Impact of Fadama III additional financing (AF) on the yield and income of beneficiaries in some selected lgas of Sokoto state, Nigeria

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Successive administration in Nigeria has initiated different projects with the aim of improving the income and productivity of the small-scale rural farmers thereby ensuring food security. However, most of these projects have not achieved the desired goal of improving the productivity, income and the living standard of the poor rural farmers in Nigeria. It is on record that since independence, the Government of Nigeria in collaboration with many international donor agencies such as the United Nations, International Fund for Agricultural Development, World Bank etc, have initiated many Agricultural Development related projects to support the rural farmers, of which, the National Fadama Development Project is one of them. This study attempted to assess the impact of Fadama III Additional Financing (AF) on the yield and income of the participating communities. The results indicates that, farmer's crop yield increased significantly as a result of participating in Fadama III (AF) Interventions; this is a welcome development because the project has succeeded in empowering rural farmers through increase in crop yield, and which in turn translate into increase in income of the beneficiaries. It is recommended that, the project be sustained by the state government in collaboration with benefiting Local Government Areas in order to extent the benefits of the project from one generation to another to allow the full-blown achievements of the project.

Key words: Fadama III AF, yield, income and Sokoto State.

INTRODUCTION

Nigeria as a country is blessed with abundance of arable land and water resources required for sustainable agricultural development. Evidences have shown that, agriculture has made a remarkable contribution to the economic prosperity of advance countries and therefore, its role in economic development of less developed countries is indispensable. This can be achieved through increase in agricultural output and productivity, which may constitutes substantially to the overall development of the economy (Simonyan and Omolehin, 2012). In

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Nigeria agriculture has been characterized by small scale production with poor investment, low output, and low income (Osondu, et al., 2014). Despite many years of agricultural development efforts by past successive governments in Nigeria and international donor agencies and in spite of million dollars committed into such development efforts, agricultural sector appears to have remained undeveloped (Nwaobiala, 2013).

The growth in income of farmers has strong correlation with the overall growth of the entire economy especially the agrarian economy like that of Nigeria. This fact has been established by many studies example (Chirwa and Mohome, 2001).

Simon and Asogwa (2011) argued that, improvement in the productivity of the small-scale farmers in Nigeria is ultimate if the most desired agricultural transformation and development is to take place on a sustained basis. This is as a result of the fact that, the greater proportion of food production (about 70%) is from small scale farmers who mostly resided in the rural areas. However, these subsistent farmers utilized local implements and unimproved inputs in their farming operations, which resulted to low yield and income. However, if the quality of life of the farmers should be improved, his productivity and subsequently income must be improved as well.

The desire to harness the vast potentials of Fadama in Nigeria culminated in the design of National Fadama Development Project I, II and III. Fadama I (Phase I of the National Fadama Development Project) was implemented during the 1993-1999 period while Fadama I focused mainly on crop production, downstream activities such as processing, preservation and marketing were largely neglected. The design did not take into cognizance of need for spatial integration of the markets (creating of physical and market infrastructure). It also failed to take into consideration other Fadama resource users such as livestock producers, fishing folks, pastoralists, hunters etc. The project did not also support post-harvest technology, which manifested in reduced crop prices and increased storage losses during the period (Momoh et al., 2007; Simon and Asogwo, 2011; Ike, 2012; Olaolu et al., 2013; Girei and Dire, 2013). However, no of the studies made an attempt to evaluate the impact of Fadama III AF especially in Sokoto State, hence the need for this study.

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**METHODOLOGY**

**Study area**

Sokoto state is located in the extreme Northwestern part of Nigeria between longitude 4°8’ and 4° 54’ East and latitude 12°0’ and 13°58’ North. The state falls within the Sudan savannah zone, which is suitable for crop and arable production. The climate is tropical continental and is dominated by two opposing air masses – tropical continental and tropical maritime. Much of the rain in Sokoto state falls between June and September in the Northern part, April, and October in the other parts. The annual rainfall is between 500 mm in the North and 1300 mm to the South (Mamman et al., 2000). The population is predominantly Muslim, with the Hausa and Fulani ethnic groups accounting for more than 90% of the population. Economic activities are dominated by farming and animal husbandry in the rural areas, and commerce and paid beneficiaries in driver’s seat. Local community members under the umbrella of Fadama Community Associations [FCAs and Fadama Users Groups (FUGs)], oversee the design and implementation of the project and are empowered through skills and capacity building to improve their livelihoods by increasing income generating activities. According to International Development Agency (IDA, 2010), the project was designed to focus on increasing the incomes of rural poor; the project will help reduce rural poverty, increase food security and contribute to the achievement of a key Millennium Development Goal (MDG).

