Exploring the Effect of Fadama III Project on Food Security in Abuja, Nigeria

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Abstract— *The study explores the effect of Fadama III project on food security in terms of: availability, affordability, accessibility and nutritional quality in Abuja. Primary data were used. The data were collected using questionnaires administered to 360 beneficiaries in the selected communities using multi-stage sampling method. The data were analyzed using descriptive statistics, a three and four- point likert scale and correlation model. The selected Fadama areas include: Gwagwalada, Abaji, Amac and, Bwari. The results of the socio-economic characteristics showed that the beneficiaries were mainly male with 69%, married with 82% and relatively old with a mean score of 51 years. The result showed that the beneficiaries had a large size of household with a mean score of five persons, with crop production as the major agricultural production carried out by the beneficiaries (53.1%) and followed by livestock farmers (17.5%). About 92.2% of the beneficiaries had formal education. The results of the effectiveness of Fadama III project on food security shows that the project moderately affected the beneficiaries' food security which increased the level of food availability and increased the use of agro-input which all ranked first. The result also reveals that lack of government support (ranked 1st) and availability of resource (ranked 2nd) were the institutional factors that affected the effectiveness of the Fadama III project. However, it is recommended that feeder roads be constructed in the study areas in other to make food more accessible and affordable, more young farmers should be encouraged by agricultural extension agents to participate in agricultural development projects and monitoring and evaluation system should be put in place in other to ensure the effectiveness of the projects.*

Keywords— Fadama, food security, availability, affordability, accessibility.

I. INTRODUCTION

Food security, according to Neill (2010), is a multi-dimensional phenomenon. National and international political action seems to require the identification of simple deficits that can be the basis for setting of targets, thus necessitating the adoption of single, simplistic indicators for policy analysis. Something like the "State of global food insecurity" analysis has to be undertaken. Since food insecurity is about risks and uncertainty, the formal analysis should include both chronic sub-nutrition and transitory, acute insecurity that reflects economic and food system volatility. Such formal exploration is usefully complemented by multi-criteria analysis (MCA) of food security. Similarly, Community Food Security has been defined as follows: Community food security exists when all citizens obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes healthy choices, community self-reliance and equal access for everyone."

Cook and Frank (2008), also defined food security as an optimal physical, cognitive, and emotional development and function in humans requires access to food of adequate quantity and quality at all stages of the lifespan. Sustainable food security has been defined in various ways by different scholars. According to FAO (2013), food security is access to the food needed by all people to enable them live a healthy life at all times. A country is said to be food secured when there is access to food of acceptable quantity and quality consistent with decent existence at all times for the majority of the population (Idachaba, 2004). This means that food must be available to the people so as to meet the basic nutritional standard needed by the body. But it should be noted that availability of food does not mean accessibility to food. Availability depends on production, consumer prices, information flows and the market dynamics. Food security is determined by various socio-economic, natural and political factors. These factors include income, education, age, availability of infrastructure,

availability of extension services, government policies on trade, and agricultural land area under cultivation, availability of Agro-inputs and social safety net (FAO, 2013).

In Nigeria, determinants of food security are stability of access, household economic status, household income variability, quality of household human capital, degree of producer and consumer price variability, food storage and inventory, household size, and access to social capital (Amaza *et al*, 2007; Oni *et al*, 2011). Food security has also been found to be both temporal and spatial in nature (*Anderson, 2009*; Ayantoye *et al*, 2011). World Bank (1986), defined sustainable food security as an access to enough food for an active, healthy life at present as well as ability to provide enough in the future. Furthermore, Abudullahi (2008), defined sustainable food security as when people have physical and economic access to sufficient food to meet their dietary needs for a productive healthy life at present as well as in the future. This definition outlines some indices for measuring the extent or degree of food security to be achieved by any country and the indices are adequate national food supply, nutritional content, accessibility, affordability and environmental protection. Absence of food security is food insecurity; food insecurity on the other hand represents lack of access to enough food and can either be chronic or temporary. Adeoti (1989) opine that chronic food insecurity arises from lack of resources to acquire and produce food thereby leading to persistent inadequate diet. FAO (2013) refers to food insecurity as the consequences of inadequate consumption of nutritious food bearing in mind that the physiological use of food is within the domain of nutrition and health. When individuals cannot provide enough food for their families, it leads to hunger and poor health. Poor health reduces one's ability to work and live a productive healthy life. Poor human development destabilizes a country's potential for economic development for generations to come (Otaha, 2013).

