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DETERMINANTS OF POVERTY AMONG FADAMA RESOURCE USERS IN KWARA STATE, NIGERIA.

Adewumi, M.O., Ayinde O. E., Aremu A. O. and C.B.Olatunji.

Department of Agricultural Economics and Farm Management, University of Ilorin, P.M.B. 7515, Ilorin, Nigeria.

ABSTRACT

Africa, over the years has been looking for ways of solving the problem of poverty and food security. This study focused on wetland resource users in the rural areas of Kwara State. The study described the socio economic characteristics of the fadama users, their poverty status, the determinants of poverty as well as the level of infrastructural development in the area. Using a three-stage sampling technique, one hundred and forty fadama resource users were randomly selected from seven Fadama Resource User Groups selected from 20 Fadama Community Associations (FCAs) of the list of registered FCAs provided by the Kwara State Fadama Development Office. The study used descriptive statistics and binary logistic regression model to analyse the data collected from the respondents. The study revealed that more than 55% of the fadama communities do not have storage facilities, agro-processing facilities and collection centers and extension office that are essential for development. Potable water, Cooperative societies and feeder roads were also not available for 40% of the respondents. The infrastructure index analysis revealed that 45% of the communities were underdeveloped and 55% were developed. The study revealed that farmers age, the fadama farm size, infrastructure and non-fadama income were the major determinants of poverty in the study area. It is recommended that the farmers should be encouraged to increase their usage of fadama land.

Keywords: Poverty, Fadama, Infrastructure index

INTRODUCTION

Poverty is a global phenomenon which threatens the survival of mankind. This informed the United Nations declaration of 1996 as the "International Year for the Eradication of Poverty" and October 17 of every year as the "International Day for the Eradication of Poverty" worldwide (Usman, 2001). Poverty is a multidimensional phenomenon with physical, economic, social and psychological dimensions (Narayan and Chambers 2000).

The United Nations has also set up various targets to be met internationally in the fight against poverty. In line with the spirit of these declarations and global reawakening to vigorously address the problem of poverty, major efforts have been made to reduce the level of poverty in Nigeria through the introduction of poverty alleviation programmes by the government and international agencies (Usman, 2001). However, the proportion of Nigerians living below the poverty line of one dollar a day has increased dramatically during the last two decades (ADF, 2004). Poverty in Nigeria is on the increase and its incidence and severity are more in the agricultural sector. It is a major problem which is prevalent in the rural areas as 75% of poor people in developing countries are in the rural areas. (IFAD, 2001).

In fact, the Nigeria poverty situation is precarious, widespread and paradoxical. Despite the fact that the country is greatly blessed with human and material resources, a proportion of her population is still poor. This has been captioned "Poverty in Midst of Plenty" (World Bank, 1996; Adewumi et. al. 2007). The incidences of poverty according to (Punch, 2006) were 28, 46, 43, 66, 70 and 70 percent for 1980, 1985, 1992, 1996, 2001 and 2003 respectively.

Small holder agriculture which is mainly rain fed and characterized by low land and labour productivity is the dominant occupation of rural Nigerians. The country has the potential advantage in the production of a variety of fresh crops especially vegetables during the dry season and livestock product (meat and milk) and fishery products

throughout the year. This is because the country is endowed with underground and surface water reserves, rich pastures and favorable agro-ecological conditions in the country's low lying plains with alluvial deposit called *Fadama* (PCU-NFIDO, 2005). *Fadamas* are low lying areas that are water logged during the rainy seasons but retain moisture during the dry season. *Fadama* lands are the only areas cultivated during the dry season. They are small in size and located in areas regarded as inaccessible and under complicated land ownership. (Alamu, 1996). *Fadama* natural resources and their users can be classified into crop producers, pastoralists, hunters, fishers folks, gatherers, processors, marketers as well as other economic interest groups. (PCU-NFIDO, 2005). In spite of the potential of these resources, production is carried out largely on a very small scale due to inadequate infrastructure, ineffective marketing practices and low human capacity, therefore leading to low productivity. As a result, there is low income generating power which eventually culminates in poverty, thus a poverty assessment of *Fadama* resource users is necessary.

