

The Impact of the National Fadama Facility in Alleviating Rural Poverty and Enhancing Agricultural Development in South-Western Nigeria

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ABSTRACT This study assessed the potential of the National Fadama (lowland irrigation) facility to enhance smallholder farmers production and income thereby lifting them out of the vicious circle of poverty in South Western Nigeria. About 5% of the participants in Osun State were randomly selected and their performance compared with that of the baseline study conducted before the facility took off. Furthermore, the stochastic frontier production function model was utilized to estimate the technical efficiency level of the participants. Results obtained shows that the farm income obtained from Fadama cultivation increased about three times from #13368.00 at baseline to #38918.00 in the current season. The stochastic production function results obtained shows the coefficients of age of farmer result number of children and farming experience being significant at 1% while the coefficient of cost of seed was significant at 10% level. The range at technical efficiency obtained was 0.9959-0.9964 suggesting a relatively efficient level of production by the participants. The programme thus has a potential to alleviate the participants from poverty.

INTRODUCTION

The issue of poverty in Nigeria has been described as “widespread and severe” CBN/World Bank (1996). This is in spite of the country’s vast resources. Poverty is not only a state of existence but also a process with many dimensions and complexities (Khan, 2000). Recent statistics from the Nigerian Federal Office of Statistics (FOS) indicate a worsening poverty statistics in the country and a cause for concern. For instance, the United Nations Development Programme (UNDP)’s Human Development Index (HDI) ranked Nigerian as the 137th among the 174 countries listed with HDI of 0.384 in 1996 by 1997, the country slipped to 142nd position and ranked among the 44 poorest countries. Furthermore, it has been observed that the percentage of the total population living below the poverty line in Nigeria has increased from 34 in 1992 to 80 in 1998. There is also large income inequality with the top 10% of the income bracket accounting for close to 60% of total consumption of goods and services. The concern about the threat posed by poverty has led the Nigerian government to devote considerable attention to alleviating its scourge through various aid programmes, some of the time in cooperation with the civil society and donor agencies.

For the success of any poverty alleviation programme, however, a knowledge of the profile of poverty in that society is essential. Studies have shown that agriculture is the locus of majority of poverty in Nigerian (World Bank, 1996). This is obvious, since agriculture remains the mainstay of Nigerian economy contributing about 40% of the total GDP, and employing about 77% of the working population” (UNICEF, 1995). It thus became imperative that appropriate policy measures aimed at alleviating poverty must take agriculture and rural development into consideration. Infact, the FOS/World Bank in their analysis of the poverty trend in Nigeria noted that poor families are in higher proportion in farming households who are mainly in the rural areas. Regions where agriculture is the major source of employment has the higher incidence of poverty.

One of the suggested ways of reducing poverty is “utilizing of the poor factor endowment for improved income earnings and in living standards”. In other words enabling the rural poor to increase their level of production of economic goods to increase their income level and thereby their living standards. An obvious way of achieving this is enabling the farming poor to increase their agricultural output, so as not only to improve their income but to lift them above the

subsistence level.

Nigeria's agricultural is mainly rain-fed, this is especially in the southern part. There are two main cropping seasons in the country based on early and late rainfall season. Given the need for continual cultivation to exploit the dry season farm income potential, government initiated the small-scale low cost farmer managed irrigation scheme to develop Fadama lands (floods plains). Furthermore, it was on realization that the incremental production necessary to make food production surpass average population growth rate and guarantee national food security cannot be attained without recourse to supplementary irrigation for the major food production areas of the country.

The National Fadama Development Programme (NFDP) was to assist the qualifying states of the Federation through the World Bank supported Agricultural Development Programmes (ADP) network to, among others finance the provision of shallow tubewells in Fadama lands for small scale irrigation, simplifying drilling technologies for shallow tubewells/ washbores; constructing fadama infrastructures; organizing Fadama farmers for irrigation management, cost recovery and better access to credit marketing and other services; and providing vehicle, pumps and other equipment. It is believed that the provision of this facility should not only boost agricultural production but enhance the income of the farmers and thereby lift them out of the vicious circle of poverty. The facility was enabled in the 1995/96 cropping year.

The purpose of this paper is to assess the impact of this facility on the participants in terms of their income, access to necessary enabling facilities and general well being. If this facility achieved the envisaged objective(s) the welfare of the rural farming households would be improved with the attendant multiplier effect on the community as a whole.

