	38.5	30.8	30.8
Educational Groups			
No formal Education	25.0	21.7	43.5
Primary	20.0	33.1	23.9
Secondary	8.3	18.5	22.0
Tertiary	46.7	26.7	10.6
Occupation			
Farming	46.4	63.4	67.2
Others	53.6	36.6	32.8
Membership of Cooperative			
Yes	60.0	28.2	31.2
No	40.0	72.8	68.8
Credit Utilization			
Yes	79.1	29.9	20.3
No	20.9	70.1	79.7
Ownership of land			
Yes	69.4	71.5	39.9
No	30.6	29.5	60.1
Income Group/month			
Less than 10000	22.0	33.0	45.1
10000-20000	37.9	37.9	24.1
Above 20000	40.1	29.1	29.8

¹Ben: Fadama II beneficiaries²Non Ben in: Non-beneficiaries of Fadama II project living within Fadama II project Local Government Areas.³Non-Ben out: Non-beneficiaries of Fadama II project living outside Fadama II Local government Areas.

engage in direct farm activities, the non-beneficiaries outside the Fadama local government recorded the highest percentage of 67.2% followed by the non-beneficiaries within the local government (63.4%) while the Fadama beneficiaries accounted for only about 46.4%. Among those that are involved in other related activities, Fadama II beneficiaries recorded the highest percentage of 53.6% followed by 36.6% for non-beneficiaries within the Fadama, while non-beneficiaries outside Fadama local government area recorded 32.8%. This is in line with the policy of the Fadama where processing, storage and marketing of farm products are encouraged to reduce wastage of farm produce.

Among the groups that owned land, non-beneficiaries living in Fadama Local government area had the highest percentage of 71.5% followed by Fadama II beneficiaries with 69.4% and non-beneficiaries outside Fadama 39.9% respectively. The mean land area owned by Fadama beneficiaries is 1.4ha, while the mean land area for non-beneficiaries outside Fadama is 1.7ha and that of non-beneficiaries within Fadama is 1.0ha. The mean land area for the pooled population is 1.39 hectares. This is a reflection of the subsistence nature of agriculture in Nigeria.

4.2. Poverty profile

From Tables 2a and 2b, the sampled observation revealed that the

prevalence of poverty (P_0) is generally higher among the non-beneficiaries but lower among the Fadama II beneficiaries. This may be due to the intervention of the project. The prevalence of poverty (P_0) is found to be higher among male non-beneficiaries than females. But reverse is the case among Fadama II beneficiaries. This implies that male folks among beneficiaries benefits more than the female folks in terms of poverty reduction programme.

Prevalence of poverty (P_0) is generally lower among Fadama II beneficiaries than the non-beneficiaries in relation to their marital status, except the widows having 60% while the single has 22%. The singles has lower prevalence of poverty (P_0) and it seems they benefit more than the other groups. This implies that the widows' still needs to be effectively targeted with programme intervention to enhance their welfare. But among the non-beneficiaries outside Fadama, poverty incidence (P_0) is higher among the married (71%) while the result is not significantly different within the non-beneficiaries within Fadama. Among the age sub-groups, the poverty rate is higher among the elderly ones that is, those that are above 60 years of age. This may be attributed to their inability to work productively compared to their younger counterparts. But this might implies that there are more income-earning opportunities

