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Research Article

Impact of Fadama III Project on the Livelihood of Livestock Farmers in Osun State, Nigeria

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Abstract

This study determined the extent of support received by the livestock beneficiaries from the Fadama III project, and the difference in livelihood status of beneficiaries and non-beneficiaries of the project. The study was conducted in Osun State, Nigeria, which has three Agricultural Zones: Osogbo, Ife/Ijesa, and Iwo. A proportionate sampling technique was used to select 30% of the participating Local Government Areas (LGAs) per agricultural zone. Proportionate and systematic random sampling techniques were used to select 10% of the beneficiaries from the selected LGAs making a total of 180 beneficiaries. An equal number of non-beneficiaries were also selected among beneficiaries' communities based on relatively equal enterprise size. Data were collected through questionnaires administered to elicit information on respondents using Open Data Kit (ODK). The results showed that the mean ages of the beneficiaries and non-beneficiaries were 44.37 ± 11.71 and 37.96 ± 11.29 years, respectively. The majority (71.67%) of the beneficiaries and (50.56%) of non-beneficiaries were males. The results further showed that all the farmers benefited from an average of two out of five components of the project. The livelihood assets index showed that in natural assets, poultry beneficiaries had a higher mean score (2.21 ± 1.55) than the non-beneficiaries (1.15 ± 0.24). The other two categories of livelihood assets across the three enterprises had similar results. The ANOVA test showed a significant difference ($F = 239.961$; $p < 0.05$) in the livelihood status of beneficiaries and non-beneficiaries. It was concluded that the Fadama III project significantly improved the livelihood status of the beneficiaries through the support received.

Keywords: Impact; Fadama III Project; Livelihood; Livestock Farmer; Beneficiaries

Introduction

"Fadama" refers to irrigable territory, which includes flood plains and low-lying areas located along Nigeria's river systems that are highlighted by shallow aquifers. Fadama regions hold moisture during the dry seasons but are usually soaked during the rainy period. The regions are thought to have excellent resources for economic growth, provided the right capital is allocated to assets, infrastructure, and technical support. The National Fadama Development Projects I, II, and III were designed as a result of the ambition to fully utilise the prospects of Fadama in Nigeria. Fadama is known as "Akuro" in Yoruba, while "Ude" or "Ala-mmiri" in Igbo [15]. Osun State only became eligible to participate in the Fadama Project during the third phase (Fadama III), which accommodated livestock farmers, crop farmers, and processors.

Fadama is an institution that has the support of the World Bank, Federal, State, and Local Governments to make its benefits available

to its beneficiaries. The targeted beneficiaries are rural households and are made up of ten members per group, along with chosen enterprises. The support provided by Fadama was in form of grant to the farmers and it cuts across the training aspects; capacity building, and advisory services, infrastructure, productive assets, and input supports. Fadama III project has to do with the livelihood of her beneficiaries because its implementation falls in line with the components and definitions of livelihood. Furthermore, the main objective of the project is to sustainably increase the income of the beneficiaries which directly affects the livelihood of the beneficiaries.

The National Fadama Development Project (NFDP) was established to guarantee crop production throughout the year in all of the federation's States by utilising tube wells, wash boreholes, and gasoline-driven pump technology to exploit each State's surface water potential and shallow aquifer [26]. The African Development Bank (AfDB) and the World Bank came up with the project's concept. Meanwhile, with the active involvement of the States and Local Governments, the Nigerian government initiated quick and sustainable agriculture and rural development initiatives with a national focus, targeted at dry season farming activities and connected to agro-processing businesses. A review of Nigeria's agricultural sector shows that approximately 70% of the labour force is employed in agriculture, which contributes roughly 37% of the national GDP. Additionally, about 70% of the population lives at or below the poverty line. They can be applied to specific programmatic initiatives or important policy decisions. Creating a link between an organisation's inputs, outputs, and outcomes is the ultimate purpose of impact assessment [24]. Impact assessments are different from other types of project evaluations because of the counterfactual. To attribute observed results to project operations, it is required to exclude alternative explanations for the observed findings. Livelihood is defined as having enough food and money on hand for a person or family to meet their fundamental needs [1]. Fadama, an organisation programme whose primary goal is to sustainably raise beneficiaries' income, has undertaken sub-projects that address the six components of livelihood by giving the impacted people access to commodities, services, and training. The six components of the hexagonal sustainable livelihood framework are: natural, physical, financial, human, social, and information capital.

The livestock industry is essential to the rural economy and way of life. In this particular sector, the impoverished directly contribute to growth rather than reaping the benefits of growth that occurs elsewhere. For the majority of farmers in Nigeria, raising livestock is a significant source of income. It provides essential inputs to agriculture, improves household health and nutrition, supplements household income, creates job opportunities, and acts as a bank of wealth during hard times.

Statement of the research problem

Nigeria suffers from a number of issues, including underdevelopment, unequal income and poor resource distribution, low productivity, food insecurity, and inadequate public infrastructure [19]. The main issues that the farmers had to deal with were bad market connections, insufficient credit, disputes with ranchers, issues with land ownership, and insufficient labour. The majority of these rural residents struggle with several issues, which lower their output. Among these issues are those related to the environment, infrastructure shortcomings, marketing issues, technology limitations, institutional difficulties, high labour costs, insufficient agricultural incentives, and a dearth of sustainable programs for rural development [22].