The Nigerian government realizing the importance and potentials of *Fadama* resources and its inhibition by poverty established the National *Fadama* Development Project. The project was designed as a major instrument for achieving the government's poverty reduction objective in the rural areas of the country. Its beneficiaries are the private economic agents who achieve their livelihood directly or indirectly from the exploitation of the natural resources in a given *Fadama* area. (AIDF, 2004). The National *Fadama* Development Project is of great importance as it sets to enhance agricultural production, productivity and value addition for small holders and rural entrepreneurs in lowland areas on a sustainable basis thereby reducing poverty of the rural poor, and also contribute to food security and increased access to rural infrastructure (PCU-NFIDO, 2005).

Fadama lands are rich in pastures, abundant underground and surface water reserves and favorable agro-ecological condition. However, these resources are vulnerable to exploitation due to poverty and uncertainty of the users' income. The *fadama* users are thus faced with difficulties ranging from inadequate access to irrigation water, high cost of inputs as well as inadequate infrastructures (AIDF, 2004). These infrastructures are likened to secondary and tertiary arteries of the body system and they are as critical as the main arteries for blood circulation. These problems are likely to affect the level of productivity and inhibit full utilization of potentials of *Fadama* resources and may consequently affect the profitability of the users and lead to poor standard of living. Hence this study examined the poverty level of *Fadama* resource users.

The specific objectives of the study are to highlight the status of infrastructural development in the study area; assess the poverty status of *Fadama* resource users in the study area; and identify the determinants of poverty among *Fadama* resource users.

JUSTIFICATION FOR THE STUDY

It is imperative to note that identification of the poor as target groups and achieving a better understanding of the nature and dynamics of poverty as policy instruments for development planner is crucial for designing effective programmes to reduce poverty. (Hassan and Babu, 1991). If poverty is to be reduced, its dimension must be identified. These are crucial elements that interveners must understand and take into account in developing policies, projects and programmes. Moreover, poverty is now acknowledged as the main goal of international development. For instance the millennium declaration of the United Nations signed by 189 countries commits the global community to reduce by half the proportion of the world's poor and hungry by 2015 (IFPRI 2001). Ultimately, over time most households in rural areas depend on agriculture and production activities on the farms done mostly during the rainy season. During the dry season, production activities are either reduced or do not take place. However, *Fadama* lands are the only areas that retain moisture during the dry season, and in which

production activities are done successfully in the dry season (Alamu, 1996). Fadama areas provide an avenue and advantage for continuous production, large output and increased productivity.

It is necessary to understand the dimension of poverty and in focusing policy formulation towards reduction of poverty among users of *Fadama* resources. In pursuit of a deeper insight into poverty issues, this study is focused on *Fadama* resource users as a case study due to the immense advantage of *Fadama* lands over the uplands. In line with the goal of the 2nd National *Fadama Development Project* focusing on poverty reduction by improving the living conditions of the rural poor and to contribute to food security. This study could be used as a framework for conducting studies among the *Fadama* resource users and a useful guide in the formulation of policies that will improve the living condition of farmers that derive their livelihood from *Fadama* lands.

THEORETICAL FRAMEWORK

The food energy approach in which, a regression of the individual caloric intake is run against the per capita or adult equivalent expenditure to determine the level of expenditure at which the minimum energy is achieved otherwise known as cost of calories (COC) method (Foster, Greer and Thorbecke 1984, Dertouzos and Krishan, 1996). This method has been applied to several studies whose main focus were on food poverty. Hassan and Babu (1991) in their work on the measurement and the determinants pattern and food poverty in rural Sudan applied the cost of caloric approach to determine the poverty line. This COC method was also used in determining the poverty line in the study of rural poor, food production and demand in Kebbi State (Adejobi, 2004). The situation of poverty could even be considered based on the level of infrastructure in villages. Due to potential synergistic effects of various elements that constitute the complex set of infrastructure, a common index was constructed for all elements that could be used to rank villages to reflect their status of development. According to Ahmed and Hossain, (1990), the infrastructure index number indicates the degree of underdevelopment; the higher the value of the index number the less developed the infrastructure. Based on this, the areas were classified as developed and underdeveloped depending on which side of the line they fall into.

