

BEHAVIOURAL CHANGES AMONG FADAMA11 PROJECT FARMERS AND LESSONS IN AGRICULTURE DEVELOPMENT OF ENUGU STATE, NIGERIA

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Abstract

The study analyzed the behavioral changes and Fadama ii project farmers and lesson in Agricultural development of Enugu State, Nigeria. A structural interview schedule was used in sourcing information from one hundred and sixty farmers using simple random sampling technique. The data obtained were analyzed using both simple descriptive and inferential statistics, namely percentages and chi-square analysis. The result obtained showed that the project farmers were mostly male (95%) and majority have no formal education 63%. vegetables, yam and maize crop combination was the most preferred crop by the project farmers. The participation of the farmers on the Fadama project made an appreciating impact on the standard of living, income of ownership of Fadama infrastructure, knowledge and adoption of Fadama crop innovation. The farmers that participated developed a positive attitude towards crop production. It was concluded that the project should be extended to all the local Government areas of Enugu State.

Keywords: behavioural changes, Fadama II project, farmers

Introduction

Every year, government of the day in Nigeria makes policies that tend to promote increase in agricultural production. This is because of the government desire to improve the life of its citizenry through increase per capital income. All the effort seems not be yielding positive fruit as increasing reduction in production of agricultural activities seems to characterize Nigeria Agricultural sector which is limiting the ability of the sector to perform its traditional role in economic development. It was on this note that Fadama programme was introduced in Nigeria and implemented during the period 1993-1999. National Fadama 1 programme focused on crop production and largely neglected support of post production activities such as commodity processing, storage and marketing (downstream agriculture sector). The emphasis then was on provision of boreholes and pumps to crop farmers through simple credit arrangement aimed at boosting aggregate crop production output (Nkonya et al, 2008). The name Fadama was an Hausa name for irrigable land flood plain and low-lying area underlined by shallow aquifer and it can be found along Nigeria's river system. Fadama can also be referred to as a seasonally flooded area for farming during the dry season. (Qureshi, 1989). They encompass land and water resources that could easily be developed for irrigation agriculture. Fadama are typically waterlogged during the rainy season but retain moisture during the dry season (World Bank, 1992).

World Bank (1996), described poverty in Nigeria as Widespread and severe as the vast resources in the country has indeed not transformed into high GDP per- capital-income; High employment rate; high industrial utilization capacity, Low-mortality rate; and,

agricultural dependent for the country. Rather poverty has not only been a star of existence but also a process with many dimension and complexities (Khan, 2000).

To this end, in an attempt to deal with the problem of poverty alleviation programme in an agrarian country like Nigeria, it is important to know the poverty profile, so that measures could be found to alleviate it. World Bank, (1996), emphasized that low productivity in agriculture is the cause of high incidence of poverty in Nigeria. It is obvious bearing in mind that agriculture has being an important factor of Nigeria, s economy since independent. It contributes about 42% to the total GDP and employing about 77% of the working population. It is therefore, imperative that any policy measure aimed at alleviating poverty must take agriculture and rural development into consideration. The Federal Office Statistic and World Bank in their analysis of the poverty trend in Nigeria noted that poor families are in higher proportion in farming household that are mainly in the rural areas* (Adeolu & Taiwo, 2004).

In Nigeria, despite the fact that average dietary calorie intake has increased over the past two decade, it is believed that over 40% of the population are still living below the minimum dietary calorie intake. It is generally believed that agriculture is the mainstay of the Nigerian economy and that it provide over 80% of the food needs of the country. The neglect of the agricultural sector by successive government has led to a decline in food production, thereby created a lot of concern with regards to increased share of food import bill in total Gross Domestic Product (FAO,2006).

Nigerian agriculture is mainly rain fed and is characterized by low technology and labour productivity. There are two main cropping seasons based on early and late rainfall periods (Anyanwale & Alimi, 2004). Nigeria has a great potential for the production of high- value vegetables and cereals during dry season. This is because the country is endowed in underground water reserves. Given the need to utilize these potential resources and ensure continuo's cultivation, Government initiated the first National Fadama Development project in the early 1990s. The project was to develop small –scale farmers, simple & low-cost farmer-managed irrigation scheme under the world Bank Financing. The development of the Fadama project also came from the realization that supplement dry season irrigation farming is essential to meet the food need of the growing Nigeria population.