Since the completion of the Fadama III Project in 2013, there has been limited information on its impact in Osun State, particularly on livestock farmers. Also, a few researchers have assessed the livelihood status of the farmers in other parts of Nigeria, and there is insufficient information in Osun State. This article, therefore, intends to assess the impact of the Fadama III Project on the livelihood status of the livestock beneficiaries who comprised the poultry, piggery, and fishery farmers. This study intends to provide answers to the following research questions: What are the socio-economic characteristics of livestock beneficiaries and non-beneficiaries of the Fadama III Project in Osun State? What supports were provided by the Fadama III Project to the livestock beneficiaries in the study area? What was the impact of the project on the livelihood status of the livestock beneficiaries when compared to the non-beneficiaries? The study intends to describe the socio-economic characteristics of the livestock beneficiaries and non-beneficiaries of the Fadama III project in Osun State, determine the extent of support received by the livestock beneficiaries from the Fadama III project, and determine

the difference in livelihood status of beneficiaries and non-beneficiaries of the Fadama III project. The study hypothesized that there is no significant difference between the livelihood status of beneficiaries and non-beneficiaries livestock farmers of Fadama III project in the study area.

Theoretical framework

In examining the impact of the Fadama III project on the livelihood status of livestock farmers in Osun State, it is essential to ground the analysis in robust theoretical frameworks. Systems theory provides a comprehensive lens to understand the interconnectedness of various components within the agricultural sector, emphasising how changes in one part of the system can influence others. The Sustainable Livelihood Framework (SLF) offers a structured approach to assess the multifaceted nature of farmers' livelihoods, focusing on the interplay between assets, vulnerabilities, and institutional processes that affect their capacity to achieve sustainable outcomes. Similarly, the Theory of Change (ToC) helps map the logical sequence of activities, outputs, and outcomes, helping to elucidate how specific interventions, like the Fadama III project, are expected to bring about desired changes in farmers' livelihoods. By integrating these theories, the study provides a holistic understanding of the dynamics at play, ensuring a thorough and nuanced analysis of the project's impact on livestock farmers.

Methodology

The study area

The study was carried out in Osun State. Osun State was purposively selected because of the abundance of livestock farmers who benefited from and those who did not benefit from Fadama III Project in the State. The register of all benefiting livestock groups and individuals was also available in the Fadama Office at the State Headquarters, Iwo. The State is located in an area covered with tropical rainforests. It has an approximate size of 14,875 km^2 and is situated between latitudes 7°30′0′′N and 4°30′0′′E [20]. The states of Kwara to the north, Ogun to the south, Ekiti and Ondo to the east, and Oyo State to the west make up its borders. The predicted population of the state in 2018 was 5,016,477 [21]. Osun State's population is primarily made up of farmers who raise cattle, cash crops, and food crops. Additionally, some people use the forest zones to collect leaves, firewood, and snails for making regional dishes like moinmoin and pap. The Yoruba, other minority ethnic groups, including the Hausa/Fulani, and the Igbos are resident in Osun State.

Research design

The quantitative research design was adopted and used for this investigation. The impact of the Fadama III Project on the livelihood of livestock beneficiaries was the dependent variable, and the independent variables included the socioeconomic and personal characteristics of both project beneficiaries and non-beneficiary livestock farmers, the extent of benefits derived, and the respondents' perceptions of the project.

Study population, sampling procedure, and sample size

The study population as obtained from the database of Osun State Fadama III Development Project, was made up of 3,640 Fadama III livestock farmer beneficiaries that comprised 1,290 poultry, 780 piggery, and 1,570 fishery farmers. A multi-stage sampling procedure was used to select the respondents for this study. At the first stage, the purposive sampling method was used to select 30% of the Local Government Areas (LGAs) from each of the three agricultural zones of Osun State because of the abundance of livestock farmers. Three LGAs (Orolu, Ede North and Ifelodun) were selected from ten LGAs that participated in the Fadama III Project in the Osogbo zone, while two LGAs (Atakunmosa East and Ife East (Area Office included) were selected in Ife/Ijesa zone out of six LGAs that participated in the project, and only one LGA (Iwo) was selected in Iwo zone out of the four LGAs that participated in the project, making a total of six LGAs. The total number of beneficiaries in the six selected LGAs was 1,745 (Atakunmosa East 130, Ife East Area Office 140, Iwo 590, Orolu 220, Ede North 270, and Ifelodun 395). At the second stage, 10% of the beneficiaries in the six selected LGAs were selected using a systematic sampling technique with a random start. The selection was at the count of two to get the total number of respondents per LGA from the list of beneficiaries, translating to 180 beneficiaries (13 from Atakunmosa East, 14 from Ife East (Area Office inclusive), 61 from Iwo, 23 from Orolu, 28 from Ede North, and 41 from Ifelodun). The same number of non-beneficiaries was also selected per LGA using the random selection technique among livestock-farmer groups in communities that did not participate in Fadama III project. Relatively, equal farm sizes were also considered in the choice of beneficiaries and non-beneficiaries.