The infrastructure index measure was used in a study on Development Impact of Rural Infrastructure in Bangladesh (Ahmed and Hossain, 1990). This procedure for measuring the degree of infrastructure development is comparable to the method developed by Sen. (1990) for ranking countries by levels of economic development. This measure not only simplifies ranking of villages by reducing a large amount of data to a single measure, it also incorporates many qualitative aspects of infrastructure in a quantitative measure. This quantitative index is essential for capturing the full extent of infrastructural effects in analysis. Certain indirect effects of infrastructure, such as spread of information and development of entrepreneurship among local residents, are by-products of interaction among various elements of what is broadly termed infrastructure. These effects are hard to incorporate in any analysis that does not develop an overall index for infrastructure development (Ahmed and Hossain, 1990).

METHODOLOGY

The study was conducted in Kwara state. The state has a latitude of between 7°45'N and 9°30'N and between longitude 2°30'E and 6°25'E. A three stage technique was used for the study. The first stage was a random selection of 20 *Fadama* Community Associations (FCAs) from the list of registered FCAs provided by the central region of Nigeria *Fadama Development Office*. The second stage involved a random selection of 7 *Fadama* Resource User Groups in each *Fadama* community association. The final stage involved random selection of 5 resource users in each group. The total number of *Fadama* resource users for the study is 140 but only 132 resource user's data were found useful for the analysis.

DATA COLLECTION

The study made use of primary data. The data was obtained by means of an interview schedule.

ANALYTICAL TECHNIQUES

To highlight the status of infrastructural development of the study area, a composite measure of infrastructure was used. This is a composite group consisting of a number of infrastructural elements rather than that of discrete element.

Following Ahmed and Hossain (1990) the infrastructure index (INI) used in this study is given as

$$INF = \sum (W_i \times ICI) / \sum (W_i)$$

$i = (1, 2, \dots, n)$ where $n = 10$ different types of infrastructures

where $ICI = \text{distance} \times \text{cost per (kilometer to destination)}$

$$TC_i = \sum ICI$$

$W_i = \text{Correlation of } ICI \text{ with } TC \text{ (Correlation coefficient)}$

$ICI = \text{Individual cost of access to destination of infrastructure}$

$TC = \text{Total cost}$

$N = \text{Type of infrastructure}$

The elements of infrastructure are as follows: $n_1 = \text{access to health facilities}$; $n_2 = \text{access to market}$; $n_3 = \text{access to storage facilities}$; $n_4 = \text{access to agro-processing unit}$; $n_5 = \text{access to school}$; $n_6 = \text{access to extension services}$; $n_7 = \text{access to portable water}$; $n_8 = \text{access to collection centre}$; $n_9 = \text{access to cooperative society}$; and $n_{10} = \text{access to feeder road}$.

The descriptive statistic such as mean, mode, standard deviation, frequency distribution and percentage were used in describing their demographic characteristics to develop a profile of poverty status of the fadama resource users in the study area. The cost of calories approach was used to determine the poverty line. This method yields a value that is usually close to the minimum calorie requirement for human survival. The nutritional poverty line is given as

$$\ln X = a + bC \dots \dots \dots \text{equation 1}$$

Where X is the adult equivalent food expenditure in Naira.

C is the actual calorie consumption per adult equivalent in kilocalories.

The calorie content of the recommended minimum daily nutrient level (1), (FAO, 1982; Food Basket, 1995) was used to determine the poverty line using the equation

$$Z = e^{(a + bL)} \dots \dots \dots \text{equation 2}$$

Where Z is the cost of buying the minimum calorie intake (poverty line) a and b parameter estimate from equation 1. $L = \text{Recommended minimum daily energy (calorie) level, 2250kcal as recommended by FAO. (1982)}$

Based on this households were classified as poor or non poor depending on which side of the line they fall into. The conversion factor adapted by Storek *et al.* (1991) was used to obtain the per adult expenditure due to the different compositions of household in terms of household in terms of sex and age. The factors are presented in appendix 1. In order to develop a poverty profile, this study adopted the Foster, Greer and Thorbecke (1984) class of poverty measure. This is defined as

$$Pa(x; z) = (1/n) \sum (g_i/z)^\alpha$$

Where $x = \text{total household income}$

$q = \text{number of households with income not greater than } z$

$n = \text{total number of households}$

$$g_i = (z - x_i)$$

$z > 0$ is the predetermined poverty line

α is a measure of poverty aversion

When $\alpha = 0$ Pa will be equal to the poverty headcount ratio. (incidence)

