International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 4 Issue 1, December 2019 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Evaluation of the Impact of Fadama III Programme on the Livelihood of Women Farmers in Anambra State, Nigeria

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ABSTRACT

The study sought to assess the impact of FADAMA III programme on the livelihood of women farmers in Anambra State. The study focused mainly on the activities of FADAMA III programme that supported women farmers relative to income, savings, household expenditure of women farmers, farm asset and non-farm asset acquisition which reflects the livelihood of women farmers. A total of 363 women farmers were selected for the study from a population size of 3880 FADAMA users in Anambra State using Taro Yamene Formula ensuring proper spread to all the agricultural zones in Anambra State. Data were collected through the use of structured and pre-tested questionnaire and analyzed through the use of Descriptive and inferential statistical tools. The Double-Difference (DD) Estimator was used to compare changes in outcome measures between Fadama Users Groups (FUGs) and Non Fadama Users Group. The difference in mean shows that the mean income before the programme was N189, 412.43 and N360, 465.68 after the programme. The mean savings before and after the programme was also found to be N37, 326.04, and N62, 805.33 respectively. Equally; the mean annual expenditure before and after the programme was found to be N49, 978.70, and N131, 607.40 respectively. The study shows that the FADAMA III programme has a strong positive effect on the livelihood of women farmers in Anambra State. It is recommended that provision of services such as communication, empowerment training on basic agricultural business, monitoring, should be promoted and continued by the management of FADAMA III since these are known to have positive effect on women's livelihood capabilities.

KEYWORDS: *FADAMA III, Livelihood, Women, Farmers*

How to cite this paper: Ekoh Rejoice. Chiamaka | Onugu Uchenna Charles "Evaluation of the Impact of Fadama III Programme on the Livelihood of Women Farmers in Anambra State, Nigeria" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-4 | Issue-1, December 2019, pp.1174-1184, URL: www.ijtsrd.com/papers/ijtsrd29608.pdf

IJTSRD29608

INRODUCTION

Nigeria as a developing nation is characterized by the problems of under development, which include widespread illiteracy, endemic poverty, unemployment, uneven distribution of resources and incomes, low productivity, food insecurity, poor public infrastructure, among others (Ekong, 2003). Despite the economic growth rates with an average of 7.4% according to the Nigeria economic report released in July 2014 by the World Bank, yet poverty still remains significant at 33.1% in Africa biggest economy for a country with massive wealth and a huge population to support trade and commerce for an improved Gross Domestic Product (GDP). Thus, the level of poverty caused by the political instability, income inequality and ethnic conflict that majorly affect the rural areas remains largely unacceptable (Kozah and Kozah, 2018).

One of the key features of FADAMA III project was to empower the communities to collectively decide on how resources are allocated and managed for their livelihood activities and to participate in the design and execution of their sub-projects. It employs community demand – driven approach which emphasized and promotes beneficiary's participant and ownership of sub projects from initiation, implementation, monitoring and evaluation (Innih and Dimelu, 2013).

Valde's and Foster (2005) noted that, women are more discriminated upon on the issue of farm asset ownership. As a result of cultural inclination and societal values (a society dominated and influenced by men), women find it difficult to lay claim to family Properties and control over assets, that is; legal regulation and customary rules often restrict women access to control assets that can be accepted as collateral such as lands or livestock. Furthermore, dilapidated access roads to farm roads as well as absences of good structures markets for the women farmer's products have always constituted a great challenge to a successful farming season in Anambra state, thereby possess a negative challenge to the income of the women.

In businesses, income can refer to a company's remaining revenues after paying all expenses and taxes. In this case, income is referred to as "earnings." Most forms of income are subject to taxation. Households and individuals, "income is the sum of all the wages, salaries, profits, interest payments, rents, and other forms of earnings received in a given period

of time (Staff, 2012). Chirwa (2005) equally argued that macro-economic policies that promote growth in income are likely to lead into poverty reduction.

The extension services components have been de-emphasized and given little or no attention by agricultural intervention programme in the past. These constraints are capable of imposing significant adverse effects on improved livelihood of women farmers (Ezeh, 2006).Sofa and Cheryl (2011) argued that Agriculture can be an important engine of growth and poverty reduction but the sector is underperforming in many developing countries because women, who are often a crucial resource in agriculture and the rural economy, face constraints that reduce their productivity.

FADAMA in Nigeria, is a term generated from the Hausa extraction which means irrigable land-usually low lying plains under laid by shallow aquifers found along major river systems. There have been various phases of implementation of the FADAMA III programme including Phases I, phase II and currently phase III. The programme is intended to increase the incomes of users of rural land and water resources on a sustainable basis, increasing their incomes, reducing rural poverty, increase food security and contribute to the achievement of key Millennium Development Goals (MDGs). Women are a major contributors to farming output and were largely involved in the FADAMA Users Groups, however since the inception of the FADAMA III programme, studies have not been carried out to ascertain the level of influence of the Programme on the livelihood of women farmers in Anambra State, hence the need for the study.

Objectives of the Study

The broad objective of the study is to examine the effects of Fadama III programme on livelihood of women farmers in Anambra State.