At the last stage, proportionate sampling method was used to select the respondents per enterprise per LGA, which comprised an equal number of beneficiaries and non-beneficiaries. In Atakunmosa East LGA, 26 (having four poultry, three piggery, and six fishery farmers between beneficiaries and 13 non-beneficiaries). In Ife East LGA (Area Office inclusive), 28 (having five poultry, three piggery, and six fishery farmers between beneficiaries and 14 non-beneficiaries). In Iwo LGA, 122 (having 21 poultry, 13 piggery, and 27 fishery farmers among beneficiaries and 61 non-beneficiaries). In Orolu LGA, 46 (having eight poultry, five piggery, and 10 fishery farmers between beneficiaries and 23 non-beneficiaries). In Ede North LGA, 56 (having 10 poultry, six piggery, and 12 fishery farmers between beneficiaries and 28 non-beneficiaries). In Ifelodun LGA, 82 (having 14 poultry, 10 piggery, and 17 fishery farmers between beneficiaries and 41non-beneficiaries) making a total of 360 (180 beneficiaries and 180 non-beneficiaries) respondents.

Slovin's sample size calculation was used to confirm whether the sample size carried out was scientific enough or not. Slovin's sample size formula was used.

Sample size n = $\frac{N}{(1+Ne^2)}$

Source: https://www.statology.org/slovins-formula/

Where:

n = Sample size needed

N = Population (3,640)

e = Acceptable margin of error (0.05)

Therefore, Sample size = $\frac{3640}{(1+3640\times0.05^2)}$ = 180 respondents

This confirms that the sample size of 180 respondents was statistically appropriate for the study.

Research instrument, data collection, and analysis

The research instrument used for data collection was validated among experts in the field of agricultural extension and animal sciences. A high reliability test result of (rho) of 0.81 was obtained using Spearman correlation coefficient with the test–retest reliability method. The research instrument was adjudged reliable for the study with the result. Data were collected from the selected livestock farmers (selected beneficiaries) and non-beneficiaries using Open Data Kit (ODK). The data collected were analysed with both descriptive and inferential statistics. ANOVA was used to further draw inferences from the study. The impact of Fadama III project on the livelihood of livestock beneficiaries was measured in four stages of individual, enterprise, household, and community, using the non-beneficiaries' information as a basis for comparison.

Results and Discussion

Socio-economic characteristics of beneficiaries and non-beneficiaries of Fadama III livestock farmers

Age

The results of the findings in Table 1 show that the mean age of Fadama III beneficiaries was 44.37 ± 11.71 years, while that of non-beneficiaries was 37.96 ± 11.29 years. Few (10.00%) and below average (43.89%) of beneficiaries and non-beneficiaries, respectively, were of the ages between 20 and 35 years old. The highest percentage (57.78%) of the beneficiaries fell within the ages of 36 to 50 years, while their non-beneficiary counterparts in the same age range were 41.11%. This was followed by 29.44% of the beneficiaries within the ages of 51 and 65 years, and the non-beneficiaries were 13.89% within that age range. This showed that most of the respondents were still in their active years and they engaged in productive activities, especially livestock production. This suggests that the Fadama III Project's support for livestock production benefited mainly youth and able-bodied adults to enhance their production as well as improve their livelihood. This finding is in tandem with that of [2,6].

Sex

Results presented in Table 1 gave the distribution of respondents by sex. The majority (71.67%) of the beneficiaries and about half (50.56%) of non-beneficiaries were male, while the remaining 28.33% beneficiaries and 49.44% non-beneficiaries were female. This showed the prevalence of male livestock farmers over females in Osun State; also, more males were among the beneficiaries of the Fadama III project in Osun State than their female counterparts. This implies that more resources are available for male livestock farmers to work with compared to female livestock farmers. This is corroborated by the findings of [7,8].

Religion

Results in Table 1 show the religious affiliation of the respondents in Osun State. Among the respondents, 59.44% of the beneficiaries and 52.22% of non-beneficiaries were Christians, 40.0% of those who benefited and 46.67% of those who did not benefit were Muslims, while 0.56% of those who benefited and 1.11% of those who did not benefit were traditional worshipers. This shows that there are three notable religions in Osun State, and all the respondents belong to one religious organisation or the other. This implies that the two well-practiced religions in the study area are Christianity and Islam, while the third religion is practiced by fewer people when compared with the first two religions. It is opined that religious beliefs are capable of influencing individuals' perception of ideas and innovations. This is supported by the findings of [3,9].

Marital status

Results in Table 1 showed that the majority (82.78%) of beneficiaries and 74.44% of the non-beneficiaries were married and living together with their spouses. It further showed that 8.89% of the beneficiaries and 6.67% of the non-beneficiaries were married but not living together with their spouses. Then 8.33% of the beneficiaries and 16.67% of the non-beneficiaries were single, while no beneficiary and 2.22% non-beneficiaries were widowed. This implies that a majority (78.61%) of the farmers, both beneficiaries and non-beneficiaries, are married, whether they live with their spouses or not, meaning that they are responsible adults with financial commitments, hence the need to work and earn income to take care of their responsibilities. There is also the likelihood of getting cheap or unpaid labour from the members of their families. This finding is similar to that of [17].

