Impact of the National Fadama Development Project Phase-II (NFDP-II) on Rural Infrastructural Provision and House Hold Farm Yield in Kaduna State

Mama, R.O
Department of Vocational Teacher Education,
University of Nigeria, Nsukka

&
Alkali, M.
Department of Agricultural Education,
Kaduna State College of Education Gidan Waya, Kafanchan.

Abstract

This paper appraises the impact of the National Fadama Development Project Phase 11 on rural infrastructural provision and household farm yield in Kaduna state. Two research questions and two hypotheses guided the study. Questionnaire was used for data collection. The sample of the study was 465 consisting of 415 FPFs and 50 EAs. Findings of the study revealed that infrastructural facilities were more available in the study area after the implementation of the project than before it was implemented. Also farmers recorded increases in their farm yield on the different agricultural enterprises as a result of participation in the project. It was recommended, among others that measures should be taken to sustain the improved agricultural practices brought about by the project.

Keywords: Fadama, Development, Project, Infrastructure, Farm, Impact.

Introduction

Agriculture is one of the cornerstones of rural development in developing countries including Nigeria. Majority of Nigerian population, about 70% reside in the rural area and are mostly peasant farmers (Federal Office of Statistics, 2004). These people largely depend on agriculture for their livelihood. Unfortunately however, this sizeable population of the country is the most poor and neglected with little or no presence of infrastructure and support services to encourage meaningful agricultural productivity. In line with this observation, the International Fund for Agricultural Development, IFAD (2009) stated that social services and infrastructure are limited or non-existent in rural Nigeria. Sudhir and Yassir (1999) stated that the provision of infrastructure in developing countries of

course Nigeria inclusive does not receive attention by policy makers. Some of the difficulties arising as a result of inadequate infrastructure include non-availability of hand pumps, tube wells, collection centers for products, lack of storage facilities, and inadequate processing facilities, poor linkage with the market and bad roads. These problems affect the level of productivity and inhibit full utilization of potentials of farm households thereby leading to low agricultural productivity, low level of income and poor standard of living. According to the Project Coordinating Unit, National Fadama Development Office (PCU-NFDO, 2005), the role played by infrastructure can be likened to secondary and tertiary arteries of the body system and they are crucial as the main arteries for blood circulation.

For the agricultural sector to achieve its potential, investment in infrastructure is necessary. In the opinion of Zongzhang and Xiaomin (2009), the development of rural infrastructure is highly related to agricultural production. The authors observed further that rural infrastructure not only provides essential agricultural production conditions such as roads, telecommunications, power, irrigation systems but also provides education and medical services related to enhancing the quality of rural labors.

Rural infrastructure as used in this study are those services and agricultural equipments/inputs provided by fadama project phase 11 such as rural roads, irrigation pumps, grinders, storage tanks, open wells, tube wells, wash bores, sprayers, ridgers etc. Indeed the status and development of rural infrastructure not only influence agricultural production and operation modes directly, but also improve the living standards of rural people and enhance quality of rural labor. Deficient rural infrastructure may hinder agricultural production and induce poor technical performance.

Realizing the place of agriculture in the national economy, various governments in Nigeria past and present have come up with several programs, approaches, policies and strategies aimed at developing the sector and improving the conditions of the rural poor. Some of these efforts are still on course while many have since gone moribund. Some of the programs embarked upon by various governments in Nigeria aimed at developing agriculture and improving rural living conditions include the National Accelerated Food Production Program (NAFPP), the Nigerian Agricultural and Cooperative Banks (NACB), the Operation Feed the Nation (OFN), the Agricultural Credit Guarantee Scheme (ACGS) and the River Basin Development Authority (RBDA). Others are the Green Revolution (GR), Directorate of Food, Roads and Rural Infrastructure (DFRRI) and the Family Economic Advancement Program (FEAP) (Ajayi 2001, Akinleye, Awoniyi, and Fapojuwo 2005 and Daudu 2008).