FAO (2013), explains that the core determinants of food security are availability, accessibility, utilization and stability.

Food Availability: Availability of food plays a conspicuous role in food security. Having enough food in a nation is necessary but not adequate to ensure that people have satisfactory access to food. Over the years, population has increased faster than the supply of food thus resulting in food unavailability per person.

Food Accessibility: The ability to have access to food depends on two major conditions; Economic access and physical access. Economic access depends on one's income, the price of food and the purchasing power of the people. Physical access depends on the availability and quality of infrastructure needed for the production and distribution of food. Lack of economic access to food is as a result of the increase in the rate of poverty.

Food Utilization: Food utilization is measured by two outcomes indicators which reflect the impact of inadequate food intake and utilization. The first outcome is measured by under-five years of age nutrition level while second measurement is quality of food, health and hygiene.

According to FAO (2013), measuring the nutritional status of under-five years of age is an effective approximation for the entire population. The indicators for the measurement of under-five years of age are wasting (too thin for height); underweight (too thin for age) and stunting (too short for age). Most times, progress in terms of having accessing to food is not always accompanied by progress in the utilization of the food. A more direct indicator of food utilization is underweight because it shows improvement more promptly than stunting and wasting whose improvement can take a longer time to be noticeable. Since 1990, the prevalence rates of under-five stunting and underweight have declined in some developing countries, while some countries still report a prevalence rate of 30% or more and World Health Organization categorizes this as being high (WHOUNICEF, 2011).

Stability: Stability has to do with exposure to short-term risks which have a way of endangering long-term progress. Key indicators for exposure to risk include climate shocks such as droughts, erosion and volatility in the prices of inputs for food production. The world price shocks leads to domestic price instability which is a threat to domestic food producers as they stand the chance of losing invested capital. Nigerian farmers are mainly smallholders farming mainly for subsistence, this makes it difficult for them to cope with changes in the prices of inputs, and it also lowers their ability to adopt new technologies thereby resulting in reduced overall production. Changing weather patterns as a result of climate change have played a part in reducing food supply, for instance flood in the southern parts of the country and drought in the northern parts leads to substantial losses in production and income. The interplay of all these variables determines whether an individual, household, state or nation is food secured or not. This is because sustainable food security at the household level does not guarantee sustainable food security at the state or national level. Therefore, the purpose of this study is to examine the effect of Fadama III project on food security in terms of: availability, affordability, accessibility and nutritional quality of food in Abuja.

The specific objectives of this study are to:

i) Describe the socio-economic characteristics of the Fadama III beneficiaries in Abuja;
ii) Identify the Fadama III Projects available in the study area;
iii) Assess the effectiveness of Fadama III Project on beneficiaries in the study area.

II. MATERIALS AND METHODS

The study was carried out in Abuja, Nigeria. It is the Federal Capital Territory of Nigeria. It was formed in 1976 from parts of the states of Nasarawa, Niger and Kogi. It is within the middle belt region of the country. It has an estimated population of 2,440 200 (NPC, 2015). Abuja lies between latitude 9.072264 and longitude 7.491302 and also covers an area of 7,315km (latlog, 2018). In terms of vegetation, Abuja falls within the Guinean Forest Savannah Mosaic Zone of the West African Sub-region. Patches of rain forest, however, occur in the Gwagwa plains, especially in the rugged terrain to the southeastern parts of the territory, where a landscape of gullies and rough terrain is found. The territory is currently made up of six area councils namely; Abaji, Abuja Muncipal, Gwagwalada, Kuje, Bwari, Kwali. The major occupation of people in the area includes; civil servants, farming, artisans, trading, teaching among others. Major crops cultivated by farmers in Abuja includes; maize, sorghum, rice, cassava, millet and miscellaneous crops such as; okra, pepper, and garden egg which are grown in large quantities. It has a population of 2,245,000 in 2010 (NPC, 2011). Abuja is one of the fastest growing urban settlements in the world that need adequate food to feed rapidly growing population. In recent time, the land available for farming has decreased drastically due to urbanization of the territory. There is need to increase or at least maintain the production of crops per unit land area on the remaining over-cropped lands so as to meet the increased demand for food given the rapid population increase.