Variable	Beneficiaries		Non-Beneficiaries		Mean	SD
	Freq	%	Freq	%		
Age						
20-35	18	10.00	79	43.89		
36-50	104	57.78	74	41.11		
51-65	53	29.44	25	13.89		
66 and above	5	2.78	2	1.11		
Mean age of beneficiaries					44.37	11.71
Mean age of non-beneficiaries					37.96	11.29
Sex						
Male	129	71.67	91	50.56		
Female	51	28.33	89	49.44		
Religion						
Christianity	107	59.44	94	52.22		
Islam	72	40.00	84	46.67		
Traditional	1	0.56	2	1.11		
Marital Status						
Single	15	8.33	30	16.67		
Married and living together	149	82.78	134	74.44		
Married, not living together	16	8.89	12	6.67		
Widow/Widower	0	0.00	4	2.22		
Formal Education						
Primary school not completed	177	98.33	178	98.89		
Primary school not completed	3	1.67	3	1.67		
Primary school completed	18	10.00	32	17.78		
Secondary school not completed	14	7.78	18	10.00		
Secondary school completed	74	41.11	59	32.78		
Tertiary school not completed	6	3.33	15	8.33		
Tertiary school completed	62	34.44	51	28.33		

Table 1: Distribution of respondents according to age, sex, religion, marital status used and reasons for engaging in livestock farming.

Supports received from fadama III project by the livestock beneficiaries

The supports received by respondents from the Fadama III project were discussed under five categories, namely: capacity building, community-owned infrastructure, advisory services, input support, and productive assets. However, input support and productive assets are not very relevant to this study.

Capacity building training

The Fadama III project provided capacity building training to the farmers in five areas, namely: record keeping, contract negotiation, nutrition and dieting, agribusiness management, and group dynamics. The results in Figure 1 show that the majority of the beneficiaries indicated that they received capacity building training provided by the Fadama III project, and they were 85.4% poultry farmers, 87.5% pig farmers, and 75.1% fish farmers who indicated that they received capacity building training on record keeping. Additionally, a significant proportion (68.4%, 70%, 64.1%) of poultry farmers, pig farmers, and fish farmers reported receiving capacity-building training on contract negotiation. Furthermore, 74.2% poultry farmers, 70% pig farmers, and 43.6% fish farmers indicated that they received capacity-building training on agribusiness management. The results further revealed that 87.1% poultry farmers, 85% pig farmers, and 75.1% fish farmers indicated that they received capacity building training on group dynamics, while 58.1% poultry farmers, 65% pig farmers, and 62.8% fish farmers indicated that they received capacity building training in family nutrition and dieting. The explanation for this result could be due to the fact that capacity building was fully supported by the Fadama III project. Beneficiaries were not required to pay any counterpart contribution before they benefited from the training. Many of them might not have remembered vividly all the topics delivered to them then. It could be deduced from the results that capacity-building topics received from the Fadama III project might have contributed to the farmers' present livelihood status.

Community-owned rural infrastructure

The Fadama III project provided five community-owned infrastructures to the farmers, which were an access road, a borehole, lock-up shops, an incinerator, and a ventilated improved pit (VIP) toilet. The results in Figure 2 show that 17.7% poultry farmers, 32.5% pig farmers, and 28.2% fish farmers benefited from access to roads. Then 22.6% poultry farmers, 5% pig farmers, and 3.8% fish farmers benefited from the borehole. Moreover, 19.4% poultry farmers, 22.5% pig farmers, and 11.5% fish farmers benefited from lock-up shops. The result further revealed that 0.1% poultry farmers, 3% pig farmers, and 10.3% fish farmers benefited from the incinerator, while 0.1% poultry farmers, 2% pig farmers, and 10.3% fish farmers benefited from the ventilated improved pit toilet.

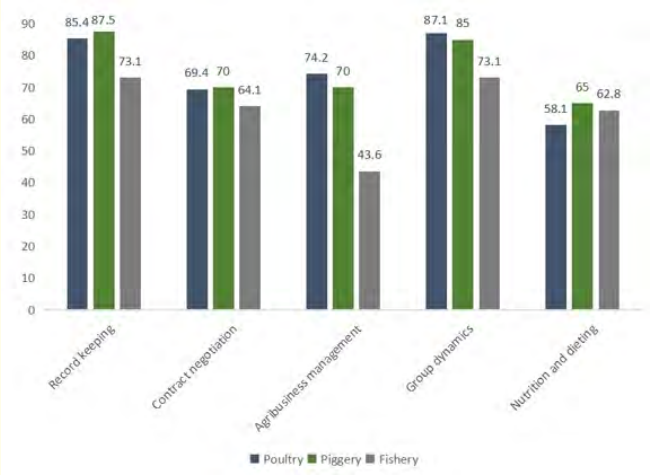

Figure 1: Showing capacity building training topics received by the beneficiaries.