A recent effort towards improving the rural living condition and boosting farm yield was the introduction of the

Fadama Development Project Phase II (NFDP-II). The project was launched in 2004 and was to last till 2010 (2004-2010). The NFDP-II is co-funded by the World Bank and the African Development Bank, (ADB) to the tune of 100million and 30million US dollars respectively. The fadama project implementation manual (PIM) reported that Fadama 11 is coordinated at the state level by the State Fadama Development Offices (SFDOs) housed at the Agricultural Development Projects (ADPs). The Kaduna state Fadama Coordination Office(2004) stated that farmers (project potential beneficiaries) are encouraged to form economic activity specific groups referred to as Fadama Resource User Groups (FRUGs). ADP extension agents (EAs) who are communicators of change were contracted as project facilatators. According to the National Fadama Development Office, (NFDO z2004), eighteen (18) states of the federation are participating in the Fadama Phase II and they include Adamawa, Bauchi, Gombe, Imo, Kaduna, Kebbi, Niger, Lagos, Ogun, Oyo, Taraba, Kogi, Katsina, Jigawa, Plateau, Kwara, Borno and the Federal Capital Territory, FCT, Abuja.

The project aimed at providing support to economic ventures in the rural areas such as crop production, livestock production, honey production, fishing, hunting, marketing, processing, transportation etc. Fadama Project Phase 11 also aimed at providing basic rural infrastructure necessary for meaningful agricultural productivity such as access roads, culverts, water supply, etc.

One of the goals of the National Fadama Development Project Phase 11 (NFDP-11) was the provision of basic rural infrastructure necessary for the stimulation of meaningful agricultural productivity. A lot of human and material resources have been committed in to the National Fadama Development Project Phase 11. The federal, state and local government areas in collaboration with the funding agencies have put in a substantial sum of money for the realization of the project's objectives. The project has been fully implemented and its life cycle has expired. The strengths and weaknesses of the project need to be established in order to find justification for the huge investments that have been made. An evaluation study is considered expedient to determine whether the project has achieved its objective of bettering the living condition of the rural dwellers through the provision of basic rural infrastructural facilities and consequently raising the farm yields of the project beneficiaries. Such information will be useful to government policy makers in that it will reveal the weaknesses and strengths of the project design and implementation and therefore serve as a useful guide in the design and implementation of future projects and programmes.

Purpose of the Study
The major purpose of the study was to ascertain the impact of the National Fadama Development Project Phase II on rural infrastructural provision and farm yield   of the beneficiaries in

Kaduna state. Specifically, the study determined the respective levels of

1. Availability of infrastructural facilities in the area before and after the project.
2. House hold farm yield before and after the project.

Research hypotheses

HO_1: There is no significant difference between the Mean ratings project participants on the levels of availability of infrastructural facilities in the area before and after the project intervention.

HO_2: There is no significant difference between the Mean ratings of Fadama II project participants on their levels of farm income before and after the project intervention.

Methodology

Area of the Study: The area of the study was Kaduna State which comprised of twenty-three local government areas (LGAs). Only ten of the twenty-three LGAs were covered by Fadama phase 11 project. The ten LGAs were, for administrative purpose, organized into Fadama zones.

Design of the Study: The survey research design was adopted for the study.

Population for the Study: The population for the study was 12,177 project farmers (PFs) in the ten local government areas in Kaduna state covered by the project. This number included Fadama 11 Project farmers engaged in different agricultural activities spread across the three Fadama zones in the study area.

Information on the total number of project farmers was obtained from the Kaduna State Fadama Development Coordinating Office.

Sample for the Study: Multistage and purposive sampling techniques were employed. First two LGAs were purposively selected from each of the three Fadama zones in the state. The criterion was two LGAs in each zone with the highest number of project farmers. The procedure produced 8,306 project farmers at this stage. Finally, 5 percent of the farmers in the six LGAs were randomly sampled which gave a final sample size of 415 project farmers.

Instrument for Data Collection: A structured questionnaire called 'Fadama Project Farmer's Questionnaire (FPFQ)' was developed and used for the study. The instrument was designed to obtain information from the project farmers (PFs), ratings of their respective levels of farm yield and availability of infrastructure in the area before and after the implementation of Fadama Project phase 11. A "Before and After Impact Assessment Model" was adopted for the study. A five-point rating scale was constructed for the farmer's response. The scale points and their respective numerical values were Very High (5), High (4), Moderate (3), Low (2) and Very Low (1). The instrument was validated by three experts and pilot-tested for internal consistency. A reliability coefficient of 0.89 was obtained with Cronbach Alfa (α) technique and the instrument was considered reliable.