2.1 Sampling Techniques and Sample Size

For the purpose of the study, multi-stage random sampling and a combination of purposive and random sampling techniques were used in selecting the sample size for the study. Abuja is made up of six Area Councils; Abuja Municipal, Gwagwalada, Abaji, Kuje, Bwari and Kwali, which represented the first stage. In the second stage, four councils were purposively selected from the six councils because of the Fadama Community Associations (FCA), Fadama User Groups, presence of Fadama III Projects and high number of beneficiaries in those areas which are Abaji, Gwagwalada, AMAC and Bwari. In the third stage, three Fadama communities were randomly selected from each of the four councils making it a total of twelve Fadama communities that were studied. In the fourth stage five Fadama User Groups were selected randomly from each Fadama community making it a total of sixty user groups that were studied. In the fifth stage, 10 farmers were randomly selected from each of the sixty Fadama User Groups to give a population of 600 farmers and in the final stage, 6 farmers representatives were randomly selected from each of the 60 User Groups to give a sample size of 360 for the study.

2.2 Data Collection

The research instruments used for the study include; structured questionnaire, interview schedule and personal observation. The content of the instruments used for the study were validated. The prepared questionnaire was given to the project supervisors and some research experts, who validated the content to ensure that the validity of the instruments is not questioned. After the content was validated, 10% of the questionnaire was administered to group of farmers outside the study area as a pilot test. The questions not answered by the respondents used for the pre-testing were assumed as ambiguous, complex and misunderstood, thus modified and re-structured. The structured questionnaire was used to collect information from the target groups having established its validity.

Primary and secondary data were collected by the researcher herself with the help of three enumerators who were properly trained on the objectives of the study. The data were collected with the aid of structured questionnaire and interview schedule based on the objectives of the study. The structured questionnaires were used to collect data from literate respondents while the interview schedules were used to collect data from less literate respondents. Occasional visits were made to the areas covered by the enumerators to ensure that the work was done in line with the objectives of the study. The data collection lasted for eight weeks.

2.3 Data Analysis

Descriptive statistics such as frequency distribution, means, percentages, weighed mean score and ranking was used to analyze objective one. 3 point likert-type scale was used to measure objective two and three. 4 point likert-type scale was used to measure objectives four, while analytical tool such as logistic regression and 4 point likert-type scale was used to

measure objective five. The hypothesized relationship was analyzed using correlation for both hypothesis H_1 and H_2. The Data generated from the field were analyzed using Statistical Package for Social Science (SPSS) as described by Adekoya and Ogunfitimi (2004). Also, descriptive statistics (frequencies, percentages, means, weighed means and Ranking) and 4 point Likert-type scale.

III. RESULTS AND DISCUSSION

3.1 Distribution of Respondents According to Socio-economic characteristics

3.1.1 Gender

Figure 1 presents the results on Gender of respondents in the study area. The result revealed that 31.1% were female while 68.9% were male. This finding indicates that both genders were well represented in the survey. Although women participation in the Fadama III project as seen is low, which is in line with the findings from Muhammah, Umar, Abunakar and Abdullahid (2011) that both gender benefited from Fadama III projects in Abuja. Inferences from this study would therefore be gender friendly.

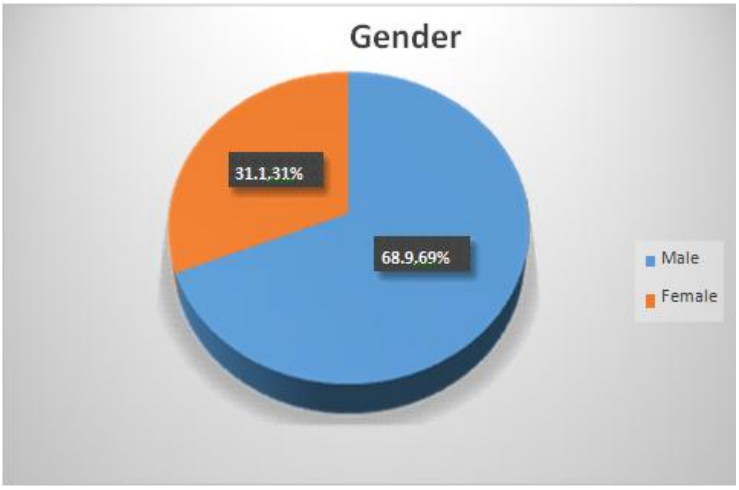


FIGURE 1: Pie chart showing the gender of the respondents
Source: Computed from field data, 2019