Fadama is a local name for low-floor plains usually with easily accessible shallow groundwater- blench and Ingawa (2004), define it as flood plains and lowly areas underlined by shallow aquifer and found along Nigeria's river systems. Fadama have been a source of income to many users such as farmers, pastoralists, fisherman, hunters, etc, who depend directly or indirectly on the Fadama resources for their livelihood (Adesoji etal, 2006).

The first Fadama Development Project (Fadama I), which was implement between 1993 and 1999, was executed in seven core state of Bauchi, Gombe, Jigawa, Kano, Kebbi, Sokoto, and Zamfara. Following the widespread adoption of the Fadama technology, farmers realized income increases of up to 65% for vegetables, 334% for wheat and 497% for rice, of The economic rate of return at completion was 40% compared to an estimated 24% envisaged at conception level of Evaluation of Fadama I show that non-involvement of the farmers in project planning, non-consideration of marketing and processing and ignoring of other Fadama resources users were the major limitation to the achievement of the full potentials.

Impressed by the achievement of Fadama I, government approached the African Development Fund and the World Bank For Financial support towards the second Fadama Development project (Fadama II): The ADF approved a credit facility by UA 22 million (US\$30.8 million) in December 2003 and the Fadama 11 commenced in june 2004 in nine state of Borno, Jigawa, Kastina, Kogi, Kwara, Plateau, Enugu, Imo, and Anambra. The project duration is six years and the participation state were selected based on several criteria such as: a written proposal for both upstream and downstream post-harvest activities,

commitment for regular payment of counterpart funding to be deducted at sources, evidence of project management team and operational and active Fadama resources users group and record of Fadama 1 loan recovery rate of at least 75%, among others.

The Fadama II objective is to sustainably increase the income of Fadama users –those who depend directly or indirectly on Fadama resources (Farmers, pastoralist, fishers, hunters, gatherers, and services provides) through empowering communities to take charge of their own development agenda, and by reducing conflict between Fadama users. The project has three components,(1) capacity building Advisory services, (2) community infrastructure development and (3) project consideration and management. The main features include, empowering the farmers, supporting the provision of market infrastructure, improving the conflict resolution mechanism. Supporting rural and non-farm enterprises, focusing on the contributions of women and supporting increased food production and efficient management of Fadama resources (FDP,2005). The implementation is to be carried out through the bottom-top approach; individual farmers are coordinated by community level project implementation committee, who are themselves coordinated by the local government level project implementation committee. The local government level project implementation committee is coordinated by the state level project implementation committee, while the state committee is coordinated by the federal level project implementation committee. The take off of the Fadama 11 represent one of the ambitions step by the government to achieve the goals of reducing hunger in the country, however, achieving the stated objectives will not only require good execution and management but also the avoidance of factors that caused the failure of similar projects in the past.

Small scale farming is the dominant occupation of rural people in Nigeria and it is mainly rain-fed and also characterized by low land and labour productivity due to a combination of problems which include among other poor macroeconomic and sector policies. Not with standing, Nigeria has a potential comparative advantage in the production of a variety of fresh and processed high value crops, especially vegetables during the dry season and livestock product (meat and milk) and fish products throughout the year. This is because the country is endowed in underground and surface water reserves, rich pasture and favourable agro-ecological conditions in the country's low-laying plains with alluvial deposit called Fadama. One peculiar paradox of poverty in Nigeria is that it is the midst of plenty. Despite the rich endowment of Nigeria, especially rural Nigeria, with abundant natural and human resources, poverty is more acute in the rural area where about 70% of the total population of over 140 million people resides(NPC:2008) . The Fadama expansion program is considered to be an instrument for technical transformation in agriculture which would empower the small holder farmers to get out of the poverty trap on the evaluation of the success of Fadama 1, it is was learnt that the phase * failed to attend to some key sectors of the economy as can be explained below.