The specific objectives are to:

1. determine the impact of Fadama III programme on the income of women farmers;
2. Assess the influence of the FADAMA III programme on the savings of women farmers;
3. Ascertain the impact of Fadama III programme on household expenditure of women farmers;
4. Investigate the influence of Fadama III programme on women farm asset and non-farm asset acquisition

Hypotheses

Ho_1: There is no significant difference in the income of women farmers before and after participation in Fadama III Programme in the area**.**

Ho_2: There is no significant difference in the savings of women farmers before and after participation in Fadama III Programme in the area.

Ho_3: There is no significant difference in the household expenditure of women farmers before and after participation in Fadama III Programme in the area.

Ho_4: There is no significant difference in the overall asset (farm asset and non-farm asset) acquisition of the women farmers before and after participation in Fadama III Programme in the area.

Review of Related Literature

Concept of Livelihood

The concept of livelihood is widely used in contemporary writings on poverty and rural development, but its meaning can often appear elusive either due to vagueness or to differentiate definition being encountered in different sources. Its dictionary definition is a' means to living', which straightway makes it more than merely synonymous with income because it directs attention to the way in which living is obtained ,not just the net results in terms of income received or consumption attained. The most popular definition advanced by Ellis (2000), is "a livelihood comprises the assets (natural, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by an individual or household." A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.

The livelihoods framework is founded on a belief that people require a range of assets to achieve positive livelihood outcomes. Assets require investments of time and money in order to be acquired or create livelihoods resources. Different households have different access to livelihood assets, which the sustainable livelihood approach aims to expand. Changes in the portfolio of assets, their productivity and the extent to which households have access to them are the attributes that are critical in determining livelihood diversification and ultimately household welfare (Dorward et al., 2003).

The concept of livelihood and sustainable livelihood framework has become an integral part of rural development and poverty reduction in recent times. Rural livelihoods are composed of the activities that provide the means of household survival and long-term well-being (Stephen and Lenihan 2010). The further stated that state that livelihood strategies may be classified into natural resources based activities (e.g. collection and gathering, cultivation, livestock-keeping, etc) and non-natural resources based activities (e.g. trade, services, remittances).

Income, Savings, and Household Expenditure

Income is the money that an individual or business receives in exchange for providing a good or service or through investing capital. Income is used to fund day-to-day expenditures. Investments, pensions and social security are primary sources of income for retirees. In businesses, income can refer to a company's remaining revenues after paying all expenses and taxes. In this case, income is referred to as "earnings." Most forms of income are subject to taxation. Households and individuals, "income is the sum of all the wages, salaries, profits, interest payments, rents, and other forms of earnings received in a given period of time (Staff, 2012).

Savings is income not spent, or deferred consumption. Methods of saving include putting money aside in, for example, a deposit account, a pension account, an investment fund, or as cash. Saving also involves reducing expenditures, such as recurring costs. In terms of personal finance, saving generally specifies low-risk preservation of money, as in a deposit account, versus investment, wherein

risk is a lot higher; in economics more broadly, it refers to any income not used for immediate consumption. According to Dell'Amore, & Giordano (1983), saving differs from savings. The former refers to the act of increasing one's assets, whereas the latter refers to one part of one's assets, usually deposits in savings accounts, or to all of one's assets. Saving refers to an activity occurring over time, a flow variable, whereas savings refers to something that exists at any one time, a stock variable. This distinction is often misunderstood, and even professional economists and investment professionals will often refer to "saving" as "savings"

Household Expenditure: According to Organization for Economic Co-operation and Development (OECD, 2018), household expenditure is the amount of final consumption expenditure made by resident households to meet their everyday needs, such as: food, clothing, housing (rent), energy, transport, durable goods (notably, cars), health costs, leisure, and miscellaneous services. It is an essential variable for economic analysis of demand. Household spending, including government transfers, is the actual individual consumption that is equal to households' consumption expenditure plus those (individual) expenditures of general government and non-profit institutions serving households (NPISHs) that directly benefit households, such as, health care and education.

Asset Ownership (productive and non-productive farm asset)

An asset is a resource with economic value that an individual, corporation or country owns or controls with the expectation that it will provide a future benefit. According to Siegel, Dauber & Shim, (2005), asset simply represents value of ownership that can be converted into cash (although cash itself is also considered an asset). Asset ownership is an economic and social condition that is more persistent and prevalent than income among women. Ability to access farm productive assets by women farmers goes a long way to provide for their basic needs. These basic needs refer to the minimum standards for consumption and acceptable needs (Welfare expenditure).

Farm productive assets are the key determinants of family extent of livelihood strategy. Access to farm productive asset/asset ownership will get the women farmers out of poverty; women have low access to productive asset. Ownership of these farm assets (land, livestock, household labour, education, farm machinery, fertilizer, access to improved farm inputs, among others will help the farmers to respond faster to change in market situation.