Consequently, because of the tremendous achievements recorded by the Fadama III Interventions, Additional Financing (AF) of the Fadama III was approved on 29th May, 2016 in Sokoto state with aims to scale up the impacts and development of effectiveness of a well-performing project by aligning it more closely with the new Agricultural Transformation Agenda that was adopted by the government of Nigeria in 2011. It will support cluster of farmers in selected states with comparative advantage and high potential to increase production and productivity of cassava, rice and sorghum and horticulture value chains and link them to better organized markets, within the selected states. Over the years, many studies were conducted on the impact of Fadama I, II and III on its impact on the benefiting communities (Momoh et al., 2007; Simon and Asogwo, 2011; Ike, 2012; Olaolu et al., 2013; Girei and Dire, 2013). However, no of the studies made an attempt to evaluate the impact of Fadama III AF especially in Sokoto State, hence the need for this study.

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employment in the urban centres. The state has three senatorial districts, with 23 Local Government Areas (LGAs). Fadama III AF has intervention activities in all the 23 Local Government Areas of the state.

**Method of data collection**

The study made use of primary source of data. The data was collected from Fadama III AF crop farmers using structured questionnaires in form of interview scheduled. The information was collected on socio-economic characteristics of respondents, their farm yield and incomes before and after joining the project and information.

**Sampling technique**

Multi stage sampling technique was adopted in selecting the respondents for this study. The first stage involved purposive selection of two Local Government Areas in each of the 3 Senatorial district of the state based on the intensity of the Fadama farming activities (the local government selected were Kware and Sokoto south in Sokoto central senatorial district, Gada and Gwadabawa Local governments in Sokoto East and Tambuwal and Yabo local government in Sokoto west senatorial district). However, the second stage involved a random selection of 20 production groups in each of the two selected Local Government Areas to arrive at a total of 120 Fadama III AF beneficiaries.

**Method of analysis**

The quantitative and qualitative data collected was analyzed using standard statistical procedures with STATA 12 software version. The filled questionnaires were cross-checked in the field to detect, correct and remove inconsistencies or improper administration of instruments by supervisors. Both descriptive and inferential methods of analysis were used. Descriptive statistics information of frequencies and percentages were used to analyze data on socio-economic characteristics of respondents, their farm yield and incomes before and after the Fadama interventions.

**Ho**

To test the hypothesis, there was no statistically significant difference in the yield and income of farmers before and after FadamaIII AF intervention in the selected Local Government Areas.

\[ H_0: \mu_D = 0 \quad \text{or} \quad H_0: \mu_D \leq 0 \]

\[ H_1: \mu_D \neq 0 \quad \text{or} \quad H_1: \mu_D > 0 \]

Using the following formula:

\[ t = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}} \quad (1) \]

Where, \(\bar{x} - \mu_0\) represents difference before and after values; \(S\) is the sample standard error and \(\sqrt{n}\) the number of pairs.

**RESULTS AND DISCUSSION**

The socio-economic characteristics of Fadama III AF beneficiaries in some selected Local Government Areas is presented in Table 1.

The respondents’ distribution by age indicates that 34.70% of the beneficiaries were between the 41-50 years age brackets, while 22.86% are between the ages of 31-40 years of age. This implies that, majority of the respondents are still within their economically active age and therefore, capable of feeding themselves and the nation at large if given necessary supports required in form of farm inputs and desired technology. This is probably due to the current drive of the government to repositioned Agricultural sector in Nigeria and inadequate white-collar jobs for many young school leavers.

However, the distribution of respondents by gender shows that overwhelming majority (about 96%) of the respondents were male while only 4% were females. This indicates a dominance of male folks over females in Fadama III (AF) Intervention activities in the study area. This result is expected and normal in Sokoto state because the religion and culture instruct a seclusion of pudah women. Women in the state mostly dominate lighter value addition activities such as processing.

Table 1 also presents the marital status of the respondents; it indicates that all the respondents were once married, its disaggregation shows that 99% of the total respondents were married; while only 1% was divorce. The finding shows that married people are predominantly involved in different farming activities than the single persons in the study area. This implies that couple at family level can depend on one another for different farming activities and financial need, while male may engage in direct cultivation, the female may carry out lighter processing activities. Similarly, high dependency ratio of married person may force them into farming activities for survival.

Household size is the number of persons living together in one compound as a family, contributing to the total income of the household and eats from the same pot. The result from the survey reveals that, 30.70% of the respondents had a household size of from 11-15, 29.82% had 6-10 members and 26.32% had over 16 members in the households. This indicates that majority of the farmers in the study area had a fairly large household size; this may probably supply more farm labour. It is postulated that agrarian households are characterized by high number of members, with high dependency ratio in Nigeria. This is as a result of demand for more hands that constitute the farm labour (Olaolu et al., 2013).