Fadama project helped producers increase output, but not to store, preserves and markets their surpluses. As a result, much of output was either not sold at all or sold at low prices due to supply glut (World Bank. 2003). It did not involve and empower key stake holders such as producer organizations, Local government organization in designing and implementing projects and in providing advisory services. It thus raised concern about project ownership and sustainability (World Bank 2003).

Fadama did not address mechanisms for conflict resolution in the Fadama project areas. It failed to adequately consider the needs of other users of Fadama resources other than sedentary farmers. As a result, conflict sometimes broke out between them and pastoralist who found their traditional routes to water and pasture blocked. These confrontations result in physical injury and destruction of properties. Fadama gave little support to the establishment of rural non-farm enterprise. It narrowly focused on crop production neglecting opportunities

to add values through processing and other non-farm activities. These challenges gave rise to the quest to examine how rural farmers have fared under the Fadama II project.

As a follow up to the Pilot National Fadama Development project, The World Bank and African Development Bank (ADB) invested in a second National Fadama Development Project known as Fadama 11 project. The implementation of Fadama 11 project commenced in January 2004 and ended 2009 it was expected to cause an increase in income of farmers, provide employment opportunities and reduced poverty in the country. This study was broadly designed to examine the behavioural changes among the project farmers and lessons in Agricultural Development in Enugu state, Nigeria.

Objectives of the study

The broad objective of the study is to examine if there has been changes in the behaviours of small holders farmers in response to their participation in the Fadama II project in Enugu State, Nigeria. Specially, the study is designed to:

- describe the socio-economic characteristics of the respondents.
- identify the crop production preferences of the respondent.
- ascertain reasons for the crop production preferences by the Fadama farmers .
- compare difference in crop production behaviour of the farmers before and after joining the Fadama project.

Hypothesis for the study

Ho: “There is no significant difference in crop production behaviours of the rural farmers before and after joining the Fadama user associations (FUA) in Enugu state, Nigeria”.

Methodology

The study was conducted in Nkanu East Local Government Area (LGA) of Enugu State; Nkanu East L.G.A is one of the seventeen (17) Local Government Areas in Enugu state recognized by the Federal Republic of Nigeria. It has Amagunze as its headquarters with eleven (11) other communities that made up the Local Government Area. Two (2) communities out of the eleven communities were selected because of the high activities of Fadama programmes in these areas. These Two (2) communities have streams that do not easily dry up during dry season; these streams are their sources of irrigation water during dry season for their farm produces. The people of these two (2) communities are known for their effort on food production in the state especially on rice and the vegetable productions. The main occupation of the people is agriculture, hence the reason for been the pilot communities.

The target populations for this study were the project farmers from the two selected communities. The list of the registered Fadama Users Association (FUAs) was obtained from Enugu state Agriculture Development Programme office (ENADEP), the number of FUAs then was five hundred (500). From the two (2) communities which were purposively selected, one hundred and sixty (160) FUAs farmers were randomly selected .in the communities. Eighty (80) Fadama project user were selected randomly, form each of 2 communities. Therefore, a total of 160 farmers formed the sample size of the study.

Data were collected through the administration of structured questionnaire on the sample population. Where necessary, the use of oral interview was also employment for more clarification on grey issues. The questionnaire was divided into sections each aimed at achieved stated objectives of the study.

Results and discussion

Household characteristics of Fadama farmers

The characteristics of sampled Fadama farmers are presented in the 2 below. The average household size of ten is higher than the national average but more surprisingly is that, majority of the households (41%) have between ten to fourteen people in their household. About 5% of the households are headed by women. Only about one-fifth (1/5) of farmers have secondary school education and above, while more than 60% of the farmers have no formal education. Majority have less than 10 years experience in non-Fadama farming, while about 21% have more than 19 years of experience in non-Fadama farming. The average farm size of 14.1 hectare is quite high in the areas, though about half of the farmers have Fadama land that is less than one hectare approximately 90% of the farmers use either family or community land for farming. The scarcity of labour also limited majority of the farmers to using family labour.