Methods of Data Collection and Analysis: Since most of the farmers

were not literate, the questionnaire developed was in some cases used as an interview schedule. Data collection was carried out through personal contact with the services of three research assistants. Four hundred and fifteen (415) copies of the instrument were administered and 383 retrieved.

The Mean and frequencies were data analysis techniques used to answer the research questions. The mean scores were used to determine the respective levels of availability of infrastructural facilities and house hold farm income in the study area before and after the project implementation expressed on a 5-point scale for each of the items. The hypotheses of the study were tested using t-test statistic at 0.05 level of significance.

Findings

The following findings were made:

a) Availability of infrastructural facilities

Table 1: Mean Ratings, Standard Deviations and t-test analysis of the responses of Fadama project participants on the level of availability of infrastructural facilities in the area before and after NFDP-II (N=383)

s/no	Infrastructural facility/service Item	BEFORE NFDP-2			AFTER NFDP-2			t-value	Sig (2 tailed)	Decision
		$\overline{X}$	SD	RMKS	$\overline{X}$	SD	RMKS			
1	Sprayers	1.71	.492	Low	3.76	.702	High	-46.663	0.000*	Rejected
2	Ridgers	1.58	.702	Low	3.66	1.008	High	-33.245	0.000*	Rejected
3	Work bulls	1.52	.650	Low	3.83	1.119	High	-34.930	0.000*	Rejected
4	Ox-cart	1.82	.758	Low	3.56	1.041	High	-26.547	0.000*	Rejected
5	Storage tanks	1.86	.797	Low	3.63	.876	High	-29.355	0.000*	Rejected
6	Irrigation pumps	2.21	.759	Low	3.84	.943	High	-28.102	0.000*	Rejected
7	Tube wells	1.65	.740	Low	3.80	.905	High	-36.051	0.000*	Rejected
8	Open wells	1.79	.795	Low	3.56	1.198	High	-24.097	0.000*	Rejected
9	Wash bores	1.98	.804	Low	4.00	1.057	High	-29.777	0.000*	Rejected
10	Pvc pipes	1.81	.841	Low	4.17	.680	High	-42.698	0.000*	Rejected
11	Rice/maize huller	2.00	.992	Low	4.05	.795	High	-31.517	0.000*	Rejected
12	Vegetable grinder	2.00	.836	Low	3.82	.898	High	-29.031	0.000*	Rejected
13	Groundnut sheller	1.79	.744	Low	3.86	.853	High	-35.815	0.000*	Rejected
14	Oil press	1.77	.786	Low	4.03	.751	High	-40.707	0.000*	Rejected
15	Juice extractor	1.92	.975	Low	3.70	1.200	High	-22.510	0.000*	Rejected
16	Groundnut oil extractor	1.86	.775	Low	3.92	1.087	High	-30.119	0.000*	Rejected
17	Maize sheller/thresher	2.30	.895	Low	4.33	.777	High	-33.597	0.000*	Rejected
18	Cassava grater	2.01	.811	Low	3.79	.872	High	-29.351	0.000*	Rejected

19	Spaghetti roll machine	1.81	1.028	Low	2.96	1.545	High	-12.030	0.000*	Rejected
20	Chick incubator	1.85	.625	Low	4.81	.506	High	-72.180	0.000*	Rejected
21	Poultry pan, drinker/feeder	1.97	.932	Low	3.96	.897	High	-30.100	0.000*	Rejected
22	Bee hive	2.12	.921	Low	3.39	.843	High	-20.018	0.000*	Rejected
23	Honey press	1.99	1.040	Low	3.72	1.044	High	-22.893	0.000*	Rejected
24	Bee harvesting kit	2.21	1.032	Low	3.73	1.053	High	-20.018	0.000*	Rejected
25	Fishing nests/gears	2.12	1.063	Low	3.48	1.033	High	-17.998	0.000*	Rejected
26	Fish pond	2.17	.957	Low	3.63	.983	High	-20.856	0.000*	Rejected
27	Fishing hooks and line	2.39	1.092	Low	3.51	1.186	High	-13.500	0.000*	Rejected
28	Fishing canoe	1.74	1.063	Low	2.30	1.401	High	-6.189	0.000*	Rejected
29	Sewing machine	2.23	1.037	Low	3.51	.730	High	-19.619	0.000*	Rejected
30	Knitting machine	2.00	.817	Low	3.79	.928	High	-28.384	0.000*	Rejected
31	Culvert/bridges	1.93	.927	Low	3.85	.880	High	-29.424	0.000*	Rejected
32	Rural roads	1.94	.966	Low	3.81	1.010	High	-26.177	0.000*	Rejected
33	Power generator	1.95	1.102	Low	2.92	1.245	High	-11.399	0.000*	Rejected
34	Market stalls	2.14	.886	Low	3.50	.859	High	-21.537	0.000*	Rejected
35	Wheel barrows	1.78	.863	Low	3.29	1.082	High	-21.416	0.000*	Rejected
36	Agro-credit facilities	2.16	1.073	Low	4.27	1.013	High	-27.980	0.000*	Rejected
37	Extension education services	2.23	.897	Low	3.91	1.052	High	-23.838	0.000*	Rejected
38	Deep freezer	1.99	.989	Low	2.76	1.192	High	-9.699	0.000*	Rejected
39	Poultry pen	2.04	1.102	Low	3.96	1.026	High	-24.835	0.000*	Rejected
40	Pig, sheep and goat pens	2.15	1.151	Low	3.24	.912	High	-14.445	0.000*	Rejected
41	Ice-block making machine	2.31	1.028	Low	3.20	1.163	High	-11.224	0.000*	Rejected