Jalan&Ravallion (2002) categorized productive asset among women farmers into six groups for easy understanding. Thus, asset could be in a form of human capital (education and household labour), natural capital (land), physical capital (livestock, farm machinery among others), public capital (participation in infrastructure such as school, health clinic, and electricity), social capital (participation in farm organization, association and link to other individual and household), financial capital (access to credit, insurance), and geographic capital (location factors such as proximity to the market. Valde's& Foster (2005), asserts that gender inequality exists in the ownership and utilization of this farm asset. In his word, "women are more discriminated upon on the issue of farm asset ownership. Asset discrimination therefore puts a break in the aggregate economic growth which reduces the income growth of the poorest strata of the population.

Non-productive farm assets refer to jewelries, clothes, television among other luxurious products meant for personal use. They are not used in the farm to improve farm productivity but they can still be converted to cash for the purchase of farm inputs.

FADAMA III

FADAMA is a term from the Hausa extraction which means irrigable land-usually low lying plains under laid by shallow aquifers found along major river systems. The National Fadama Development Project (NFDP) was established in states with Fadama potentials through the pooled World Bank loan in 1990 and it aimed at increasing and financing small scale irrigation. Also, it has the objective of increasing the income and skills of beneficiaries through capacity building to improve their livelihoods by increasing income generating activities (National Fadama Coordination office, 2012). The Third National Fadama Development Project popularly known as Fadama III emerged as a follow up after the success story of second National Fadama Development project.

According to Ogbonna&Nwabiala (2014), the National Fadama III Development Projects is a poverty alleviation programme by government of Nigeria supported by World Bank and African Development Bank (ADB), the objective of the programme is to increase the incomes of users of rural land and water resources on a sustainable basis, increasing their incomes, reducing rural poverty, increase food security and contribute to the achievement of key Millennium Development Goals (MDGs) such as eradication of extreme poverty and hunger, promote gender equality and empower women, ensure environmental sustainability and develop a global partnership for development. The bulk of the funds come from the World Bank while Federal Government secured the loan and state paid counterpart fund and the Local Government paid a token for their benefiting community (ADP, 2015). The communities assessed the loan as cooperatives. Money invested is expected to bring return on investment after a gestation period.

Support Activities of FADAMA III

Support activities of FADAMA III are Capacity building, communications and information support. This component of support activities was designed to provide additional capacity building support to farmers, with emphasis on strengthening linkages between farmers, agro-dealers, processing firms and other private sector participants to develop contracts for agreed quantity and quality of outputs

Rural Institutions Development: through the technical assistance,missions carries out preliminary sensitization of farmers using town-hall approach on the implementation of FADAMA III programme.

Communication and Information Support: The objective of the Communication and Information Sub-component is to effectively carry out information dissemination about the project and its guidelines to potential beneficiaries; and implementation of communications program.

Small-Scale Community-Owned Infrastructure: This support activity component would be scaled up to finance the interventions in the following sub-components:

A. Rehabilitation of surface water and limited construction of new small-scale irrigation schemes and borehole schemes: The surface water scheme activities include: land surveying, contour maps, land leveling and grading, design works, repairs of generator houses and generators, clearing of water courses, such as desolation, and provision of equipment, such as sprinkler component.
B. Ground water irrigation schemes: This sub-component will assist to demonstrate low-cost technologies for shallow groundwater irrigation. Additional Financing funds will be used to finance infrastructure and equipment for demand-driven small-scale irrigated rice and horticultural subprojects emanating from the beneficiary groups, organized as Out growers' Associations (OAs)/FCAs or rice/horticultural production clusters (PCs).
C. Other infrastructure support: This sub-component was designed to provide market infrastructures to clusters of farmers in order to reduce post-harvest losses and facilitate access to markets. Such infrastructure would include rehabilitation of access roads and culverts linking production sites to the processing/marketing zones, storage facilities and preservative technologies which are all related to the priority value chains.
D. Advisory Services and Support for Acquisition of Farming Inputs. The FADAMA III project finances the procurement of advisory senders to transfer know-how on proper utilization of factors of production (fertilizers, improved seeds and agricultural machinery), including advice on the associated downstream activities.

Conceptual Framework

The study was conceptualized below by the researchers. The arrows show the connectivity and interaction of variables in livelihood indicators as stated in the research objectives.