Yam and maize crop combination is the most popular cropping system in Fadama production. This is probably because the two crops are in high demand. Maize and Cassava combination is the second most popular cropping system. The major problem of Fadama farming is pest infestation, other problem, conflicts among farmers and pastoralist and inaccessible road for transporting farm produce.

Table 1: Characteristics of Rural Farmers

Characteristics	Frequency	Percentages
Gender of household head		
Male	152	95
Female	8	5
Household size		
1-4	25	15.8
5-9	36	22.5
10-11	17	41.8
More 14	33	20.8
Age of household heads (year)		
21-34	21	13.3
35-44	43	26.6
45-54	68	42.5
More than 54	28	17.5
Education of household head		
No formal education	101	63.3
primary education	29	17.5
Secondary education	17	10.8
Post secondary education	13	8.3
Farming experience (year)		
1-9	117	73.3
10-19	9	5.8
More than 19	34	20.8
Farmer size (hectare)		
Less than 1	85	52.8
1-2	66	41.4
More than 2	9	5.8
Method of land acquisition		
Family land	53	33.3
Rented land	15	9.2
Commercial land	92	57.5
Sources of Labour		
Family labour	115	71.7
Hired labour	8	5.0
Commercial labour	20	12.5
Family and hired labour	17	10.8
Crop combination		
Maize only	23	14.2
Maize and cassava	37	23.3
Maize and yam	63	39.2
Maize vegetable	13	8.3
Maize cassava, yam and vegetable	24	15.0
Production constraint		
Damage by pest and flood	64	40.0
Inadequate fund	33	20.8
Labour shortage	13	8.3
Other problems	50	30.9

Source: Field survey, 2010

Result in table 2 showed that during dry season, vegetable was the most preferred crops by the project farmer by 70.0%. This was followed by maize 55.0% that of rice 27.6%, yam 22.6%, cocoyam 15.0%, and cassava 10.0%. in the same vein, the most preferred crops by the non-project farmers showed 62.6%, for vegetable, followed by maize 40.0%, cocoyam 25.0% rice 30.0% yam 22.6% and cassava 20.0%.

The implication from this finding is that the generality of the famers (PFs and NPFs) had preference for vegetable, maize and cocoyam. However, vegetable was the most preferred produce by the two groups of farmers. This is because it is easy to irrigate vegetable garden and vegetable adopt very well and easily with the irrigation environment.

Data on table 2, revealed that during the wet seasons the project farmers (PFs) preferred maize at 57.6% followed by vegetable, 55.0%, yam 50.0%, cassava 32.6% rice 22.6% and cocoyam 7.6%. it showed from these finding that the PFs and NPFs had preference for rice, cassava and yam. However, rice was the most preferred farm produce by the two groups of farmers.

Table 2 Percentage Distribution of Respondents according to their Crop Production Preference Within seasons

Type of crops	Production Preference	
	Dry season PFs (N-160)(%)*	Wet season PFs (n-80) (%)*
Vegetable	70.0	50.0
Maize	55.5	32.6
Rice	27.6	22.6
Cassava	10.0	57.6
Yam	22.6	50.0
Cocoyam	15.0	7.5

*Multiple Response

Sources: field survey 2010

Table 3 indicated that the most obvious reason for vegetable preference all the time was its high market demand value 78.8%. This was followed by its usefulness and readily availability to the family 75.5%, high yielding capacity 57.5%, high income generating capacity 55.0% and easily maturity 40%. Other minor season for vegetable preference were cheap cost of production 17.5% pest/disease resistance 5.0% and less labour requirement 22.5%. In the same vain the respondent who preferred maize did so, mainly because of it high yielding capacity 57.5%, high income generating capacity 57.5%, high market demand 55.0%, early maturity 45.0% usefulness and readily availability to the family 37.5% and drought resistance 22.5%. The preference for rice was because of its high income generating capacity 52.5% high market demand 47.5% and high yielding capacity 40.0%. About 52.5% of the respondent preferred cassava because it generates high income, while 71.0%, 40% and 40% of the respondent preferred cassava because of it high market demand, early maturity and high yielding capacity, respectively. Respondent who preferred yam did so because of its high income generating capacity 52.5% early maturity 47.5%, high market demand 47.5%,

high yielding capacity 40% and usefulness and readily availability to the family 25%. Also cocoyam were preferred by some respondents because of its high market demand 47.5%, early maturity 47.5% high income generating capacity 45.0 and usefulness and readily availability to the family 10.0%.

