

THE IMPACT OF FADAMA DEVELOPMENT PROJECT ON THE LIVING STANDARD OF DRY SEASON FARMERS OF GOMBE STATE.

Yahaya Umar Bajoga¹ and Abel A. Adebayo²

¹ Gombe State, A.D.P., Extension Dept, P.M.B. 46, Gombe.

² Dept. of Geography, Federal University of Technology, Yola.

ABSTRACT

The aim of the study is to evaluate the impact of the Fadama development project on the income and standard of living of the farming families of the dry season farmers in Gombe state. Data were obtained from a survey of 302 farmers randomly selected from 82 samples of the Fadama associations that benefited from the Fadama loan in all the local government areas of Gombe state. The result showed that the income of the farmers has increased significantly as a result of Fadama project activities. Farmers were able to purchase more personal belongings. The Fadama development project has also improved the living standard of the loan benefiting members in the state in term of possession of more personal belongings, modern housing and social infrastructures. One major problem facing the project is the conflict between farmers and pastoralists. This has affected dry season farming in certain areas of the state as life and property were lost and or damaged during such conflicts. Other problems included high cost of petrol, lack of good market, small size of holding, land tenure system, lack of active apex association, poor government support and inputs (seeds, fertilizers and pesticides) availability in rural areas. To sustain and improve upon the level achieved the state agricultural development project should to be funded adequately.

Introduction

Fadama development started on a limited scale in the Northern zone of the former Bauchi State Agricultural Development Programme in 1982. Following the success of the programme in the state, the national Fadama Development project was introduced to other states. Appraisal for the project was conducted in February 1992 and a loan package of US\$ 10.3 Million dollars to finance a project for developing Fadama lands (floods plains), by introduction of a small – scale irrigation, was approved.

The loan for the project becomes effective in March 1993. The loan was to terminate on September 30th 1997, but was extended by one year to September 30th 1998.

The Fadama development project in the state has the following tasks to accomplish. The Construction of 656 tube wells by drilling and 5000 washbores over a period of four (4) years; Construction of 90km of Fadama access roads and storage facilities; Organizing farmers into Fadama Users Association (FUA) for better access to credit and improved irrigation management and coordinated marketing of produce; Improve infrastructure within the Fadama and water lifting equipment (water pump) for irrigation purposes; Privatizing drilling activities and building the capacity of the farmers in support of Fadama development.

The Fadama development project is to accelerate private small–scale irrigation using low–cost petrol-driven pumps to extract shallow ground water. This will make the

farmers less dependent on the erratic rainfall regimes in this part of the country. The rural people will have a gainful employment during the dry season, which will reduce the rural – urban migration. The project was also expected to increase the farmers' production and contribute to food security and poverty alleviation. A total sum of N86, 379,338.68 was disbursed to 164 Fadama farmers association within the eleven (11) local government areas of the state to be recovered over a period of four (4) years from the date of disbursement. A total of N37, 972,430.96 which represent 85% have been repaid as at April 2002.

A total of 306 tube wells and 4115 wash bore were drilled out of the targeted of 306 tube wells and 5000 wash bores in the project life span. Similarly a total of 82km of Fadama access road were constructed out of the target of 90km in five local government areas of the state. The Fadama roads were Hashidu – Malala in Dukku Local Government Area, Bajoga – Ashaka Gari in Funakaye Local Government Area, Kumo – Kembu and Kumo – Kobuwa in Akko Local Government Area, Dasa – Tsando Dandela and Zambuk – Sabon Garin in Yamaltu Deba Local Government Area and Ture – Dogon Ruwa in Kaltungo Local Government Area.

A total of 262 Fadama users associations were formed within the state. One hundred and thirteen (113) associations were registered while one hundred and forty nine (149) associations are unregistered associations. A total of 164 Fadama users associations benefited from the Fadama loan disbursed by Gombe State Agricultural Development Programme (GSADP).

The focus of this paper is to evaluate the impact of the Fadama development project on the standard of living of the dry season farmers in the state.

The Study Area

Gombe State defined as the study area lies between latitudes 9° 30 and 11° 15 N, and longitudes 10° 30 and 11° 15 E in the northern part of the country. It is bordered by Yobe state to the north, Bauchi state to the west, Taraba State to the south, Borno and Adamawa states to the south east. The state has a land area of 16,760 km² and estimated farming families of 145,983. It is located within the Sudan Savannah zone.

There are eleven (11) local Government areas namely: Akko, Balanga, Billiri, Dukku, Funakaye, Gombe, Kwami, Kaltungo, Nafada, Shongom and Yamaltu Deba.

The mean annual rainfall varies from 600mm in the North to 1300mm in the South West. The rainy season starts in May but the rain is established in the month of June. The dry season starts in October and lasts up to April. Temperature ranges between 17°C to 42°C with April as the hottest month of the year. Wind speed is high during the dry season with an average speed of 8km/hour while, it low with an average of 3km/hour during the raining season (PME, GSADP).

The soils are predominately sandy in the northern parts with organic matter of 0.09 to 1.43%, while sandy clay, loams and heavy clay with a cracking feature (the black cotton soil) are found all over the state(Klinkenberg and Higgins, 1970).