DEPENDENT VIARIABLE

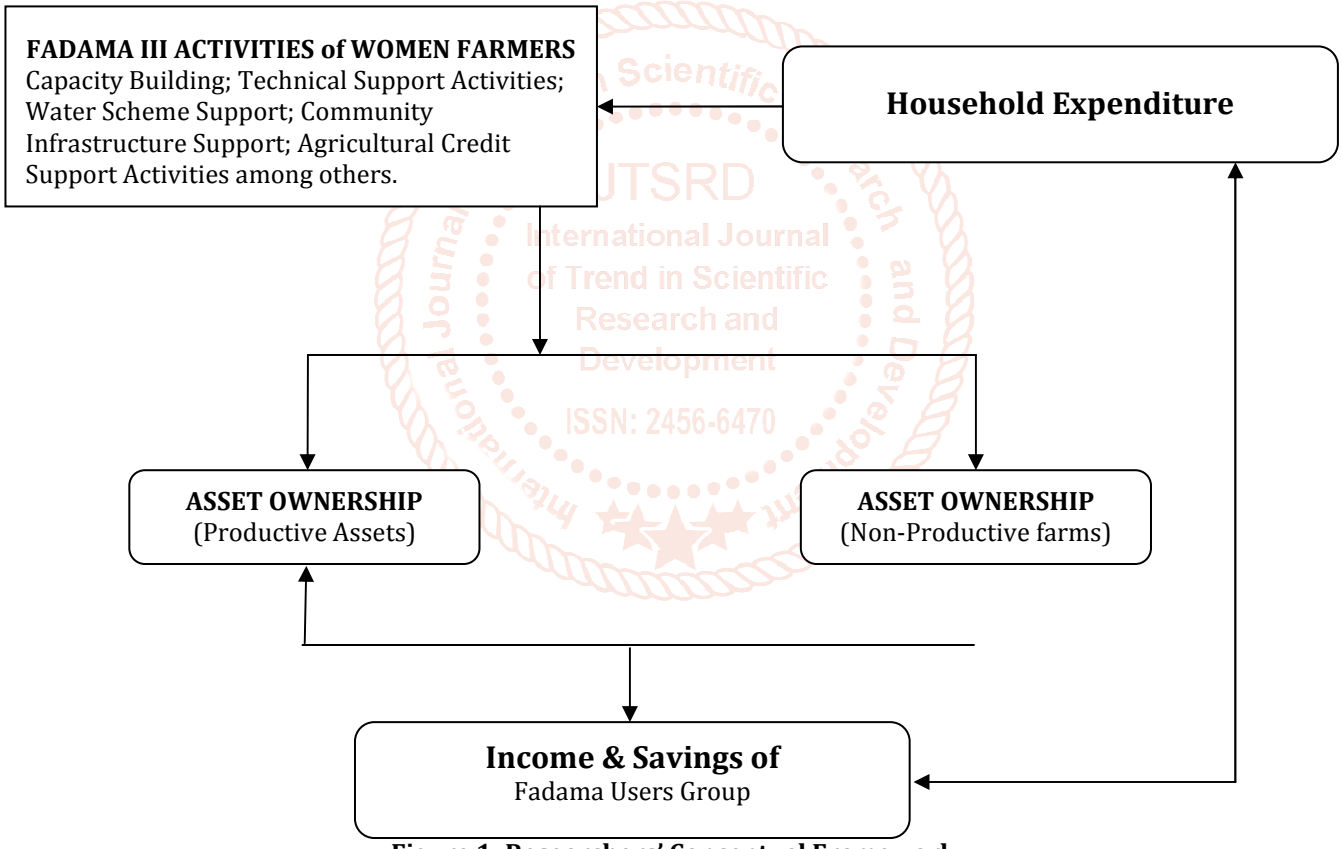

Figure 1: Researchers' Conceptual Framework

Theoretical Framework

Theory of Collective Action Theory

This study was based on the Collective Action Theory Pandolfeli, Meinze& Dick- Dohrn (2007), saw collective as both the process by which voluntary institution are created and maintained and the groups that decide to act together. Collective action plays a vital role in many people's lives, through such areas as income generation, risk reduction, public service provision, and the management of natural resources. Integrating both women and men into collective action can lead to greater group effectiveness. In many instance, the gender composition of group is an important determinant of effective collective action, especially for natural resources management in two key dimensions: (i) the ability of groups to meet their immediate purposes, whether that purpose is the management of a natural resource or the disbursement of funds to members of a burial group, and (ii) the process by which the group works to meet that purpose. Specific measures of effectiveness might include tangible indicators such as economic returns to group members, compliance with rules, transparency and accountability in managing funds, or the incidence and severity of conflicts, as well as less tangible indicators, such s members' satisfaction with the group. This conforms to the cooperative principles of open membership and gender equality.

Based on the premise above, the theory of collective action important in this work especially as Fadama Users' Group are organized, incorporated and managed as co-operative organizations. This is buttressed more by Chavez (2003) who opined that collective Action Theory's definition, principles and practice directly or indirectly relate to co-operative seven internationally recognized principles of voluntary and open membership, member economic participation; co-operation among co-operative, concern for community etc. according to Dick, Gregorio & McCarthy (2004) collective action theory is a theory that is very useful in agriculture, rural resource management, and rural development programmes. These are the hallmark of Fadama Users Groups.

Tenets for Collective Action Theory (Marshall, 1988)

The collective action theory was built on the following tenets:

- The involvement of a group of people.
- Share of interest within the group.
- Common action which works in the pursuit of the shared interest and
- Participation to distinguish it from hired labor.

Relevance of the Theory of the Study

Collective action takes place when members of Fadama User Group (FUGs) pooled their labour and resources together to invest on their selected sub project(s) as approved in the Fadama local Development Plan (FDP). This is likened to involvement of group action on a shared interest within the groups, for instance building a public toilet or water well by a particular (FUG) is common action which works in the pursuit of the shared interest and the direct members participation will obviously distinguish it from hired labour. The coming together of (FUG) to form the body called Fadama Community Association (FCAs) which is the apex body that monitors the activities of the group (FUGs) in line with the established rules on the project implementation manual (2009).