Table 2a: Poverty incidence, depth and severity estimates of respondents

Characteristics	Non-beneficiaries outside Fadama			Non-beneficiaries inside Fadama			Beneficiaries			Pooled		
	P ₀	P ₁	P ₂	P ₀	P ₁	P ₂	P ₀	P ₁	P ₂	P ₀	P ₁	P ₂
Sex												
Female	0.65	0.40	0.31	0.71	0.32	0.15	0.48	0.28	0.19	0.54	0.41	0.29
Male	0.70	0.48	0.42	0.72	0.44	0.31	0.33	0.16	0.11	0.61	0.49	0.36
Marital status												
Married	0.71	0.48	0.41	0.72	0.43	0.29	0.39	0.20	0.13	0.58	0.43	0.24
widowed	0.40	0.36	0.32	0.75	0.49	0.39	0.22	0.18	0.15	0.35	0.21	0.15
Single	0.50	0.33	0.26	0.75	0.32	0.16	0.60	0.28	0.15	0.42	0.20	0.11
Older age group												
Less than 40	0.63	0.49	0.44	0.70	0.34	0.22	0.31	0.21	0.18	0.53	0.35	0.28
40-60	0.69	0.44	0.37	0.73	0.45	0.31	0.40	0.17	0.12	0.61	0.36	0.26
Above 60	0.88	0.57	0.49	0.73	0.51	0.38	0.50	0.22	0.13	0.70	0.43	0.33
Household size group												
1-6	0.61	0.47	0.41	0.72	0.41	0.28	0.32	0.17	0.12	0.54	0.34	0.27
7-9	0.86	0.47	0.37	0.74	0.44	0.28	0.52	0.23	0.14	0.73	0.40	0.28
More than 9	0.63	0.42	0.39	0.75	0.51	0.38	0.57	0.31	0.18	0.66	0.42	0.31
Education												
No formal edu	0.80	0.36	0.27	0.93	0.58	0.41	0.54	0.38	0.31	0.74	0.42	0.31
Primary edu	0.71	0.57	0.51	0.82	0.51	0.34	0.61	0.29	0.17	0.72	0.46	0.34
Secondary edu	0.74	0.30	0.51	0.67	0.37	0.25	0.28	0.11	0.07	0.58	0.36	0.29
Tertiary edu	0.46	0.17	0.19	0.54	0.31	0.22	0.17	0.08	0.06	0.34	0.18	0.14
Occupation												
Farming	0.82	0.59	0.52	0.75	0.45	0.30	0.44	0.23	0.16	0.62	0.31	0.25
Others	0.39	0.61	0.11	0.61	0.35	0.25	0.31	0.15	0.10	0.49	0.29	0.15

Table 2b: Poverty Incidence, Depth and Severity estimates of Respondents

Characteristics	Non-beneficiaries outside Fadama			Non-beneficiaries inside Fadama			Beneficiaries			Pooled		
	P ₀	P ₁	P ₂	P ₀	P ₁	P ₂	P ₀	P ₁	P ₂	P ₀	P ₁	P ₂
Land area (Ha)												
Less than 2	0.74	0.48	0.41	0.79	0.48	0.34	0.41	0.22	0.15	0.64	0.40	0.30
2-4	0.55	0.45	0.38	0.52	0.26	0.16	0.36	0.17	0.12	0.47	0.28	0.20
More than 4	0.58	0.39	0.34	0.60	0.31	0.16	0.25	0.06	0.02	0.45	0.24	0.18
Income group												
Less than 10,000	0.88	0.78	0.75	0.90	0.66	0.52	0.40	0.30	0.25	0.78	0.64	0.56
10,000-20,000	0.79	0.65	0.58	0.81	0.44	0.29	0.36	0.18	0.09	0.64	0.39	0.29
Above 20,000	0.59	0.29	0.20	0.63	0.33	0.20	0.39	0.18	0.12	0.52	0.26	0.17
Expenditure group												
Less than 8,000	0.97	0.86	0.79	0.98	0.78	0.65	1.00	0.82	0.71	0.98	0.83	0.73
8,000-24,000	0.63	0.18	0.08	0.89	0.37	0.18	0.53	0.18	0.08	0.68	0.25	0.12
Above 24,000	0.12	0.01	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.04	0.01	0.00

for the younger ones especially those that participate in the programme. The result from the table also revealed that poverty incidence (P_1), depth (P_1) and severity (P_2) seems to reduce (except in some cases) as the number of years spent in school increases. This follows a priori expectation as education enhance the ability of those involved in this agricultural activities to utilize the information at their disposal and maximize their productivity. The result indicates a lower poverty rate among Fadama II beneficiaries than the others, while those that have no formal education need to be effectively targeted with adult education programme.

The decomposition by household size revealed that poverty rate is generally lower among the Fadama II beneficiaries than between other two groups. But comparison among the household sub-groups shows that poverty is much higher among the groups with 7 to 9 members than the other two groups. This implies that there is tendency that poverty correlates with larger household size due to the reduction in per capita expenditure as the number of family members increases.