It can be deduced from the results in Figure 2 that community-owned infrastructure had a lower percentage of beneficiaries compared to capacity building. The reasons for this might be due to the fact that farmers were made to pay a ten percent counterpart contribution of the cost of the project, then the project was jointly owned by the whole 100 people that made up the Fadama Community Association (FCA). This is in line with [5].

Advisory services

Advisory services for poultry farmers

Fadama III project provided nine advisory services to the poultry farmers which were in the areas of: poultry vaccination and handling of vaccine, incubation and hatchery management, poultry housing and equipment, poultry brooding (management of day-old chicks), management of growers, layers, breeders and

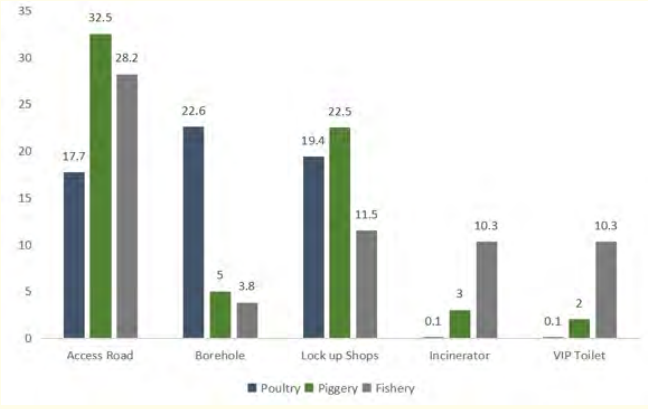

Figure 2: Showing the rural infrastructure received by beneficiaries of the Fadama III Project.

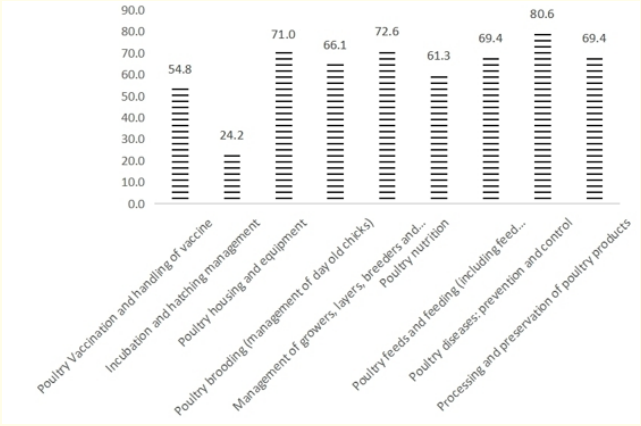

Figure 3: Showing advisory services received by poultry farmers

broilers, poultry nutrition, poultry feeds and feeding (including feed formulation), poultry diseases prevention and control and processing and preservation of poultry products. The results in Figure 3 show that many (54.8%) of the farmers received advisory service training on poultry vaccination and handling of vaccines. Then, some (24.2%) of the farmers received advisory service training on incubation and hatchery management. Furthermore, the majority (71%) of the farmers received advisory service training on poultry housing and equipment. The results further revealed that 66.1% of the farmers attested to have received advisory service training on poultry brooding (management of day-old chicks), while 72.6% farmers received advisory service training on management of growers, layers, breeders, and broilers. Advisory service training on poultry nutrition was attended by 61.3% farmers, poultry feeds and feeding (including feed formulation) was attended by 69.4% farmers, poultry diseases: prevention and control was attended by 80.6% and processing and preservation of poultry products training was attended by 69.4% farmers.

Advisory services for pig farmers

Fadama III project made ten advisory service topics available to the pig farmers which were pig vaccination, piggery housing and equipment, piggery management, management of weaners, growers and adult pigs, pig nutrition, pig feeds and feeding (including feed formulation), pig diseases prevention and control, processing and preservation of piggery products, biogas production from pig dung and fat reduction strategies in pig production. The results in Figure 4 show that half (50%) of the farmers received advisory service training on pig vaccination. Then, the majority, 82.5%, 80% and 80% of the farmers received advisory service training on pig housing and equipment, piggery management, and management of weaners, growers, and adult pigs. Furthermore, 67.5%, 82.5% and 87.5% of the farmers received advisory service training on pig nutrition, pig feeds and feeding (including feed formulation), and pig diseases prevention and control. Processing and preservation of piggery products was attended by 72.5% of the farmers, biogas production from pig dung training was attended by 37.5% of the farmers, and fat reduction strategies in pig production training were attended by 35.5% of the pig farmers.

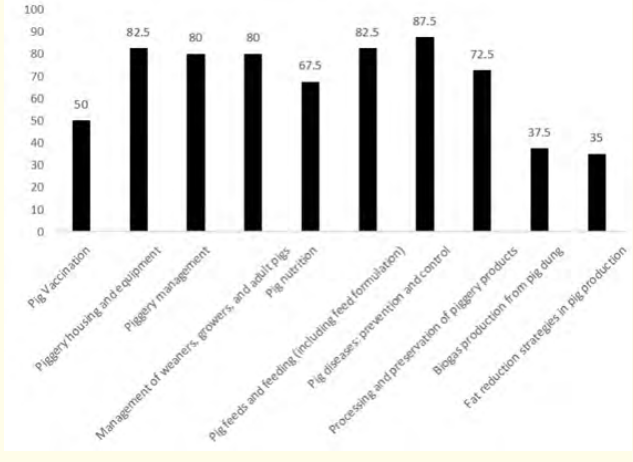

Figure 4: Showing advisory services received by pig farmers.