Methodology

The list of members of women farmers in FADAMA III programme was made available by the State Agricultural Development Programme (ADP) office. Multi-stage sampling technique was used to collect data from the women farmers through the aid of a well-structured questionnaire. Stage one: 2 Agricultural Zones were randomly selected out of the four agricultural zones in the State. Stage two: 4 Local Governments Areas (LGAs) were purposively selected from each Local Government Area based on the concentration of women FADAMA III participants. Furthermore, in stage three, 2 communities were randomly selected from each LGA, and further selection of 2 villages for the study. Thus, a total of 32 villages were randomly selected and 12 women farmers were randomly selected from each village to make the sample size a total of 384 for the study. After data sorting and filtering, only 363 copies of filled questionnaire were found valid. A combination of analytical tools such as descriptive statistics which includes; frequency distribution and mean as well as inferential statistical tool of z-test was used to analyze the data collected. The 4 objectives were analyzed with the descriptive statistics however; objective 1 and 2 were also subjected to Duflo *et al* (2004) programme effect difference in difference estimator (DDE) model. Furthermore, the null hypothesis one was tested with z-test model. Therefore;

A. Descriptive statistics was mathematically stated as:

$$\overline{X} = \sum \frac{FX}{n} \text{ ..... Eqn. 1}$$

Where;

$\overline{X}$ = mean, X = variables outcome, n = sample size, F = frequency.

B. The Dufloet al. (2004) programme effect difference in difference estimator (DDE)model is stated as:

$$DDE = (Y_{I1} - Y_{I0}) \text{ ..... Eqn. 2}$$

Where:

DDE = difference in difference effect

$(Y_{I1} - Y_{I0})$ = programme effect in income of women farmers before and after participation

$(Y_{s1} - Y_{s0})$ = programme effect in savings of women farmers before and after participation

C. Mean threshold from 5 Point Likert Scale is stated as:

$$\overline{X} = \frac{SA + A + SWA + DA + SDA}{5} = 3.0 \text{ ..... Eqn. 3}$$

Where:

SA = strongly agreed = 5. A = agreed = 4. SWA = somewhat agreed = 3. D = disagree = 2, and SD = strongly disagreed.

D. Z-test was stated as:

$$Z = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2 + S_2^2}{n_1 n_1}}} \text{ ..... Eqn. 4}$$

Where:

$\overline{X}_1$ = *mean income, savings, and household expenditure before the programme*

$\overline{X}_2$ = *mean income, savings, and household expenditure after the programme*

S_1^2 = Known variance of income before the programme participation.

S_2^2 = Known variance of income after programme participation

Presentation of Data and Results

Table1: Activities of FADAMA III Programme in support of women farmers

S/n	Activities	Mean	Std. Deviation	Decision
A	**Capacity building activities**			
1	Communication and information support	4.09	1.38	Agree
2	Empowerment training on basic agricultural business and investment	3.91	1.22	Agree
3	Group formation and development training	4.00	1.26	Agree
4	Project management, monitoring and evaluation	2.00	1.10	Disagree
B	**Water scheme support activities**			
5	Rehabilitation of surface water	2.36	1.08	Disagree
6	Construction of borehole scheme	4.00	1.18	Agree
7	Ground water irrigation scheme	2.79	0.89	Disagree
C	**Community infrastructure support activities**			
8	Rehabilitation of farm access roads	3.40	1.64	Agree
9	Construction of culverts	2.33	1.35	Disagree
10	Provision of market/market infrastructure	3.53	1.41	Agree
11	Provision of processing facilities for farm produce	4.00	0.93	Agree
D	**Technical support activities**			
12	Provision of preservation technologies for perishable product	2.50	1.24	Disagree
13	Demonstration of new agricultural technologies to farmers	3.00	1.13	Agree
14	Carrying out research/agricultural development programme with farmers	1.58	0.67	Disagree
15	Renders extension services to the farmers	4.67	0.49	Agree
16	Visitation, monitoring, and supervision of farmers	3.50	1.31	Agree
E	**Agricultural Credit support**			
17	Support/provision of farming inputs (fertilizer, seeds, herbicides, etc.) to the women	4.00	0.94	Agree
18	Provision of the facility for assets (Farm supply vehicle) acquisition	2.60	1.17	Disagree
19	Granting of agricultural credit (loan) to farmers	1.70	0.82	Disagree
20	Assistance in farm-produce processing and storage	4.20	1.32	Agree
21	Assistance in marketing of farmers produce	3.90	0.74	Agree

Source: Field Survey, 2019.

The programme activities were grouped into 5 different activities. Five (5) Point Likert scales format was used to capture the women responses which was later interpreted as greater than or equal to 3.0 as agreed and less than 3.0 as disagreed. Based on the 21 items of activities captured, 13 had mean threshold of 3.0, while 8 were below the acceptable mean of 3.0. Thus, the activities in support of women farmers were: **Capacity building activities**(Communication and information support, Empowerment training on basic agricultural business and investment, Group formation and development training), **Water scheme support activities**(Construction of borehole scheme), **Community infrastructure support activities** (Rehabilitation of farm access roads, Provision of market/market infrastructure, Provision of processing facilities for farm produce), **Technical support activities** (Demonstration of new agricultural technologies to farmers, Renders extension services to the farmers, Visitation, monitoring, and supervision of farmers), and **Agricultural Credit support** (Support/provision of farming inputs (fertilizer, seeds, herbicides, among others) to the women, Assistance in farm-produce processing and storage, Assistance in marketing of farmers produce.