Table 3: Percentage Distribution of Respondents According to their Reason for crops Production Preference during Wet and Dry Seasons (n=160)

Types of crop	Reason for preference**								
	Em (%)*	HYC (%)	HIGC (%)	CCP (%)*	HMD (%)*	LLR (%)*	PDR (%)*	DR (%)*	URAF (%)*
Vegetable	40.0	57.5	55.0	17.5	78.8	22.5	5.0	0.0	75.0
Maize	45.0	57.5	57.5	5.0	55.0	20.0	10.5	22.5	37.0
Rice	25.0	40.0	52.2	5.0	47.5	20.0	10.0	0.0	35.0
Cassava	40.0	40.0	52.5	5.0	71.0	31.3	1.3	7.5	21.5
Yam	47.5	40.5	52.5	5.0	47.5	20.5	5.0	12.5	25.0
Cocoyam	47.5	31.3	45.0	1.3	47.5	30.0	0.0	7.5	10.0

Source: field survey 2010

* `Multiple Responses

**More than one reason was given

Em = Early maturity

HYC=high yielding capacity

HIGC= high income generating capacity

CCP= cheap cost of production

HMD= High market demand

LLR= Less labour requirement

PDR= Pest /disease resistance

DR= Drought resistance

URAF= Usefulness and readily availability to the family

According to table 4, there was a significant difference ($\chi^2= 42.556$, $p < 0.05$: $DF=5$) between the estimated annual income from vegetable production of the project –farmers before and after their involvement in the Fadama project. Also, a similar significant difference ($\chi^2=15.92$: $p < 0.05$: $DF=5$) existed between the estimated annual income from crop production of the project farmers and non-project farmers as a result of the presence of the project. Before introduction of the project, majority of the PFs realize low annual income from farm crop production. But as a result of the introduction of Fadama project, majority of the PFs started earning high income. However as a result of non- participation in the project by the non-project farmer, their annual income from crop production remained low. The implication of this finding is that, the project made an appreciable impact on the annual income of the project farmers, hence the rejection of null hypothesis. Table 4 also shows that there was a significant difference ($\chi^2=38.69$; $p < 0.05$: $DF=3$) between the source of irrigation water to the PFs before and after their involvement in the project.

A similar significant difference ($\chi^2=38.20$; $p < 0.05$: $DF=3$) existed between the sources of irrigation water to the PFS as a result of the presence of the project. These findings

imply that before the introduction of the project, the PFs were probably only making use of the stream and pond that were available, as their source of irrigation water for crop production especially during dry season. After the introduction of the project, the PFs source of irrigation water is an indication of the positive impact of the Fadama project on the farmers.

Data on table 4 revealed that there was a significant difference ($\chi^2=48.59$; $p<0.05$; $DF=3$) between the sources of agrochemicals to the DFs before and after their participation in the project. Also a similar significant different ($\chi^2=36.78$; $p<0.05$; $DF=3$) existed between the sources of agrochemicals to the PFs as a result of the presence of the project .The observed significant differences confirm the benefits of the project to the farmers. Table 4 revealed that there was a significant difference ($\chi^2=108.18$; $p<0.05$; $DF=3$) between the ownership of Fadama infrastructure by the PFs before and after their involvement in the project. Also, there was a similar significant difference ($\chi^2=118.19$; $p<0.05$; $DF=3$) existed between the ownership of Fadama infrastructure by the PFs and NPFs as a result of the presence of the project. Before the project, majority of the PFs did not have any of the Fadama infrastructures, but the introduction of the project, majority of them started acquiring water pumps and wash bores introduced to them by the NFDP. The implication of these findings is that, PFs adopt project innovation faster due to direct effects the project had on them.