Number of respondents (N) =383; p≤0.05; 0.000*=significant

Data in table 1 revealed that Mean scores of availability of infrastructural services before the NFDP-11 ranged from 1.52-2.39. This means that before the project, the infrastructural facilities listed all had low level of availability in the area. After the project intervention, item 20 i.e. chick incubator had a Mean response value of 4.81. The implication is that it was very highly available in the area after the implementation of the project. Item 28 i.e. canoe had a low level of availability after the project implementation with a Mean response of 2.30. Items 19,22,25,33,35,38,40 and 41 were moderately available (Mean ranged 2.76-3.48) after the NFDP-II. The

remaining items were highly available after project intervention.

The result of the t-test analysis on Table 1 showed that there was significant difference (p≤0.05) between the Mean ratings of the responses of the project participants on the level of availability of infrastructural facilities in the area before and after the project with

Mean ratings after been higher than that of before. This implies that there was a significantly positive impact of the project on the availability of infrastructural facilities in the area.

b) Household farm yield of the Project Participants

Table 2 Mean Ratings, Standard Deviations and t-Test analysis of the Responses of Project Farmers on their levels of house hold farm yield before and after the project intervention (N=383).

Variable	BEFORE NFDP-2			AFTER NFDP-2			t-value	Sig(2 tailed)	Decision
	$\overline{X}$	SD	RMK	$\overline{X}$	SD	RMK			
Crop production									
Maize	2.60	1.031	Mod	3.82	0.886	High	-17.558	0.000*	Rejected
Rice	2.31	1.073	Low	3.99	0.779	High	-24.772	0.000*	Rejected
Cassava	1.88	0.747	Low	3.73	0.872	High	-31.513	0.000*	Rejected
Tomato	1.82	0.889	Low	3.84	1.081	High	-28.143	0.000*	Rejected
Pepper	2.28	0.811	Low	4.02	0.964	High	-27.052	0.000*	Rejected
Okra	1.93	0.849	Low	3.92	0.817	High	-33.051	0.000*	Rejected
Livestock production									
Poultry	1.88	0.719	Low	4.38	0.679	High	-49.552	0.000*	Rejected
Goat	1.72	0.880	Low	3.73	0.876	High	-31.814	0.000*	Rejected
Sheep							-32.125	0.000*	Rejected
Pig	1.93	0.869	Low	3.89	0.818	High	-20.712	0.000*	Rejected
Cattle	2.00	0.898	Low	3.91	0.915	High	-29.137	0.000*	Rejected
Fish production									
Fishing	2.13	1.125	Low	4.13	0.789	High	-28.407	0.000*	Rejected
Bee farming									
Honey	2.33	1.035	Low	3.41	1.085	Mod	-14.085	0.000*	Rejected

Note: p≤0.05; $\overline{X}$ =Mean; SD=standard deviation; RMK=remark; Mod=Moderate

Data analysis on crop production cluster presented in Table 2 indicated that item 1 had a Mean response value of 2.60 before the project. This implies that yield on the item was moderate before the intervention of the project. All other items on same cluster before the

intervention had Mean response values ranged 1.82-2.31. The implication is that Fadama II project participant's farm yields on these items were low before the project intervention. The same cluster revealed that after the project, the items had Mean response values

ranged 3.73-4.02. This means that after the project, participants recorded high yield on the items. Data analysis on livestock production cluster revealed that all the items on this cluster before the project had Mean response values ranged 1.72-2.14. This implies that yields on the items were low before the project intervention. After the project, the respondent's Mean ratings of the items ranged 3.69-4.38. The interpretation is that respondents recorded high yields on livestock production after the project intervention.