3.1.2 Marital status

Result on Figure 2, shows that majority (82.8%) of the respondents were married, 7.8% and 6.4% were divorced and widowed respectively, while only 1.7% and 1.4% were single and separated respectively. In the traditional African society high value is attached to marriage relationships especially when individual are matured. Therefore, marriage responsibilities prompt commitments among the Fadama farmers in their farm productions. This is in line with the findings of Kaloi, Tayebwa, and Bashaasha (2005), that marital status and food security had positive relationship in Uganda and Ethiopia respectively.

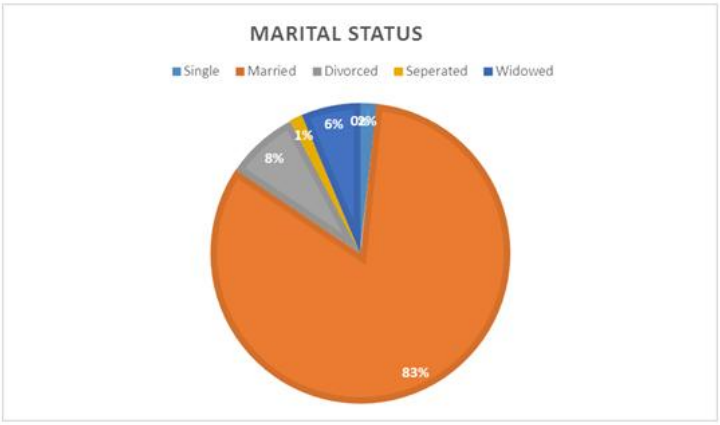


FIGURE 2: Pie chart showing the Marital Status of the respondents
Source: Computed from field data, 2019

3.1.3 Age

Figure 3 revealed that the mean age of the respondents was found as 51.2. This shows that the Fadama III project beneficiaries in the study area were old enough to take full responsibility of the project funding and also had better control and maintenance of the projects. The result is also in line with Muhammah, Umar, Abunakar and Abdullahid (2011), findings which revealed that 54.7% of the respondents were between the age brackets of 45-59 years. Therefore, the results suggest that a good proportion of the youths and elderly benefitted from the Fadama III project.

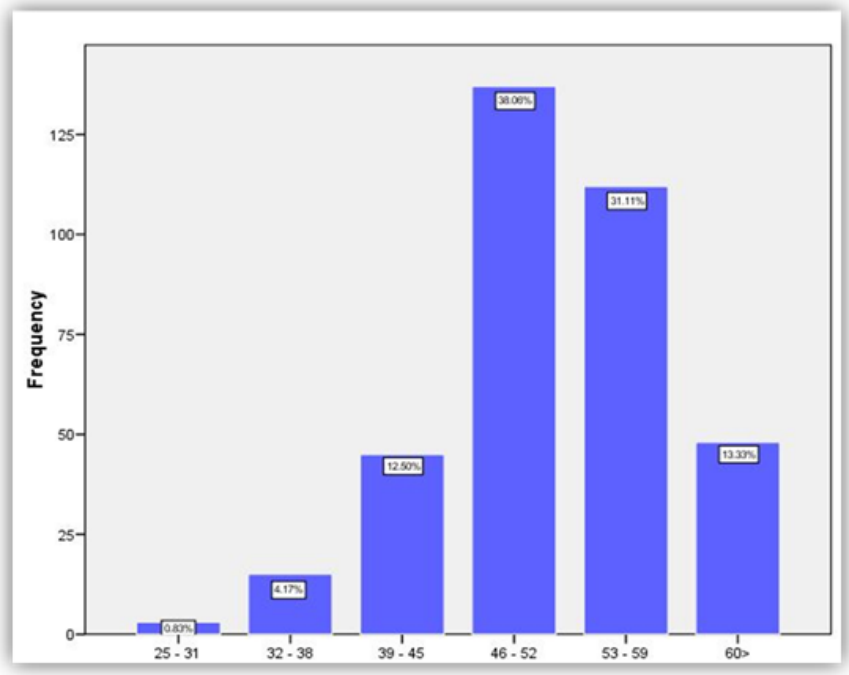


FIGURE 3: Bar chart showing the Age of the respondents
Source: Computed from field data, 2019