METHODOLOGY

About 5.8 percent of the farm families in Osun State are involved in Fadama cultivation according to the baseline survey report of the National Fadama Project Report (1997). Osun State is situated in the South West of Nigeria with an estimated land area of 8882.55 square kilometers. The state is bounded in the North by Kwara State, on the south by Ogun State, on the

West by Oyo State and on the East by Ondo State. Administratively, the state comprises 30 local government areas and has the Osun State Agricultural Development Programme (OSSADEP). The state enjoys a tropical climate with prominent wet and dry seasons. The rainy season generally occurs between April and October while dry season occurs between November and March. The mean annual temperature for the state varies between 21.1°C and 31.1°C. The annual rainfall is within the range of 1000mm in the derive savannah agro-ecology to 1200mm in the rainforest belt. About 15000 farm families are currently involved in fadama cultivation in the state. This study examined the impact of the fadama facility on the participants. Structured questionnaire was used to collect information from about 5% randomly selected participants. Altogether about 100 participants were randomly selected for interview. The list of participants were collected from the OSSADEP office which served as the facilitator of the program. There was a baseline study conducted by the Osun State Agricultural Development Program against which the state of well being of participants could be compared after over six years of the operation of the program. In order to be able to assess the impact of the facility on the participants, the data collected was processed and some components of its compared with the results of the baseline survey conducted during the 1995/96 planting season where possible. The present study was conducted in the farm year 2000-2001. Descriptive statistics and the stochastic frontier production function model was used to analyse the data collected. The stochastic production frontier model was utilized to assess the level of efficiency of the participants.

RESULTS

The participation of farmers in the fadama program is expected to affect the well being of the participants positively. A general overview of the level of performance of the program can be obtained from Table 1.

The average age of the farmer participants obtained in the survey (about 50 years) appears more than that obtained during the baseline survey. (about 40 years). This suggest that the participants are ageing without adequate replacement. This may be due to migration of youths and children out of the rural farming

Table 1: Socio-economic assessment of participants in Fadama Project

	<i>Baseline</i>	<i>Survey</i>
Farmers Age (years)	40	50.25%
Marital Status	Married	Married
Gender	70% female	64%
female		
Income	13368	38918
Access to Loan	Yes	Yes
Ownership of	1	10
Water Pumps		
Average years of	-	7.58
Fadama experience		
No formal	17.8	20
Primary	43.3	20
<i>Education level</i>		
Secondary	16.7	44
Tertiary	22.2	15
Lease	15.5	28
<i>Land Tenure Form -</i>		
Inheritance	45.6	40
Rent	35.6	32
Average hectarage	0.5ha	1.5ha
Major Crop Cultivated	Leafy Vegetables	As before
Source of Inputs	ADPs	MANR
No. of Group registered	1	27
		20
No. and Area of		
Fadama fields	2	44
	3	12
	4	24
Ownership of		
mode of transport	48%	72%

Source: Analysis of Field survey Data and Baseline Survey Report

communities to the urban centres, and to increased youths/children school enrolment. There are still more women participants 64% than men. The participation in fadama seems to give the participants secured access to loan as all the respondents agreed to have access to loan facility.

The mean number of years of experience in farming of participants is 21.8 years, out of which 7.58 years was for fadama farming.

The structure of the participants level of formal education looks similar as about 80 percent of the farmers have one level of formal education or another. Furthermore, the children of the respondents are all educated formally with an average school year attendance of about nine years. An average of about three children per farming household are involved actively in farming on their parents fadama plots.

The mean hectarage sown to fadama crops increased to 1.56 ha from 0.51 ha obtained during the baseline study. In corroboration of this finding, more participants now have more than

one field sown to fadama.

The mode of land tenure of the participants seems basically similar as more than 40% (majority) still hold title to land by inheritance, while rent and leasehold provide the other forms of tenure arrangement. More participants now have more than one field sown to fadama. However, the sources of inputs seems to have shifted from the ADP's to the State's ministry of Agriculture and National Resources. Furthermore, the ownership of water pumps seems to have increased from 7 during baseline to 10 currently.

The major crops cultivated in the fadama fields remains the same as leafy-vegetables, okro, maize and tomato. The farm income obtained from the fadama fields cultivation increased by about three times from #13368.00 at the baseline to #38918.00 in the current season. This is a definite improvement in the basic welfare level of the participants over the years. The number of Fadama Users Association was 125 with 27 registered as cooperative societies and all the respondents belong to one branch of the association or the other. The number of households who owned one form of transport increased from 48% to 72% in the current year as the respondents now own one form of transport or the other such as bicycle and motorcycle. The average value of assets owned was #28993.65, with more than 90% owning watering cans, radio and the like. The average distance traveled by the farmers to farm on a daily basis is 6.58km and they get to the farm mainly by bicycles and taxi. Most 73.5% of the respondents still use manual weeding method, weeding about three times a season. Most (97%) of the respondents have access to ADP extension's training in the use of water pumps, and other irrigation methods. All of them have had contract with extension agents one time or the other while 82.5% claimed to have frequent visit of extension agents.

Empirical Model

Schubert (1994) noted a relationship between poverty and productivity. The poor own little or qualitatively poor land for agricultural production to work with and little or no access to capital. "The relation between human capital and poverty shows characteristics of a vicious circle which cannot be broken down endogenously".