The cluster on level of yield in fish production showed that before the project, the respondent's Mean response was 2.13. This means that there was low yield in fish production before NFDP-II. After the project there was high yield in fish production as the Mean response of the participants rose to 4.13.

Data on honey production cluster of the table revealed that before the project, respondent's Mean response value was 2.33 implying that yield in honey production was low before the intervention of the project. After the project, respondent's Mean response value was 3.41. This means that there was a moderate yield in honey production after the project.

Results of the t-test on participant's Mean ratings of the levels of yields of the various enterprises (crops, livestock, fish and bee production) before and after the project showed that there was significant difference (p≤0.05) between them in each case. In each item, the Mean scores after the project are higher than the Mean scores before the project. This implies that there was a significant positive impact of the project on level of farm yield.

Discussion of Findings
The findings of this study on the levels of availability of infrastructural facilities before and after the project agrees with that of Oluwole (2011) who evaluated the impact of cocoa resuscitated program and found out that project farmers reported to have access to basic infrastructure after the program participation than before it. The Findings of the study on availability of rural infrastructure before and after participation in Fadama project phase 11 concurs with that of Nwachukwu, Agu, Mbanasor, Onyenweaku and Kamalu (2008) whose findings showed that house hold access to productive assets increased after participation in the National Fadama Development Project.

The findings of the study on level of farm yield agrees with that of Onemolease (2005) who found out that Agricultural Development Project had a positive and significant impact on yield of poultry. The result of this study on farm yield conforms with the findings of Inoni and Omotor (2009) that road infrastructure had a significant positive effect on farm yield. It is also in line with the findings of Nwalieji (2005) whose study on Evaluation of Fadama Phase 1 Vegetable Production Project of Anambra State Agricultural Development Project indicated that fadama project farmers recorded higher yields in their farms than non-project farmers. The finding is also in agreement with that of Kwa in Ezeh (2006) who found out that maize

production doubled from 237 million tons in 1985 to 460 million tons in 1999 in ADP enclave areas. Findings of the study are in tune with the one of Oyaide in Ezeh (2006) that ADP contact farmers had better yields than non-contact farmers. The study showed that the provision of rural infrastructure such as roads, irrigation facilities, storage facilities among others helped to raise household farm yields. The improvement in yield recorded by the farmers after the project intervention is as a result of enhancement of production efficiency brought about by the infrastructure provided by the project. This is in consonance with the submission of Chen and Lin (2002) that rural infrastructure such as irrigation, transportation, storages among others can decrease transportation cost, storage expenses and enhance efficiency. The result of the study is also in agreement with the submission of Peng (2002) and Fang *et.al* (2004) who observed that the potential of agricultural production can be released through rural infrastructure investment such as country road construction for instance. Investments in rural road infrastructure could reduce the expenditure of agricultural production. The result of this study also concurs with the submissions of Chen, Huffman and Roselle (2006) and Chaves *et. al* (2005) that factors influencing agricultural productivity include mechanization, access to credit among others. These facilities were provided by Fadama Development Project Phase 11 and the facilities so provided helped to boost the production capabilities of the project beneficiaries.

Conclusion

One of the goals of initiating the National Fadama Development Project was to provide rural infrastructural facility necessary for increased agricultural productivity. An attempt was made in this study to find out the extent to which these basic facilities were actually provided in the area of study and how it impacted on agricultural productivity as measured by household farm yield. The result of the study indicated that infrastructural facilities and services were more available in the study area than there were before the project implementation. The study also showed that farm yield of rural house holds increased significantly as a result of participation in the project.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Measures should be taken to sustain the improved agricultural practices brought about by the project
2. efforts should be made to extend the project to other areas of Kaduna state that did not benefit from the project and
3. Government should adopt the same design and approach used fadama 11 project on similar future projects.

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