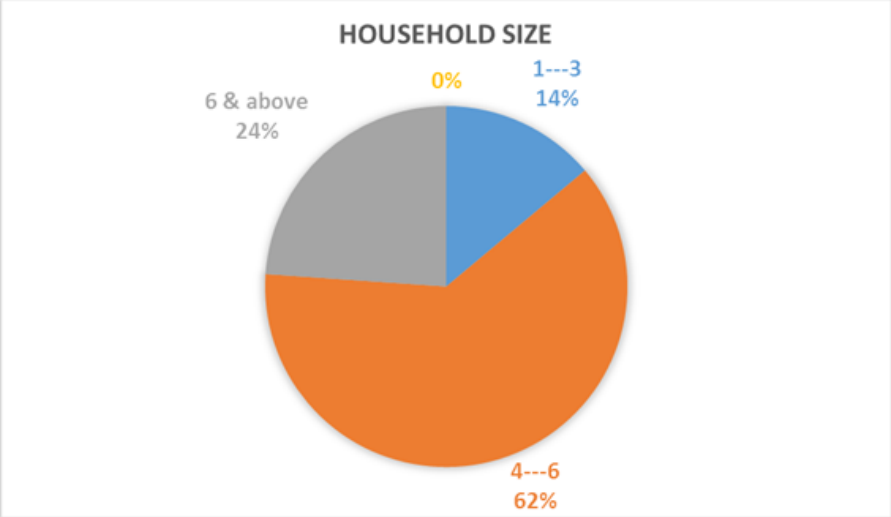
3.1.4 Educational Qualification

Figure 4 shows that less than half 48.3% of the respondents had primary school leaving certificates, 34.7% had secondary school certificates, and 5.3% had HND/B.Sc certificates, 3.9% had OND/NCE while 7.8% had no formal education. This implies that most (92.2%) of the respondents had varying degrees of formal education which should have significant effect on their food access and household food security status. This is in line with Aidoo *et al.* (2013) who found 42% of sampled farmers in Ghana as having junior high school/middle school qualification as contrary to the 73% of sampled farmers in Niger state that had no formal education (Zakari *et al.*, 2014).

FIGURE 4: Bar chart showing the Educational qualification of the respondents
Source: Computed from field data, 2019

3.1.5 Household size

As revealed in Figure 5, the mean household size was found as 5 persons. Agbo *et al*. (2015) and Ndegwa (2016) found the mean household size of farm families as 6 and 5 persons Nigeria and Kenya respectively. This implies that the Fadama III project beneficiaries had more farm power to help increase their farm production, which will also lead to food security.



Mean = 5 persons

FIGURE 5: Pie chart showing the Household size of the respondents

Source: Computed from field data, 2019

3.1.6 Income per annum

Table 1 shows the distribution of the farmers based on their annual income. The result reveals that majority (60%) of the respondents earned between ₦300,000 – ₦499,999. This is preceded by more than one third 35.0% of the respondents who earned between ₦100,000 – 299,999 while only 5% of the respondents earned ₦500,000 and above. The mean annual income earned was ₦338,522.2. This amount is considerably appreciable when compared with what is obtainable in other farming households within and outside Nigeria. Therefore, the farmers are expected to enjoy a reasonable standard of living. This may be attributed to their multiple sources of livelihood from on-farm and off-farm and also due to the Fadama III projects intervention. Ndegwa (2016) found the total annual income of sampled farm families in Kenya as 47,292K/Sh. This counters the study of Nesamvuni (2014), who found that rural households in South Africa had low income and therefore have difficulty in purchasing safe food for their households.

TABLE 1

DISTRIBUTION OF RESPONDENTS BASED ON INCOME PER ANNUM

Income/annum	F	%	Mean
100,000 - 299,999	126	35	338522.2+91559.6
300,000 – 499,999	216	60	
500,000 and above	18	5	

Source: Computed from field data, 2019.