The result of the poverty decomposition indicate that poverty rate is higher among those that are directly involved in agricultural activities than those that are engaged in agriculture – related activities though the poverty rate is lower among the Fadama II beneficiaries. The seasonal nature of agriculture product has also been a problem that keeps the

farmers below the poverty line than the non-farmers. But encouraging the farmers to practice integrated farming and production all year round is capable of keeping the farmers out of the poverty trap.

Based on land area, poverty rate tends to be higher among those that owned smaller land area. This could be due to the fact that land is a form of asset which can be converted to income at times of need or utilized for production. It is a measure of welfare because amount of land owned can also be used to measure the wealth of individuals due to the price land attract and speculative nature of land.

4.3. Determinants of poverty

The factors affecting the poverty status of the respondents is shown in Table 3. Sex, household size (Hhsz), occupation (Occup), business experience (Bizexp), credit utilization and beneficiary status (Benef) of respondents were found to significantly affect the poverty status of the respondents in the study area. Sex of the respondents is negative and significant at 10%. This implies that more of the female tends to be poor compared to the male respondents. The household size of the respondents is positive and significant at 1%. It shows that the larger the household size, the higher the probability of being poor. The marginal effect is 0.56 indicating

Table 3: Probit regression results on factors affecting poverty status

Variables	Beneficiaries of Fadama II				Non-beneficiaries of Fadama II				Pooled			
	Coefficient	t-ratio	Marginal effect	Elasticity	Coefficient	t-ratio	Marginal effect	Elasticity	Coefficient	z-ratio	Marginal effect	Elasticity
Sex	-0.407	-1.48	-0.148	-0.335	-0.912***	-2.52	-0.342	-0.745	-0.314**	-1.74	-0.124	-0.214
Age	0.009	0.74	0.003	0.490	0.009	0.69	0.004	0.393	0.010	1.35	0.004	0.382
Hhhsz	0.178***	3.37	0.063	1.022	0.119**	1.87	0.047	0.596	0.141***	4.44	0.056	0.639
Eduhead	-0.111**	-2.10	-0.039	-0.533	-0.048	-0.81	-0.019	-0.144	-0.029	-0.96	-0.011	-0.088
Occup	-0.059	-0.22	-0.021	-0.040	0.390	1.25	0.153	0.239	0.325**	2.03	0.128	0.172
Assetva	3.3e-07	0.57	1.2e-07	0.063	0.6e-07	3.89	0.2e-07	0.300	0.000	1.12	0.000	0.036
Bizexp	-0.012	-1.18	-0.004	-0.211	-0.004	-0.37	-0.001	-0.060	-0.017***	-2.99	-0.007	-0.232
Credit	0.146	0.55	0.051	0.108	-0.209	-0.66	-0.083	-0.060	0.341**	2.26	0.135	0.127
Yrclub	0.019	0.83	0.007	0.090	-0.014	-0.55	-0.006	-0.046	-0.001	-0.07	-0.000	-0.003
Benef	-	-	-	-	-	-	-	-	-0.275***	-3.18	-0.110	-0.257
Constant	-1.284**	-2.01			-0.941	-1.49			-0.883	-2.15		

* Significant 10%; ** Significant 5%; *** Significant 1%

that a unit increase in household size will lead to an increase in poverty by 0.56. The main occupation is also positive and significant at 5%. This implies that farming increases the probability of being poor among respondents. The credit utilization status is also positive and significant at 5%. This shows that availability of credit facility does not reduce the probability of being poor. Being a beneficiary of Fadama II programme however, reduces the probability of being poor among respondents. The factors affecting the poverty status of non-beneficiaries as shown in Table 3 indicate sex is negative and significant at 1%. This implies that more of the females have the probability of being poor than the males. The household size is positive and significant at 5%, meaning that the larger the household size, the higher the probability of being poor. Also factors affecting the poverty status of beneficiaries shown in Table 3 indicate household size is positive and significant at 1%. This is similar to what is obtained in the result of the pooled respondents above, meaning that the larger the household size, the higher the probability of being poor. The marginal effect is 0.06 indicating that a unit increase in household size will lead to an increase in poverty by 0.06. The elasticity coefficient of the probability of being poor among the respondents as a result of an increase in household size is 0.63 (inelastic). For non-beneficiaries, the elasticity of the probability of being poor as a result of an increase in household size is 0.60 (inelastic). For Fadama II beneficiaries, the elasticity of the Probability of being poor as a result of an increase in household size is 1.02 (elastic). The elasticity of probability of being poor for beneficiaries as a result of an increase in year of education of the beneficiaries is 0.53 (inelastic).