Identification of the Income, Savings, and household Expenditure of Women Farmers that Participated in the FADAMA III Programme

Annual Income/Saving of Women before and after the FADAMA III Programme . The income/saving range of women at the end of the farming season is presented in table 4.3 below

Table2: Income and Saving Range of women at the end of the farming season

Income (N)	Freq.	Percentage	Savings	Freq.	Percentage
Before participation					
≤ 49,900	23	6.80	≤ 29,900	196	57.99
50,000 – 99,900	21	6.21	30,000 – 39,900	76	22.49
100,000 - 149,900	32	9.47	40,000- 49,900	23	6.80
150,000 – 199,900	190	56.21	50,000 and above	43	12.72
200,000 - 249,900	20	5.92			
250,000 and above	52	15.38			
After participation					
≤ 99,000	40	11.83	≤ 49,000	68	20.12
100,000 – 199,900	30	8.88	50,000– 59,900	98	28.99
200,000- 299,900	50	14.79	60,000 - 69,900	140	41.42
300,000 – 399,900	121	35.80	70,000 and above	32	9.47
400,100 – 499,900	25	7.40			
500,000 and above	72	21.30			

Source: Field Survey 2019.

The result presented on table 2 shows that majority (56.21%) of the women farmers reported a highest income in the range of N150,000 – N199,000 before programme participation. After the women's participation in Fadama III programme, majority (35.80%) reported a highest income category in the range of N300,000 – N399,000. On the other hand; majority (57.99%) of the women reported highest savings in the range of ≤ N29,000 before the programme participation. After the programme intervention; majority (41.42%) of the women reported their highest savingscategory in the range of N60,000 – N69,900.

Programme Effect on Poverty Reduction in Women Farmers

Table3: Difference in Different programme effect on women

Items	Mean income (N)	Mean savings (N)
Before programme participation	189,412.43	37,326.04
After programme participation	360,465.68	62,805.33
Livelihood effect	171,053.25	25,479.29
Percentage increase in status (%)	90.31	68.26
Duflo (2004) Difference	**145573.96**	

Source: Field Survey, 2019.

$$Effect = (360{,}465.68 - 189{,}412.43) - (62{,}805.33 - 37{,}326.04)$$
$$Effect = (171053.25) - (25479.29)$$
$$Programme\ effect = 145573.96$$

Table 3 shows the effect of the programme on livelihood of women farmers in the project. The programme intervention increased the income status of the women by 90.31%, and their savings culture by 60.26%. The Duflo (2004) Difference in Difference showed that despite the 68.26% increase in women savings, they have N145573.96 to cater for their other household needs.

Household Expenditure (Food, Health, Education, and Electricity) of Women before and after the FADAMA III Programme

The household expenditure (Food, Health, Education, and Electricity) of women at the end of the farming season is presented in table 4.4.6 below

Table4: Household Expenditure (Food, Health, Education, and Electricity of women at the end of the farming season

Before (N)	Freq.	%	After (N)	Freq.	%
Before					
≤ 49,900	99	6.21	≤ 79,000	40	11.83
50,000 – 69,900	21	29.29	80,000 – 109,900	13	3.85
70,000- 99,900	98	28.99	110,000 – 139,900	54	15.98
100,000 – 129,900	120	35.50	140,000 and above	231	68.34
Total %		100.0			100.0
X = 49,978.70					**X = 131,607.40**

Source: Field Survey, 2019.

Household Expenditure Before the programme intervention

$$\bar{X} = \frac{16892800.60}{338} = 49{,}978.70$$

Household Expenditure After the programme intervention

$$\bar{X} = \frac{44483301.20}{338} = 131{,}607.40$$

The table therefore shows that majority (35.50%) of the women's expenditure before the programme intervention was in the range of N100,000 – N129,900. After participating in the programme, majority (68.34%) of the women reported expenditure in the range of N140,000 and above. The mean expenditure before the programme was found to be N49,978.70 and N131,607.40 after the programme intervention. The programme intervention caused 61.23% increase in their household expenditure.