3.1.7 Source of financial Assistance

Figure 6 reveals that almost half (46%) of the farmers accessed financial assistance through co-operative societies, more than one third 32% received grants from government, 16% sort financial assistance from thrift/*esusu/akawo* organizations while only 5% and 1% had assistance from family and friends and loans from bank respectively. This implies that the farmers did not have enough farm credit which incapacitates their effort to expand their scope of farm operation. However, this may equally explain the reason farmers in the study area embraced fadama III project.

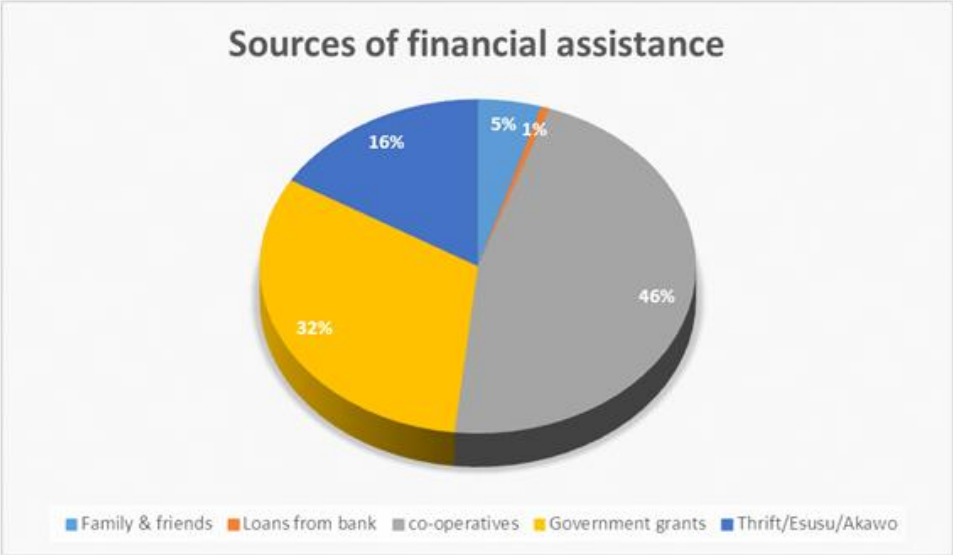


FIGURE 6: Pie chart showing the Source of financial assistance of the respondents
Source: Computed from field data, 2019.

3.2 FADAMA III Projects available in the study area

Table 2 shows that ADP support and research was the most available FADAMA III project in the study area as it was ranked first ($\bar{x}$ = 1.93), followed by free training ($\bar{x}$ = 1.92). ADP plays a prominent role as it concerns agriculture throughout the country and also in the implementation of FADAMA III, partly through linking farmers with new agricultural innovations. ADP is equally responsible for the provision of public extension services to farmers, conveys farmers' problems to research for solution to be proffered. They also help to provide technical support to farmers in form of trainings on sustainable and best farming practices which can go a long way in boosting agricultural production and thus enhancing the food security of farmers.

Supply of agro-input was ranked 3rd ($\bar{x}$ = 1.89) as the most available Fadama III project. Different range of agro-inputs such as seeds, fertilizers, insecticides, herbicides, etc. are crucial to agricultural production circle (Ogunlade *et al.*, 2012), as successful agricultural production is highly dependent on them. Thus their availability to farmers under FADAMA III project was a plus. Construction of feeder roads ($\bar{x}$ = 0.46) was the least available and completed project in the study area. This one way or the other contradicts the submission that the construction of feeder roads made food more accessible to people (World Bank, 2016).