Advisory services for fish farmers

Fadama III project provided nine advisory service topics to the fish farmers which in the areas of: pond preparation, artificial fish breeding, fish pond types and equipment, fish management, management of fries, fingerlings, juveniles and table size fish, fish nutrition, fish feeds and feeding (including feed formulation), fish diseases prevention and control and processing and preservation of fish products. The results in Figure 5 show that 60.3%, 47.4% and 64.1% of the farmers received advisory service training on pond preparation, artificial fish breeding, and fish pond types and equipment, respectively. Moreover, the results further revealed that majority (65.4%, 66.7% and 61.5%) of the farmers received advisory service training on fish management; management of fries, fingerlings, juveniles and table size fish; and fish nutrition, while 65.4%, 69.2% and 62.8% of the farmers received advisory service training on fish feeds and feeding (including feed formulation); fish diseases prevention and control; and processing and preservation of fish products.

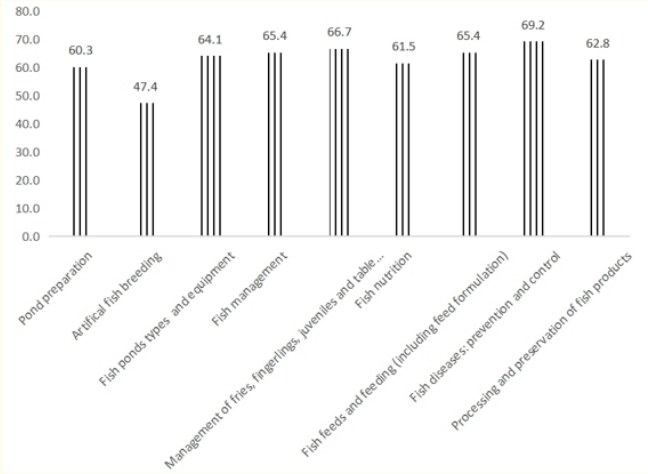

Figure 5: Showing advisory services received by fish farmers.

Difference in livelihood status of the beneficiaries and non-beneficiaries

Table 2 show the frequency of "Yes" responses of beneficiaries and non-beneficiaries in all three enterprises of poultry, piggery, and fishery, along with their respective livelihood asset categories of natural, human, and financial assets. Table 3 shows the frequency of "Yes" responses of beneficiaries and non-beneficiaries in all three enterprises of poultry, piggery, and fishery, along with their respective livelihood asset categories of social, information, and physical assets.

- **Natural assets:** The results in Table 2 revealed that, the beneficiaries in all the three categories of livestock farming, had at least two natural assets (poultry = 2.21 ± 1.55, piggery = 2.30 ± 1.87, fishery = 2.67 ± 1.91) while the non-beneficiaries in all the three categories of livestock farmers had an average of one to two natural asset (poultry = 1.15 ± 0.24, piggery = 1.98 ± 0.19, fishery = 0.64 ± 0.21). It might be implied that the beneficiaries were more economically empowered when compared to the non-beneficiaries, hence the beneficiaries had more access to natural assets like land, houses, access to forest, and natural surface water. This shows that Fadama III had a positive impact on the livelihood status of beneficiaries. This result was in support of [10,12], who identified natural assets as an important asset in agricultural production, so much so that in the absence of natural assets, no production can take place.
- **Human assets:** The results further showed that beneficiaries had an average of between ten and twelve human assets (poultry = 12.52 ± 5.36, piggery = 11.95 ± 4.09, fishery = 9.81 ± 4.85), while the non-beneficiaries had an average of between two and five human assets (poultry = 4.90 ± 1.14, piggery = 5.03 ± 2.02, fishery = 1.67 ± 0.65). It was found that the beneficiaries were able to train more of their wards to the tertiary level, and they were also able to hire more labour when compared to the non-beneficiaries. The implication of this might be that the beneficiaries had more money to train their wards to tertiary education. This shows the impact of Fadama III on the livelihood of the beneficiaries. This study complied with [10,23], who identified human assets as one of the assets contributing to the livelihood status of livestock farmers.
- **Financial assets:** The results also revealed that the livestock beneficiaries had an average of three financial assets (poultry =2.92 ± 1.82, piggery = 3.00 ± 1.74, fishery = 3.06 ± 2.12), while the non-beneficiaries had between one and two financial assets (poultry = 1.26 ± 0.27, piggery = 2.13 ± 0.46, fishery = 0.99 ± 0.23). It was found that the estimated income of beneficiaries in all three categories of livestock farmers considered in this study was higher than

that of the non-beneficiaries. It could imply that, despite that the beneficiaries and non-beneficiaries sampled were of relative farm size, the training and other supports received from the Fadama III project might be what made the difference. This showed that Fadama III had a positive impact on the livelihood status of livestock farmers in Osun State. This study affirmed the studies carried out by [13,18], where it was established that financial assets, which include availability of credit, savings, cash, remittances, or accessible stocks like liquidable assets such as livestock and cash flow from regular income, are all significantly related to what constitute the livelihood status of livestock farmers.