Level of education of respondents is presented in Table 1, which indicates that, 46% of the respondents did not have any form of formal education. However majority of them had Quranic education, with 21% had tertiary education, 18% secondary and 15% primary education. This implies that over 50% of the total respondents had a form of formal education at different levels. This finding corroborate the findings of Ike (2012) and Girei and Dire (2013) that educational level of the farmers make it easier for the implementation of development projects, similarly,
Table 1. Socio-Economic Characteristics of Fadama III (AF) Beneficiaries.

| Variable          | Frequency | Percentage | Min | Max |
|-------------------|-----------|------------|-----|-----|
| **Age**           |           |            |     |     |
| 20-30             | 10        | 8.47       |     |     |
| 31-40             | 27        | 22.86      |     |     |
| 41-50             | 41        | 34.70      | 81  |     |
| 51-60             | 32        | 27.12      |     |     |
| 61-70             | 6         | 5.8        |     |     |
| 71-80             | 1         | 0.84       |     |     |
| 81 and above      | 1         | 0.84       |     |     |
| **Total**         | 100       | 100        |     |     |
| **Gender**        |           |            |     |     |
| Male              | 115       | 95.83      |     |     |
| Female            | 5         | 4.17       |     |     |
| **Total**         | 120       | 100        |     |     |
| **Marital Status**|           |            |     |     |
| Married           | 118       | 99.16      |     |     |
| Divorce           | 1         | 0.84       |     |     |
| **Total**         | 119       | 100        |     |     |
| **Household Size**|           |            |     |     |
| 0-5               | 15        | 13.16      |     |     |
| 6-10              | 34        | 29.82      |     |     |
| 11-15             | 35        | 30.70      |     |     |
| 16->              | 30        | 26.32      |     |     |
| **Total**         | 114       | 100        |     |     |
| **Level of Education** |       |            |     |     |
| Non-formal        | 55        | 46.22      |     |     |
| Primary           | 18        | 15.13      |     |     |
| Secondary         | 21        | 17.65      |     |     |
| Tertiary          | 25        | 21.00      |     |     |
| **Total**         | 119       | 100        |     |     |
| **Farming Experience** |     |            |     |     |
| 1-10              | 13        | 10.92      |     |     |
| 11-20             | 36        | 30.25      |     |     |
| 21-30             | 37        | 31.10      |     |     |
| 30->              | 33        | 27.74      |     |     |
| **Total**         | 119       | 100        |     |     |
| **Farm Size**     |           |            |     |     |
| 0-0.5             | 2         | 1.67       |     |     |
| 0.6-1             | 28        | 23.33      |     |     |
| 2-3               | 59        | 49.17      |     |     |
| 3->               | 31        | 25.83      |     |     |
| **Total**         | 120       | 100        |     |     |
| **Crop cultivated**|         |            |     |     |
| Rice              | 60        | 50         |     |     |
| Sorghum           | 20        | 16.67      |     |     |
| Tomatoes          | 40        | 33.33      |     |     |
| **Total**         | 120       | 100        |     |     |

Source: Field Survey, 2017.
more literate people are increasingly becoming interested in farming no matter their level of education. The level of education of the farmers makes them more innovative in terms of adoption of new technologies in farming for enhance productivity.

The distribution of respondents based on their farming experience in Table 1 indicates that, 31% of the farmers had 21-30 years of farming experience. However, 30.25% had from 11-20 and 27.74% had above 30 years of farming experience. The result implied that, majority of the respondents had reasonable years of farming experience; this further indicates that some of the respondents were born and broad up in farming families. This experience is expected to assist the farmers in reducing the level of unnecessary risk associated with farming and could lead to achieving better productivity.

The farm size is measured in terms of hectare of land own by the farming households. As shown in Table 1, 49% of the farmers had between 2-3 hectares of cultivable land. However, about 26% of the respondents had over 3 hectares of land. This implied that, majority of the farmers had reasonable quantity of land for cultivation. Therefore, with support from agricultural development programmes such as Fadama III project sky would certainly be their limit of productivity.

The distribution of respondents by crop cultivated as shown in Table 1 indicates that, 50% of respondents cultivate rice, 33.33% cultivate tomatoes while 16.67% cultivate sorghum. This suggests that, majority of the Fadama III (AF) farmers cultivate rice and tomatoes, though some of the farmers combine many crops at a time. However, preference mostly goes to rice farming and this is probably because of its high yield and high price in the market. The crop is also less risky due to the fact that, it is less perishables compared to tomatoes.