Evaluation of Asset Ownership

Table5: Evaluation of Asset Ownership

S/N	Asset	Before Mean	Before Std. dev	Decision	After mean	After Std. Dev	Decision
	Non-Productive						
1	Car/Van/Truck	1.67	1.32	Disagree	1.56	1.33	Disagree
2	Motor bike/Keke	2.56	1.42	Disagree	3.33	1.58	Agree
3	Bicycle	3.89	1.69	Agree	3.89	1.69	Agree
4	Television	2.44	1.59	Disagree	3.78	1.48	Agree
5	Radio	3.00	1.41	Agree	3.44	1.33	Agree
6	Cellphone	2.78	0.97	Disagree	3.44	1.51	Agree
7	Sewing machine	3.00	1.58	Agree	3.33	1.41	Agree
8	Generator	2.56	1.51	Disagree	3.11	1.27	Agree
9	Set of furniture	2.11	0.93	Disagree	3.11	1.45	Agree
10	Stove	3.33	1.00	Agree	4.00	0.87	Agree
11	Fridge	2.00	0.87	Disagree	2.56	1.13	Disagree
	Productive Asset						
12	Wheelbarrow	2.22	1.30	Disagree	3.33	1.50	Agree
13	Hoe	4.11	1.27	Agree	4.61	0.78	Agree
14	Cutlass	3.78	1.56	Agree	4.67	0.71	Agree
15	Tractor/power tiller	2.00	1.32	Disagree	1.56	0.73	Disagree
16	Axe	2.67	1.00	Disagree	4.11	1.36	Agree
17	Agro-chemical	2.91	1.24	Disagree	4.35	1.70	Agree
18	Spraying gang	1.94	0.43	Disagree	3.89	1.22	Agree
19	Livestock equipment	2.13	0.81	Disagree	2.34	1.19	Disagree
20	Processing equipment	2.00	1.32	Disagree	2.67	1.00	Disagree
21	Storage facilities	1.90	0.40	Disagree	4.12	1.38	Agree
22	Land holding	1.02	0.91	Disagree	2.21	0.99	Disagree
23	Irrigation equipment	2.67	1.00	Disagree	3.33	1.41	Agree
	Grand mean	2.45	1.05	**Disagreed**	3.43	1.16	**Agreed**

Source: Field Survey, 2019.

Table 5 based on the eleven (11) items of non-productive farm asset owned by the women before and after the programme, 3 were of the mean threshold of 3.0, while 8 were below mean threshold of 3.0 before the programme, while 9 were upto the mean threshold 3.0 and 2 were mean threshold below 3.0 after the programme. This finding shows that the non-productive assets among the women before the programme in the area include; Bicycle, Radio, Sewing machine, and Stove. While on the other hand, the non-productive asset after the programme includes; Motor bike/Keke, Bicycle, Television, Radio, Cellphone, sewing machine, Generator, Set of furniture, and Stove.

Table 5 based on the twelve (12) items of farm productive assets before and after the programme, 2 were up to the mean threshold of 3.0 while 10 were the mean threshold below 3.0 before the programme which includes; wheelbarrow, and cutlass. Equally, after the programme, 8 assets were up to the mean threshold of 3.0 while 4 assets were the mean threshold below 3.0. Thus, the farm productive asset that improved as a result of women's participation in Fadama III programme includes; Wheelbarrow, Hoe, Cutlass, Axe, Agro-chemical, Spraying gang, Storage facilities, and Irrigation equipment. The grand mean of 3.43 shows that the programme had a strong effect in improving the livelihood of women farmers.

Test of Hypotheses

Hypothesis one (Ho_1: There is no statistical difference in the income of women before and after joining Fadama III Programme in the area).

The Z test result of Ho_1 is presented in table 4.8 below

Table6: Test of Ho_2

Variable	Mean (N)	Std. dev.	DF	Z – cal.	Z – tab.	Decision
Before income	189,412.43	53,093.65	676	22.21	1.96	Reject the null hypothesis
After income	360,465.68	130,793.52				

Source: Field Survey, 2019.

The difference in the income of the women before and after joining the programme was tested with a Z-test (parametric tool), the table shows the standard deviation calculated from the mean income before and after joining the programme were 53,093.65, and 130,793.52 respectively. The degree of freedom was 676 while the Z calculated was 22.21. This Z value was greater than the Z tabulated, which implies that the Ho_1 was rejected, as significant difference exists in the income of the women before and after joining the programme. Mathematically; the Naira difference in the income was found to be N171,053.25.

Hypothesis Two (Ho_2: There is no statistical difference in the savings of women before and after joining Fadama III programme in the area).
The Z-test result of $Ho_2$is presented in table 7 below

Table7: Test of Ho_2

Variable	Mean (N)	Std. dev.	DF	Z – cal.	Z – tab.	Decision
Before savings	36,066.57	502.62	676	25.75	1.96	Reject the null hypothesis
After savings	62,805.33	5,026.25				

Source: Field Survey, 2019.

The difference in the savings of the women before and after joining the programme was tested with a Z test (parametric tool), the table shows the standard deviation calculated from the mean savings before and after joining the programme were 502.67 and 5,026.25 respectively. The degree of freedom was 676 while the Z calculated was 25.75. This Z value was greater than the Z tabulated, which implies that the null hypothesis was rejected, as significant difference exists in the savings of the women before and after the programme. Mathematically; the Naira difference in the savings was found to be N25,479.29.

Hypothesis Three (Ho_3: There is no statistical difference in the expenditure of women before and after Fadama III Programme in the area).
The Z-test result of Ho_3 is presented in table 8 below

Table8: Test of Ho_3

Variable	Mean (N)	Std. dev.	DF	Z – cal.	Z – tab.	Decision
Before Exp.	25,479.29	22,769.03	676	29.06	1.96	Reject the null hypothesis
After Exp.	131,607.40	20,177.95				

Source: Field Survey, 2019.