Asset	Frequency of Yes responses					
	Beneficiaries			Non-beneficiaries		
	Pou	Pig	Fish	Pou	Pig	Fish
Natural Assets						
Housing Land (Plots)	29	19	42	18	13	6
Farming Land (Ha)	35	21	39	10	17	10
Access to economic trees	26	11	44	9	13	11
Access to stream/river	21	14	48	12	14	13
Hunting of wildlife/Aquatic wildlife	6	6	18	7	3	6
Gathering of non-timber/non-fish product	4	8	18	5	5	4
Gathering of firewood	16	13		10	14	
Human Assets						
Labour employed (males)	37	28	45	24	17	15
Labour employed (females)	37	9	32	21	7	2
Family labour (males) engaged	37	18	52	23	14	13
Family labour (females) engaged	36	11	35	22	12	12
Children trained in school (male)	50	36	60	22	26	16
Children trained in school (female)	51	28	58	22	27	22
Access to extension services	43	25	56	20	9	12
Acquired the skill of deworming	48	33		15	8	
Acquired skill of debeaking (chicken)/stunning (pig)	48	27		16	1	
Acquired the skill of vaccination	43	30	43	17	11	3
Acquired the skill of feed formulation	50	33	51	14	18	5
Acquired the skill of waste management	52	28	52	20	11	7
Acquired knowledge of record-keeping	52	37	64	20	15	8
Acquired knowledge of group dynamics	52	35	57	11	10	4
Acquired knowledge of agribusiness management	51	33	56	14	2	5
Acquired knowledge of contract negotiation	46	32	51	8	7	2
Acquired knowledge of family nutrition	43	35	53	15	6	4
Financial/Occupational assets						
Average annual income from live chicken/pig/fish	52	38	4	31	35	5
Average annual income from frozen chicken/pork/	21	8	9	3	7	1
Average annual income from eggs/juveniles	19		18	5		1

Average annual income from manure/dung/table-sized fish	15	12	62	9	9	24
Average annual income from feathers/hair/Frozen fish	1	1	16	0	0	6
Average annual income from blood/intestine	0	3	0	0	1	0
Average annual income from poultry services rendered to outsiders	7	7	18	5	6	4
Average annual income from dried fish			7			5
Average annual income from smoked fish			19			11
Average personal savings per annum	33	28	59	25	27	20
Average savings in the FUEF account per annum	33	23	27	0	0	0

Table 2: Index of livelihood assets of beneficiaries and non-beneficiaries - natural assets, human assets, and financial assets.

Social assets

The results in Table 3 also showed that the beneficiaries had an average of five to six social assets (poultry = 5.32 ± 3.39, piggery = 6.18 ± 4.20, fishery = 5.35 ± 4.45), while the non-beneficiaries had an average of one to two social assets (poultry = 1.43 ± 0.10, piggery = 1.58 ± 0.92, fishery = 1.00 ± 0.04). This showed that the beneficiaries had higher social standing and connections than the non-beneficiaries. This showed that Fadama III beneficiaries were more socially connected than non-beneficiaries. This showed the impact of the Fadama III project on the livelihood status of livestock farmers. It was found from the study that each beneficiary belonged to a group of ten people, the group belonged to Fadama Community Association (FCA) of 100 people, and the FCA belonged to the local government Federation of Fadama Community Associations (FFCA), and all local government FFCA belonged to the State FFCA. This structure made it easy for the beneficiaries to connect with other farmers from different towns, LGAs, States, and the nation as a whole. This result is in line with [14,23], in their various studies, where it was established that membership of formalised groups, voluntary associations, relationships of trust, and social networks have a significant relationship with the livelihood status of farmers.

Information assets

Results in Table 3 also revealed that the beneficiaries of the Fadama III project had more access to information (poultry = 4.47 ± 3.22, piggery = 2.98 ± 2.83, fishery = 4.86 ± 3.34), while the non-beneficiaries had less access to information (poultry = 2.27 ± 1.20, piggery = 3.25 ± 1.81, fishery = 0.96 ± 0.42). It was found from the study that the beneficiaries attended capacity building and advisory services training organised by the Fadama III project. They also had access to market information and disease outbreak information due to their participation in the project. This further shows that the Fadama III project had a positive impact on the livelihood status of the beneficiaries. However, it was also found that the pig farmers among the non-beneficiaries had more information assets than their beneficiaries' counterparts. This might be because non-beneficiaries search for information everywhere, not depending on Fadama and their beneficiaries' counterparts. Researchers like [4,25] affirmed the importance of timely and accurate information that has to do with farmers' health, animal health, weather forecast, market trends, and exchange rate as a major contributor to the livelihood status of farmers.