TABLE 2
AVAILABILITY OF FADAMA III PROJECTS IN THE STUDY AREA (N=360)

FADAMA projects	Rank completed	Available and Completed	Available and Completed	Not Available	Mean
ADP support and Research	93.3	6.1	0.6	1.93	1st
Free training	93.6	4.4	1.9	1.92	2nd
Supply of agro-input	91.1	6.9	1.9	1.89	3rd
Asset acquisition	76.4	16.1	7.5	1.69	4th
Construction of livestock Pen	65.3	29.4	5.3	1.6	5th
Construction of fish pond	33.3	35.6	31.1	1.02	6th
Construction of borehole	31.1	29.7	39.2	0.92	7th
Supply of storage facilities	14.2	32.5	53.3	0.61	8th
Construction of markets Stalls	10.6	30.6	58.9	0.52	9th
Construction of feeder	7.5	30.6	61.9	0.46	10th

Source: Computed from field data, 2019

3.2.1 Effectiveness of Fadama III project on Food Security

Results of the effectiveness of Fadama III project on food security shows that the project increased the level of food availability ($\bar{x}$ = 1.57). Food availability is quite important because food must be available before one can think of purchasing it. Food availability relates to the supply of food through production, distribution, and exchange (FAO, 2009). When food is available, that is when someone can be bothered about the nutrition quality of food , which was ranked 2nd ($\bar{x}$ = 1.36). The result also shows that other food security variables expect food availability were moderately effective. This implies that the Fadama III projects had a moderate effect on food security. This calls for more effort on the part of the government to establish more projects centered on achieving food security. The concern over the nutritional quality of food was part of the primary objective of FADAMA III, which is partly in response to widespread under- nutrition and growing concern about the capacity of agriculture to meet future food needs.

TABLE 3
EFFECTIVENESS OF FADAMA III PROJECT ON BENEFICIARIES' IN THE STUDY AREA (N=360)

Food security variables	Extremely Effective	Highly Effective	Moderately Effective	Not Effective
Availability of Food	10.6	36.1	53.3	0
Nutritional quality of Food	1.1	35.3	62.2	1.4
Accessibility of Food	0.0	24.7	73.9	1.4
Affordability of food	0.0	20.3	78.1	1.7

Source: computed from field data, 2019.

IV. CONCLUSION

The Fadam III project was established by government of Nigeria through the pool of worldbank loan. The project was targeted to improve the Agricultural production of Farmers. Food security is one of major elements of development and poverty alleviation and has been a goal of many international and national public organizations. It is in line with this that the study assessed the effects of Fadama III project on beneficiaries' food security.

From the findings of this study, it can be concluded that the beneficiaries of the Fadama III were predominantly males and married. Greater proportion of the beneficiaries had average household size of five persons beneficiaries earned between ₦300, 000.00 and ₦499, 999.00 per annum. The study revealed that ADP support and research was the most available Fadama III project in the study area. In terms of agricultural enterprise, most of the beneficiaries were crop farmers. The results of the effectiveness of Fadama III project on food security shows that the project has moderately increased the level of food availability. Therefore, Fadama III project moderately affected the farm income and also enhance the standard living of the beneficiaries, therefore more projects should be established in other to achieve food security. The study also made appropriate recommendations on how to improve Farmers productive effectiveness of Agricultural programmes in other to achieve food security in Nigeria. However, the result reveals that lack of government support and availability of resource are the most institutional factors that affected the effectiveness of the Fadama III project in the study area.

RECOMMENDATIONS

Based on the findings of this study, the followings recommendations were made in an attempt to improve the Fadama III project in the study area.

The study revealed that the projects moderately affected the food security variables listed. Therefore, it recommends more effort by government agencies to establish more projects targeted at achieving food security in Nigeria.

1. The study revealed that most projects were available and not completed, especially construction of feeder roads. Thus, it recommends that government should endeavour to create more social amenities such as accessible feeder roads and market in order to encourage farmers' participation and to aid extension service. This will help to make food more accessible and affordable.
2. The study revealed that the mean age of the beneficiaries were 51 years. It recommends that more youths be encouraged to participate in Agricultural Development Programmes, this will also help to achieve food security in Nigeria.
3. Monitoring and evaluation of projects are very crucial to the success of the project. The study revealed that it was one of the institutional factors that affected the effectiveness of Fadama III projects. Therefore, it recommends that

effective monitoring and evaluation system be put in place, in other to achieve the aims and objectives of the project. Financial support could be granted to the farmers for participating in the Fadama III project, as one of their challenges is economical.

4. The study recommends that the communities where agricultural projects are cited should assist the government to protect and maintain these projects.

5. The study revealed that Fadama III project had a moderate effect on food security. This calls for more effort on the part of the government to establish more projects centered on achieving food security

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