The difference in the general expenditure of the women before and after joining the programme was tested with a Z test (parametric tool), the table shows the standard deviation calculated from the mean expenditure before and after joining the programme were 22,769.03 and 20,177.95 respectively. The degree of freedom was 676 while the Z calculated was 29.06. This Z value was greater than the Z tabulated (1.96), which implies that the null hypothesis was rejected as significant difference exists in the level of expenditure of the women before and after joining the the programme. Mathematically; the Naira difference in the expenditure was found to be N**25,479.29.**

Hypothesis Four (Ho_4: there is no significant difference in Asset acquisition of women before and after joining Fadama III Programme in the area).
The result of the paired sample t-test for Ho_4 is presented in table 4.10 below

Table4.10: Test of Ho_4: t-Test: Two-Sample Assuming Unequal Variances

Variables	Asset Before	Asset After
Mean	2.55	3.34
Variance	0.56	0.76
Observations	23	23
Hypothesized Mean Difference	0	
Df	43	
t Stat	(3.28)**	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.02	

Source: Computed from the Field Survey, 2019.

Due to the non-parametric nature of the asset acquisition, the mean threshold of objective two was standardized by transforming it into natural log. Two sample t-test of unequal variance was used to test the effect or difference in asset ownership before and after the programme intervention. The t-value (3.28)** as was calculated was significant at probability value of 0.000. This is greater than the standard t-value of 1.96 at probability value of 0.05. Therefore; the null hypothesis was reject, the alternative hypothesis (Ho_a) was accepted, hence there is significant difference in asset ownership.

Summary of Findings

The research findings show that the capacity building activities in support of the women were Communication and information support, Empowerment training on basic agricultural business and investment, and Group formation and development training. The water support scheme was the Construction of borehole scheme. The community infrastructure support scheme were Provision of market/market infrastructure, Provision of processing facilities for farm produce, and Rehabilitation of farm access roads. Demonstration of new agricultural technologies to farmers, renders extension services to the farmers, and visitation, monitoring, and supervision of farmers were the technical support activities rendered to the women farmers. Assistance in farm-produce processing and storage, assistance in marketing of farmers produce, support/provision of farming inputs (fertilizer, seeds, herbicides, etc.) to the women were the agricultural support activities rendered the women farmers.

This finding is in consonance with the finding of Babatundu,Abraham, Temitope(2017) which studied effect of fadama III program on dry season vegetable growers in kwarastate,Nigeria. Data obtained were analyzed with descriptive techniques and T-test. The results showed that beneficiaries acquired benefits from the extension services rendered to them and it in turn revealed a positive effect on the farmers' livelihood.

The study further, found that the non-productive asset owned by the women before the programme were Bicycle, Radio, Sewing machine, and Stove. While after the programme the women added Motor bike/Keke, Television, Cellphone, Generator, and Set of furniture. On the agricultural productive asset, the women had Cutlass, and Hoe. While after the programme they added Wheelbarrow and Axe to the list of the asset, This agrees with the finding of Babatunde et al (2017) that beneficiaries benefitted access to watering cans, knapsack sprayer, agro chemicals etc

The researchers found out that the mean income before and after joining the Fadama III Programme were N189,412.43, and N360,465.68 respectively. The mean savings before and after joining the programme was also found to be N37,326.04, and N62,805.33 respectively. Equally; the mean annual expenditure before and after joining the programme was found to be N49,978.70, and N131,607.40 respectively. Equally, the programme effect on women's income was found to be N145573.96 which was about 90.31%, in line with Nwachukwu et al (2016) who studied the effect of fadama III user groups(FUGs)participation on farmers income in Anambra State and affirmed that there is positive relationship between farmer level of income and their participation experiences in fadama programme.

On the test of hypotheses, the two sample t-test of unequal variance of Ho_1 (3.28TT value) at 0.000 probability value was rejected. The Z test result of the null hypotheses of Ho_2 (22.21), Ho_3 (25.75) and Ho_4 (29.06) were all rejected since they were all greater than the table Z value of 1.96 at probability value of 0.05. Therefore, all the null hypotheses were rejected and the alternate hypotheses accepted.

Conclusion

FADAMA III Programme had a positive effect on women farmer's income and improvement of the livelihood of women farmers in Anambra State. The programme was one of those established by the World Bank to eradicate hunger and increase food security. Most of FADAMA community projects like market stores, borehole construction, culvert, access roads etc are still in existence. This is an ideal programme that the government of the day should look into since it has a grass root approach. It's a rural development strategy where the beneficiaries are among the people that choose what to be done in their area. Conclusively, Fadama III Programme had a visible effect in the livelihood status of the women as their level of income increased and also their savings equally improved.

Recommendations

The following recommendations were made based on the findings; they include

1. It is recommended that services such as communication, empowerment training on basic agricultural business, monitoring, construction of borehole, rehabilitation of farm access roads, provision of market etc, which are some of the support services rendered to the women farmers should be encouraged and continued by the management of FADAMA III.
2. Women farmers should be given access to land ownership to enable them use it to obtain loans. Having increased access to loans will promote women participation in FADAMA III and increase their agricultural output.
3. Low literacy level should be corrected by the government by encouraging education among women through adult education to assist them participate fully in decision making in programmes that involves them.

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