In order to successfully break the vicious circle of poverty, a push in the form of increased productivity may be needed to empower the poor

over the devastating effects of poverty, this paper assessed the extent to which the participation in the Fadama facility has enhanced the level of production efficiency of the participating farmers using the production frontier model. The concept of technical efficiency is central in characterizing the performance of a production process in transforming a set of specific inputs into output. It is obviously meaningful to scrutinize how productively scarce resources are utilized in the process of maximizing returns and enhancing the derivable income.

The stochastic frontier production function (Aigner et al., 1977) was utilized to measure the technical efficiency estimates of the participants on the Fadama project.

The typical frontier production function is started as

$$Y_i = X_i \beta + (V_i - U_i)$$

$$i = 1, \dots, N$$

Where Y_i = (the logarithm of) the output of the i th farmer

X_i = $K \times 1$ vector of (transformations of the) input quantities of the i th farmer

β = vector of unknown parameters

V_i = random variable which are assumed to be iid $[N(0, \sigma_v^2)]$

Specifically, the frontier production function utilized for this study is

$$Y_i = b_0 + b_1 \ln X_{i1} + b_2 \ln X_{i2} + b_3 \ln X_{i3} + b_4 \ln X_{i4} + b_5 \ln X_{i5} + b_6 \ln X_{i6} + V_i - U_i$$

Where the subscript $i = 1, 2 - N$ represent the i th farmer in the survey

Y_i = monetary value of output

$\ln X_1$ = age of farmer in years

$\ln X_2$ = farm size in hectares

$\ln X_3$ = the cost of weeding during the season

$\ln X_4$ = the number of children

$\ln X_5$ = farming experience in years

$\ln X_6$ = the naira value of seed.

All the variables are entered in at their natural logarithm values since we are estimating a Cobb-Douglas production function estimates. The V_i and U_i are assumed to have the property explained before. The maximum likelihood method of estimation was used to derive the estimates and the technical efficiency estimates. The frontier 4.1 software was utilized to derive the estimates.

The results obtained from the stochastic production function estimates is presented in Table 2. The coefficients of Age of farmer, number of children, and farming experience were all significant at 1% level, while the cost of seed was significant at 10% level.

The negative sign on the age coefficient confirmed the observation that the participants are relatively elderly, more so with the mean age

Table 2: Estimates of the stochastic frontier production function

Variable	Coefficient	t-ratio
B_0	12.5443	2.5227
$\ln X_1$	-2.2304*	-2.2379
$\ln X_2$	-0.3148	-0.9736
$\ln X_3$	0.3634	0.075
$\ln X_4$	0.9962*	2.4201
$\ln X_5$	0.9709*	2.3628
$\ln X_6$	0.4949*	1.4296
σ^2	0.4994*	3.6905
γ	0.5047	

Source: Analysis of Field Survey Data 2001

• mean significant at 1% level

• **mean significant at 10% level

being 50.25% year. The participants are gradually moving out of the productively active stage of life and will need a conscious replacement program. The coefficient of the number of children was also significant suggesting the need to encourage the children of the participants in the programme.

The need to encourage the participation of experienced hands on the programme is revealed by the positive coefficient on the estimate of farm experience. The more experienced the participants are, the greater the output they will obtain. The coefficient of the cost of seed is also positive and significant suggesting the need to consciously encourage the farmers to invest in purchasing improved seed to enhance their output. The range of technical efficiency was 0.9959-0.994 suggesting that participants are relatively efficient. The scope of improvement the farms is about 0.004%.

Lessons Learned

The findings of this study has suggested the fact that the National Fadama Program have some positive impact on the participating farmers in Osun State of Nigeria, as a model of such programmes in Nigeria and other developing countries.

The programme increased the asset base of the participants, increased their income by about three times, enhanced access to farm inputs and increased the training and knowledge base of participants in low-land irrigation farming. The programme also ensured a high level of technical efficiency of the participants. These results suggest that the programme has a positive impact on the participants and has a wide potential of alleviating rural poverty in the study area.

The positive effect of cooperative group efforts can be seen in the fact that all the respondents belong to an association, have access to input and claim to benefit from their membership of the cooperative association. Infact the association was the main thrust behind the acquisition of tangible assets, and enhanced equal position of the members.

The implication of the findings of this study for policy makers is that – there is a need to consciously encourage youths into the fadama farming. This may be by wide publicity of the potential of the facility in improving the welfare of participants, furthermore, the training, aspect of the farming programme need to be enhanced to enable the participants tap the most of the potential of the farming system.

The recent reported difficulty in obtaining farm inputs by the respondent needs to be urgently addressed so as not to reverse the positive impact of the programme.

The ability of the farmers to participate in other non-farming activities is enhanced by their enhanced access to credit facilities.

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