$\alpha = 1$ Pa will be equal to the normalized poverty gap. (depth)

$\alpha = 2$ Pa will be equal to the squared normalized poverty gap

To identify the determinants of poverty among Fadama resource users, the logit regression model was used to identify the determinants of poverty among the Fadama resource users. The logit regression model is one of binary choice regression models in which a dichotomous regression variable is considered as the dependent variable. This model was chosen for this study instead of the linear probability and probit model because the model guarantees that the estimated probabilities lie in 0-1 range and that they are none linearly related to the explanatory variables (Gujarati, 1995). This is an advantage over the linear probability model. In addition it is easier and more convenient to compute than the probit model. The logit model is based on the cumulative logistic distribution function expressed below

$$P_i = E(Y = 1/X_i) = \frac{e^{\alpha + B_1X_1 + \dots + B_nX_n}}{1 + e^{\alpha + B_1X_1 + \dots + B_nX_n}} \quad \text{equation 3}$$

$$P_i = E(Y = 1/X_i) = \frac{1}{1 + e^{-(\alpha + B_1X_1 + \dots + B_nX_n)}} \quad \text{equation 4}$$

$$\text{For ease of exposition, } Z_i \dots = \alpha_i X_i + B_2 X_2 \dots + B_n X_n \quad \text{equation 5}$$

Where P_i = Probability of being non poor

Generally, if the probability of the event is less than 0.5, we predict that the event will not occur, if it is greater than 0.5 we predict otherwise. It is unlikely that the event will probability is exactly 0.5. The log of odds ratio or the Logit (L_i) = $Z_i + u_i$. The logit (L_i) = $\ln(\text{the probability of being non poor} / \text{the probability of being poor})$. In order to obtain the value of Z_i , the likelihood of observing the sample needs to be formed by introducing a dichotomous response variable Y_i such that 1 if the household is non poor and 0 if poor. Where X_i 's are independent variables; B is vector of parameter to be estimated; P is the probability of Fadama household poverty status.

The independent variables are: X_1 = Age in years; X_2 = level of education in years; X_3 = farm size in hectares; X_4 = Adjusted household size in numbers; X_5 = Food expenditure in naira; X_6 = Fadama income in naira; X_7 = Non- Fadama income in naira and X_8 = Infrastructure index in numbers.

RESULTS AND DISCUSSION

Infrastructure Index

The availability of infrastructures may influence their poverty level. It is shown that infrastructures like storage facility, agro-processing unit, collection centre and extension office were not available for more than 55% of these communities, 40% of the communities do not have cooperative society, feeder roads and potable water while less than 20% of the communities do not have health facility, market, primary and secondary school. Out of 20 communities, 11 were found to have access to primary school, secondary school, health facility and market. A common index was obtained based on these infrastructures for each of these communities (Appendix 2).

An average index of 83.96 was computed in order to categorize these communities. 6 communities had index numbers below the average and are categorized as developed in terms of these infrastructures while 5 communities had index numbers above the average and are categorized as undeveloped.

Poverty Profile of Fadama Resource Users

It was found that majority of the Fadama resource users are male with about 86% being married. About 60% of these resource users are those aged above 40 years. The average physical household size is 6 with adjusted size of 4. Only 6.06% of the Fadama resource users have no formal education with about 93% having one form of education or the other. Their primary occupation is the usage of Fadama resources while about 80% of the users still have other sources of income and this implies that much still has to be done in order to realize maximum potential of Fadama resources.

By regressing the individual calorific intake against the per capita expenditure in $\ln X = a + bC$ and further using $Z = e^{(a + bL)}$ to obtain the poverty line, a food poverty line of ₦105.91 per day was obtained and households whose expenditure fall below this line are regarded as poor while those with expenditure above this are classified as non poor. A poverty line of ₦105.91 is still less than the World Bank poverty line of 1 US dollar per

day at an exchange rate of ₦120 of a dollar. The poverty profile was developed using the foster, Greer and Thorbecke class of poverty measure. The outcome is in appendix 3. This outcome shows that 41% of the *Fadama* resource users fall below the poverty line while the depth and severity of poverty are 0.13 and 0.03 respectively.