Table 2 clearly indicates other different sources of income open to farmers in the study area. About 66% of the respondents engaged in petty trading, while about 10% of the farmers were civil servants. However, about 6% of the respondents engaged in transportation businesses as a means of income diversification. This is probably because of the fact that, one source of income (farming) does not meet the daily needs adequately. It was established that, farming alone is not capable of bringing farming households out of poverty and food insecurity.

Consequently, Table 3 indicates that majority of the respondents benefited for being a member of PGs by accessing at least one or more of either improved variety of seeds, water pumping machine, Agro-chemicals and fertilizers etc.

**Hypotheses testing**

One sample t-test was conducted to ascertain the null hypothesis. The yield and income of Fadama III AF beneficiaries was statistically different before and after Fadama III AF intervention. The results are presented in Tables 4 and 5.

The t-test of significant difference was estimated to determine the mean difference of crop yield among Fadama III (AF) beneficiaries before and after intervention (Table 4). The result indicates a paired test of change in yield as determined at 95% confidence level (P<0.05). The results shows that, there is a statistically different before and after intervention at 1%, therefore, Null hypothesis that said there is no significant difference between yields before and after was rejected and alternative hypothesis was accepted. This shows that Fadama III AF has impacted positively on the crop yield of the beneficiaries.

Table 5 shows the t-test results of significant difference in mean of income of the Fadama III AF beneficiaries before and after interventions. The result of the paired test of change in income was determined at 95% confidence level (P<0.05) and it shows that the model was equally statistically significant at 1% level. Therefore, null hypothesis was rejected. This implies that Fadama III (AF) intervention activities had tremendously increased the income of beneficiaries after the interventions for the participating farmers.
Table 3. Benefits Derivable for being PGs Member of Fadama III (AF).

| Type of Benefits                        | Frequency | Percentage |
|-----------------------------------------|-----------|------------|
| Provision of Improved Seeds             | 15        | 13.76      |
| Provision of Water Pumping Machine      | 49        | 44.95      |
| Provision of Rice Processing Machine    | 2         | 1.83       |
| Provision of Agro-chemicals             | 41        | 37.61      |
| Others                                  | 2         | 1.83       |
| **Total**                               | **109**   | **100**    |

Source: Field Survey, 2017.

Table 4. Estimated Difference in means of Crop Yield of Fadama III (AF) Beneficiaries before and after joining the Project.

| Parameter                  | Before Fadama III (AF) in Kg | After Fadama III (AF) in Kg | Paired test of change in yield (P<0.05) | t-statistics | Conclusion          |
|----------------------------|-------------------------------|-----------------------------|-----------------------------------------|--------------|---------------------|
| Degrees of freedom = 237, N =120 | 1427.899                      | 62933.06                    | 0.0009***                               | t = -3.3585  | Reject Null hypothesis |

Source: Field Survey, 2017; Figures in parentheses are the standard deviation, ***shows a statistical significant difference at 1% level.

Table 5. Estimated Difference in means income of Fadama III (AF) Beneficiaries before and after joining the Project.

| Parameter                  | Before Fadama III AF | After Fadama III AF | Paired test of Change in Income(P<0.05) | t-statistics | Conclusion          |
|----------------------------|----------------------|---------------------|-----------------------------------------|--------------|---------------------|
| Degrees of freedom = 119, N =120 | 85625                | 247530              | 0.0000***                               | t = -4.7524  | Reject Null hypothesis |

Source: Field Survey, 2017; Figures in parentheses are the standard deviation, ***shows a statistical significant difference at 1% level.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the study, it was concluded that Fadama III (AF) project have made appreciable positive impact on the beneficiary farmers through significant increase in their crop yield and consequently their income which is expected to be accompanied and consequently help in reducing household poverty level and increase standard of living. Similarly, Fadama III AF Intervention contributed a lot in assisting farmers to have access to various Fadama Interventions Activities such as improved variety of seeds, water pumping machines, weed and pest control chemicals, fertilizers etc. Furthermore, social capital formation enables the farmers to know more about various government support policies/programmes on agricultural development through their contact and meetings.

Having established the potency of Fadama Intervention Activities in improving the crop yield and income among benefiting farmers in Nigeria, it is recommended that the project be sustained by the state government in collaboration with benefiting Local Government in order to extent the benefits of the project from one generation to another to allow the full-blown achievements of the project.

Secondly, there is need for more information and awareness about the expanded activities of the Fadama III (AF) project, as this would increase the level of participation to other non-participating famers particularly in the rural areas. Finally, it is further recommended that, the procurement and supply of farm inputs should be done at the right time through proper planning ahead of time.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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