5. Conclusion and recommendations

Considering the empirical results obtained from this study, we can however conclude that Fadama II project have positively impacted on the lives of the beneficiaries. This will invariably empower the beneficiaries financially above that of non-beneficiaries. The implication of this is that the Fadama II beneficiaries also have more assets at their disposal for agricultural production which will also help them raise more income to meet their daily needs. These results could further be justified by the reduction in incidence of poverty of the Fadama II beneficiaries than that of the non-beneficiaries. Widows still needs to be targeted as poverty is generally high among them. It is also noted that poverty reduces as the year of education increases, while the household size significantly increase the probability of beneficiaries and non-beneficiaries being poor. Arising from the result generated, it is recommended that the Fadama Project should be extended to the non-benefiting communities since findings have shown that being a beneficiary reduces the probability of being poor. Secondly, there is a need to promote birth control programme (i.e family planning programme) among respondents since findings have shown that the higher the household size, the higher the poverty status of the respondents

References

- Ajibefun, I.A. and E.A. Aderinola (2004) Determinants of Technical Efficiency and Policy Implication in Traditional Agricultural Production: Empirical study of Nigeria Food Crop Farmers. Final Report Presentation at Bi-annual Research Workshop of African Economic Research Consortium, Nairobi, Kenya, 2004.

- Babatunde R.O., E.O Olorunsanya and A.D. Adejola (2008) "Assessment of Rural Household Poverty: Evidence from south-western Nigeria." *American- Eurasian Journal of Agric and Environmental science*. 3(6): 900-905 IDOSI Publications, 2008.
- Bhagawati J.N (2001) "Poverty and Public Policy". *World Development Report*, Vol 16(5), 539-654.
- Chung, K., L. Haddad, J. Ramakrishna, and F. Riely. (1997). Identifying the food insecure: Consumption and Nutrition Division Discussion Paper 72. International Food Policy Research Institute Washington DC.
- Dollar D. and Kray. A (2002) "Growth is good for the Poor". *Journal of Economic Growth* Vol 21 No8 Pg 7. Pg 50-67.
- Datt and Ravallion (1992) "How important to India's poor is the sectoral composition of economic growth". *World Bank Economic Review* Vol.20.no 7.Pg 10-28.
- D'silva, E and By south K. (1992), "Poverty Alleviation through Agricultural Projects". Washington D.C World Bank.
- Eicher, C., and Witt, L. (eds.) (1964). *Agriculture in Economic Development*. New York.
- Foster, J., J. Greer, and E. Thorbecke. (1984). A class of decomposable poverty measures. *Econometrica* Vol 52 No(3): Pg761-765.
- Fuchs V., (1965). *Towards a Theory of Poverty*, Task Force on Economic Growth and Opportunity, The Concept of Poverty, Chamber of Commerce of the United States of America, Washington DC, USA
- Hatch, J., and L. Frederick. (1998). Poverty assessment by micro-finance institutions: A review of current practice. Micro-enterprise best practices. Bethesda, MD.
- IFAD. (1993) "The State of World Rural Poverty". A profile of latin America and the Caribbean. International fund for agricultural Development. Discussion Paper 10
- Kudi, T.M., Usman, I., Akpoko, J.G and A.L Banta (2008) "Analysis of the Impact of National fadama Development Project II (NFDP) in Alleviating Poverty among Farmers in Giwa Local Government Area of Kaduna state, Nigeria". *Ozean Journal of Applied Sciences* Vol 1 No1 Pg20-31.
- Lansley (1980) In: M. Asghar Zaidi (1992). "Relative poverty in Pakistan an estimation from the household income and expenditure survey" *Pakistan Development Review*. Retrieved on 9/29/2009 from http://findarticles.com/p/articles/mi_6788/is_4_31/ai_n28620551/?tag=content;coll
- Moser, C., M. Gatehouse, and H. Garcia. (1994). *Urban poverty research sourcebook. Module I: Sub-City Level Household Survey*. UNDP/UNCHS/World Bank Urban Management Programme, UMP Working Paper Series No. 5. Washington, D.C: World Bank.
- NPC(2006); National Population Commission Census Figure. Nigeria
- Nkonya, E., D. Philip, T.Mogues, J.Pander, M.K. Yahaya, G. Adebowale, T.Arokoyo and E. Kato (2007) "Impacts of a Pro – Poor Community – Driven Development Project in Nigeria". IFPRI discussion Paper 00756, IFPRI, Washington.
- Odusola, A. F 1997 Poverty in Nigeria. An Eclectic Appraisal of Selected papers from the Nigeria Economics society's Annual Conference.
- O' Higgins and Jenkins (1990) In: M. Asghar Zaidi (1992). "Relative poverty in Pakistan an estimation from the household income and expenditure survey" *Pakistan Development Review*. Retrieved on 9/29/2009 from http://findarticles.com/p/articles/mi_6788/is_4_31/ai_n28620551/?tag=content;coll.