Figure 1 shows the poverty status of the *fadama* resource users in each of the sampled communities. It shows that the number of *fadama* resource users who are poor are more than users that are not poor in some communities like Aran and Kuro. Also there is still average number of user who are poor despite the presence of greater number of users who are not poor, hence the *fadama* resource users still need help to alleviate their poverty level.

Determinants of Poverty

It is shown from our result (Appendix 4) that the logistics regression model explains 64.4% of the total variation in the poverty status of *Fadama* users' households. The Chi square statistics shows that the parameter included in the model were significantly different from zero at 5% level. Age of the farmers, farm size, infrastructure and non *Fadama* income significantly affect the *Fadama* resource users and so determine the users' poverty status probably because ageing leads to decrease in productive capability, small farm size will produce small output resulting into low income and income from other occupations will distract the users from full utilization of *Fadama* resources respectively. Farmer's age, infrastructure and non *Fadama* income all have the expected sign except farm size and this may probably be due to the fact that farm sizes are underutilized. More other inputs may be needed to complement of available *fadama* farmland in the area. The farmers' level of education in years, adjusted household size, food, expenditure income from *fadama* resources have the expected signs, with the exception of food expenditure, they however do not significantly affect the poverty status of *fadama* resource users. The non significance of these variables could probably be due to low level of education, large number of household sizes, low level of expenditure spent on food and under-utilization of *Fadama* resources respectively.

As shown in the Exp (β) statistics, the odds in favour of being non poor increased by a factor of 1.057 in age, 1.009 in level of education, 1.040 in adjusted household size, 1.002 in infrastructure index and decreased by a factor of 0.792 in farm size and 0.999 in food expenditure.

RECOMMENDATIONS

The findings of this study suggest that provision of the needed infrastructures for *Fadama* areas could go a long in encouraging and benefiting the *fadama* resource users in the area.

CONCLUSION

The necessary infrastructures for *fadama* resource were not available for a larger proportion of the communities and this affects their output and income level. About 41% of the *fadama* users in the area could be said to fall between the poverty line. The farmer's age, infrastructure and non *Fadama* income were the main determinants of poverty in the *Fadama* areas.

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APPENDICES

Appendix 1: Conversion Factors for Calorie Requirement for Different Age Groups

Age group (years)	Male	Female
<10	0.6	0.6
10-13	0.9	0.8
14-16	1.0	0.75
17-50	1.0	0.75

Source: Culled from Stork et. al. (1991)

Appendix 2: Communities and Infrastructure Indices

Communities	Infrastructure indices
1. Osi	18.57
2. Ijomu Oro	25.11
3. Isolo Opin	51.87
4. Ipetu Igbomina	58.56
5. Oke Opin	63.09
6. Afon	76.26
7. Koro	87.18
8. Budo Egba	99.49
9. Lasaju	130.00
10. Isapa	144.53
11. Wako	168.91

Source: Data Analysis 2007.

Appendix 3: Poverty measurement

Poverty measure	Value
Incidence	0.41
Depth	0.13
Severity	0.03
Source: Data Analysis 2007	

Appendix 4: Logistic Regression Model Result

Variable	B	SE	Sig	Exp(β)	R
Age	0.555*	0.024	0.019	1.057	0.145
Education	0.009	0.040	0.822	1.009	-0.105
Farm size	-0.234*	0.115	0.043	0.792	0.114
Household size	0.039	0.141	0.781	1.040	0.087
Food expenditure	-0.001	0.001	0.271	0.999	-0.069
Fadama income	0.001	0.001	0.189	1.000	0.045
Non-Fadama income	0.001*	0.001	0.022	1.000	0.140
Infrastructure index	0.002*	0.001	0.048	1.002	0.024
Constant	-1.019	1.201	0.396	0.361	

Model Chi-square = 14.637

Overall case predicted correctly = 64.4%

* = Significant at 5%

Sources: Data Analysis 2007

Figure1: Poverty Status of Fadama Users