Result in table 4, indicated that there was a significant difference($\chi^2=22.73$: $p<0.05$: $DF=2$) between the Fadama production knowledge by PFs before and after becoming project farmers. There was also a significant difference ($\chi^2=7.83$: $p<0.05$; $DF=2$) between the Fadama production knowledge by the PFs and NPFs due to existence of the project. Majority of the PFs had poor knowledge about Fadama crop production before becoming project farmers, a greater proportion of both PFs and NPFs had fair and adequate knowledge about Fadama production. It is possible to conclude that the project improved the knowledge of the PFs towards adoption of Fadama crops innovations.

Data in table 4 showed that there was significant difference ($\chi^2=23.86$: $p<0.05$; $DF=3$) between the rating of standard of living before and after becoming project farmers by the PFs. Table however shows that there was significant difference ($\chi^2=2.61$; $p<0.05$; $DF=3$) between the rating of standard of living after the project life . It could be deduced from these findings that the PFs had position change in the perception of their standard of living after becoming project farmers. This perception become insignificant when compared the standard of living of PFs.

The contents of table 4 indicated that a significant difference($\chi^2=52.45$: $p<0.05$: $DF=3$) existed between the attitude towards crops production before and after becoming project farmers by the PFs. Also there was a significant different ($\chi^2=18.23$; $p<0.05$; $DF=3$) between the attitude towards crop production by the PFs as a result of the presence of the project. Before becoming project farmers implication of this finding was that, the project had succeeded in increasing the attitude of farmers towards crops production.

Table 4: Chi-Square Analysis of behavioral Differences on Crop Production of Fadama Farmers.

Socio Economic Variables value	Before (n=160)	After (n=160)	X- ($P_0<0.5$)
Estimated Annual Income from Production (N)			
1,000 – 10,000	25	6.3	
11,000 – 20,000	36.3	15.5	

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21,000 – 30,000	11.3			7.5
42.56*				
31,000 – 40,000	6.3		6.3	
41,000 – 50,000	2.5		27.5	
51,000 – 60,000	18.8		37.5	
Source of Irrigation Water				
Stream	55		48.8	
Wash bore/tube well	3.8			33.8
38.69*				
Pond	35		11.3	
Open well	6.3		6.3	
Source of Agrochemicals				
ADP	6.3		10	
Market / dealer	48.8		77.5	
Do not apply agrochemicals	38.8		6.3	
Ownership of FADAMA				
Infrastructure				
Water pump	6.3		45	
Wash bore/tube well	6.3		26.3	
108.18* Sprayers		22.5		22.5
Do not have any of the- Above	65		6.3	
Fadama production knowledge				
Poor knowledge	55		18.8	
Fair knowledge	38.8		67.5	
22.73*				
Adequate knowledge	6.3		13.8	
Standard of Living				
Worse than other	6.3		6.3	
As good as other	70		4.4	
Better than other	8.8		41.3	
23.85*				
Don't know	15		8.8	
Attitude toward crop production				
Very positive	6.3		42.5	
Positive	76.3		45	
52.45*				
Negative	11.3		6.3	
Very negative	6.3		6.3	
Significant (P≤0.05)				

Source: Field survey 2010

Conclusion and Recommendations

The study examined the changes in the behaviors of small holders' farmers in response to their participation in the Fadama II Project in Enugu State, Nigeria. It was discovered that majority of the household have between ten to fourteen people in their household and average farm size of 14.1 hectare. Vegetable, yam and maize crop combination is the most popular crops among Fadama famers and majority had no formal education. Vegetables were the most preferred crop by the project farmers. Participation in Fadama project had appreciable impact on the annual income of the project farmers; many acquired Fadama infrastructures, gained massive knowledge and adopted Fadama crop innovation. Thereby improving their standard of living.

As a result of the findings of the study, it was recommended that all the local Government areas should be involved in the Fadama project. The project made a positive impact on the project farmers' attitude to crop production and annual income, mass participation in it will serve as a solution to the problem of food security and poverty in the state.

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