- Oluwasanmi, H.A. (1966). *Agriculture and Nigeria's Economic Development* Ibadan: Ibadan University Press.
- Oni O.A., R.G Adeola, A. Adebayo, and O.A Murele (2007). "Beneficiary Impact Assessment of Second National Development Project in Oyo State". Oyo State Fadama Fadama Development office, Ibadan, Oyo State.
- Rainwater (1969). In: M. Asghar Zaidi (1992) "Relative poverty in Pakistan an estimation from the household income and expenditure survey" *Pakistan Development Review*. Retrieved on 9/29/2009 from http://findarticles.com/p/articles/mi_6788/is_4_31/ai_n28620551/?tag=content;coll.
- Ravallion, M. (1994). *Poverty comparisons*. Chur, Switzerland: Harwood Academic Publishers.
- Ravallion and Datt (1996). "How important to India's poor is the sectoral composition of economic growth". *World Bank Economic Review*. Vol.10. No 1.
- Rein (1974). In: M. Asghar Zaidi (1992) "Relative poverty in Pakistan an estimation from the household income and expenditure survey" *Pakistan Development Review*. Retrieved on 9/29/2009 from http://findarticles.com/p/articles/mi_6788/is_4_31/ai_n28620551/?tag=content;coll
- Rosenbaum, P.R. and Rubin, D.B. (1983). "The Central Role of the Propensity Score in Observational Studies for Causal Effects", *Biometrika*, Vol. 70, No1, Pg41-55.
- Sen, A. K. (1976) Poverty; An Ordinal Approach to Measurement. *Econometrica* 44:2 219-231.
- Sen, A. (1999). "Development as Freedom". New York: Anchor
- Smith J. and P. Todd (2005). "Does matching overcome La Londe's critique of non experimental estimators". *Journal of Econometrics* Vol 125 No(1-2) Pg 305-353.
- Stewart, R. (2000) Welcome Address" *Proceedings of the 7th World Sugar Farmers Conference*. Durban. www.sugaronline.com/sugarindustry/index.htm (Last accessed, April 16 2002, now discontinued
- Streeten, P. (1994). Poverty concept and measurement. In *Poverty monitoring: An international concern*, ed. R. van der Hoeven and R. Anker, 15-30. New York: St. Martin's Press.
- Teekens and Zaidi (1990) In: M. Asghar Zaidi (1992). "Relative poverty in Pakistan an estimation from the household income and expenditure survey" *Pakistan Development Review*. Retrieved on 9/29/2009 from http://findarticles.com/p/articles/mi_6788/is_4_31/ai_n28620551/?tag=content;coll
- UNDP (1990) "Human Development Report". New York: Oxford University Press.
- World Bank (2006) Report on Nigeria. Retrieved on April 3, 2006 from World Bank website <http://www.WorldBank.org/Nigeria>.
- Yusuf S.A., A.O. Adesanoye and D.O Awotide (2008). "Assessment of Poverty among Urban Farmers in Ibadan Metropolis, Nigeria. *Journal of Human ecology* 24(3): 201-207.