Physical assets

The results further showed that the beneficiaries in all the three categories of livestock farming had an average of between four and eight physical assets (poultry = 7.18 ± 4.89, piggery = 8.03 ± 4.14, fishery = 3.65 ± 2.50). While their counterparts on the non-beneficiary's side had an average of between two and five physical assets (poultry = 4.27 ± 1.77, piggery = 5.15 ± 2.49, fishery = 1.72 ± 0.68). It was found from the study that the Fadama III project supported the beneficiaries to acquire physical assets to the tune of 70% while the beneficiaries only had to provide 30%. Towards the end of the project, counterpart contribution was waived, and the farmers were supported with assets of not more than ₦500,000 per group. The implication of this was that the Fadama III project enhanced the beneficiary's acquisition of physical assets to complement the ones they had before the project intervention. This study complies with those of [11,16], in which they established that physical asset is the most important type of assets to determine the socio-economic status of people and communities, and these assets include water and sanitation, pen, producer goods, and equipment.

Asset	Frequency of Yes responses					
	Beneficiaries			Non-beneficiaries		
	Pou	Pig	Fish	Pou	Pig	Fish
Social assets						
Do you have Cousins, Aunties, Uncles (relatives) that support you on the farm	25	12	29	23	6	13
Are you an FUG executive?	21	23	23	0	0	0
Are you an FUG committee member?	30	28	39	0	0	0
Are you an FUG ordinary member?	10	3	21	0	0	0
Are you an FCA executive?	18	20	18	0	0	0
Are you an FCA committee member?	22	21	20	0	0	0
Are you an FCA ordinary member?	12	4	14	0	0	0
Are you an FFCA executive?	11	6	10	0	0	0
Are you an FFCA committee member?	10	6	8	0	0	0
Are you an FFCA ordinary member?	16	11	20	0	0	0
Do you have access to the Fadama market	8	12	28	3	2	6
Access to motorable roads rehabilitated by Fadama	14	16	25	5	3	8
Belongs to faith faith-based organisation	18	17	27	9	6	4
Belongs to the labour exchange group	11	10	16	1	2	2
Belongs to a political party	24	15	26	14	17	12
Belongs to non-farm cooperatives	29	22	42	17	9	14
Belongs to community leadership	21	10	16	5	3	2
Belong to other social organisations	30	11	35	12	15	17
Information assets						
Access to the weather forecast	34	17	38	15	14	7
Access to pre-information on human health	35	19	43	18	18	11
Access to pre-information on animal health	35	22	47	19	20	12
Access to market fluctuations information	39	12	52	21	18	13
Access to information on the inflation rate	39	12	54	18	13	12
Access to information on livestock production	34	14	54	19	18	8
Access to information on livestock processing	28	11	46	15	15	7
Access to information on livestock value addition	33	12	45	16	15	5
Physical assets						
Pen/earthen pond (fish)	53	34	68	31	32	41
Chickens/Pigs/concrete pond (fish)	45	36	8	29	32	9
Battery Cage/drag net (fish)	11		31	3		1
Feeders/smoking kiln (fish)	36	27	11	29	21	7
Drinkers/water pump (fish)	34	28	30	29	26	7
Well for water	50	33	16	25	18	8
Borehole	0	0		3	1	

Pumping machine	33	25	8	14	3	4
Overhead tank	35	26	5	13	3	8
Tank support	35	26	5	11	3	6
Generator	25	24	9	13	4	7
Shovels	29	20	20	22	12	4
Cutlass	13	11	19	13	21	7
Hoe	5	2	12	4	15	1
Wheel Barrow	29	14	12	18	10	4
Nipple type Drinkers/inlet and outlet hose (fish)	5		27	2		13
Storage Freezers	4	15	4	6	5	7
Feed mill	3	0	0	0	0	0

Table 3: Index of livelihood assets of beneficiaries and non-beneficiaries - social assets, information assets and physical assets.

To show the significant difference in the livelihood status of livestock beneficiaries and non-beneficiaries in the study area, Analysis of Variance was used, and the result is shown as follows: The test for homogeneity of variances was significant (Levene's statistics = 2.873 and $p < 0.05$) as shown in Table 4. This indicates that the variances of the means of the beneficiaries and non-beneficiaries were equal (homogeneous). The results of analysis of variance in Table 5 show that there was a significant difference in the livelihood status of livestock beneficiaries and non-beneficiaries in the study area (F-value = 239.961, $p \leq 0.01$). This implies that the livelihood status of the beneficiaries and non-beneficiaries in the study area differ significantly from each other, and the differences could be attributed to the participation of beneficiaries in the Fadama III project.

Levene statistics	df1	df2	Sig
2.873	1	358	0.091

Table 4: Result of the test of homogeneity of variances of the livelihood status of livestock beneficiaries and non-beneficiaries.

Conclusion

This study concluded that the Fadama III project impacts the livelihood of the beneficiaries more when compared to the non-beneficiaries. It was therefore recommended as a way of policy that future interventions that could sustainably improve income of rural dwellers should be encouraged. And that interventions like Fadama III Project should be a continuous exercise among the poor and vulnerable people, so that level of poverty could be sustainably and considerably reduced.

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