The state is blessed with abundant human and natural resources. Agriculture is the major occupation of majority of the citizens. A wide range of crops are cultivated and

livestock reared in the state. Dry season farming is practiced in all parts of the state because of availability of vast tracts of Fadama land, and surface water bodies for irrigation and livestock consumption.

For irrigation, the hydrological resources of Gombe State were harnessed by the construction of three (3) dams, which are of critical importance to irrigation and crop production in the state.

The dams are situated on the river Gongola and two of its tributaries on its southward flow to the Benue River. The dams are Dadin-Kowa dam, which is the largest dam in North East and second largest in Nigeria, with a capacity of 1,770 million cubic meters of water; Balanga dam with 73 millions cubic meters and Cham dam with 6.6 million cubic meters (Ministry of Water Resources, MWR, 2001).

There are 55 Earth dams of various capacities located in different places within the state, which are used in rural areas for human and livestock water consumption (Fadama Dept. GSADP, 2002).

The state has 32,414 hectares of Fadama land but only 10793.5 hectares which represent 33.3% is presently being cultivated.

Materials and Methods

In this study, the primary data were collected from Fadama farmers in the state. The data were sourced through the use of structured questionnaires administered to the Fadama farmers and personal interviews in form of group discussion with 19 groups (Fadama Users Associations) and extension staff involved in the Fadama activities of the project.

Data collected as primary data includes personal data of farmers, Income realized from dry season farming, infrastructure (tubewell, washbore, roads and storage facilities) and farmers ability to own some items and support the education and health of their family members.

A random sampling method was used in sourcing data for this research. All Fadama users associations that benefited from the Fadama loan constitute the population, and the local government area was the sampling unit. In selecting sample size, 50% of the Fadama users associations that have benefited from the Fadama loan in the state were selected, and this amounted to sample size of 82.

To determine the distribution of the questionnaires within the selected Fadama users associations, proportional allocation technique (Cochran, 1979) was adopted using the following formula $nh = Nh/N*n$.

Where nh = is the number of individual sampled FUA

Nh = is the total number of members that benefited within the local government area.

n = total number of questionnaire distributed

N = Total number of members that benefited in all the FUA within the state.

However where the proportional allocation yield less than 5 respondents, the minimum of 5 respondents were selected so as to achieve a fair response from the population. A total of 302 (three hundred and two) questionnaires were administered.

There are (2) two different questionnaires, which were used in data collection: The farmers' questionnaire and the ADP's questionnaire. The farmer's questionnaire is divided into five (5) sections. Options were provided for the farmers to select from and a space is provided to fill in the answer is also provided. The ADP's questionnaire is an open-ended questionnaire type was filled by the Fadama Department of the GSADP. The data obtained were analyzed using descriptive statistics (means and percentage) and inferential statistics namely T-test and regression analysis.

To examine the differences in income before and after Fadama development programme among the dry season farmer's t-test was used. To obtain the degree of relationship between farmer's income after the Fadama project, farmer's ability to pay for their children's education and the health status of the family members in the Fadama area, a multiple regression (linear) analysis was used to understand the influence of income on farmer's living standard.

The farmer's income after the project was the dependent variable(y) while the farmer's ability to pay school fees, ability to buy other items (radios, bicycles, textiles materials, new houses, work bulls) and medical bills of his family members was the independent variable (x).

Results and Discussions

a) Socio – Economic Background of the farmers

The table below shows the educational background of the farmers.

Majority of the respondents are married. This is not unrelated with the culture and norms of the people in the study area. People marry at an early age for the benefit of having children to help and support them in their farming activities. The married respondents also include female farmers who also benefited from the Fadama loan.

Majority of the respondents (66.0%) had adult/Islamiya education, which is readily available in the study area. Most villages in the study areas have an Islamiya school, which teaches religion.

Those that had primary education (18.5%) are next to adult/Islamiya education. The number that attends to a particular primary school is reduced as the distance toward the school increase. This could be the reason for such a high percentage.

Table 1: Education background

Status	Respondents	%
Education		
Adult/Islamiya school	185	66
Primary education	52	18.5
Secondary education	25	8.8
Post-secondary education	19	6.7

Source field survey 2003.

In table 1, 8.8% that had secondary education are mostly respondents that have a secondary school close to their village and / or represent their family as it is practiced in some families; Children are apportioned into various trades. Majority of them couldn't continue with post – secondary education due to their economic status and / or don't have the requirements to further their education.

The 6.7% respondents that had post secondary education are mostly retired civil servants that are engaged in Fadama farming in the study areas and are benefiting from Fadama farming.

b) Fadama Development Loan

The Fadama loan package includes a water pump which is usually a 2 -inch type, a tube well or washbore and administrative charges of 16% of the total value of the loan package. The loan package was classed into tubewell and washbore. The tubewell is grouped into I, II and III due to variation in time in the award of contract and the exchange value of the dollar. The tube well has a loan value of N27, 095.00, which includes the administrative charges. Associations that are along the Gongola river benefited the tube well I, which stands, at 306 tubewells during the Bauchi state days. Majority of the benefiting farmers falls into the washbore class, which was grouped into I, II and III. Washbore I has loan value of N25, 023.00, while N29, 899.98 and N35, 240.00 is the loan value of washbore II and III respectively.

The loan value variation between the groups is due to the differences in time for the award of contract for drilling and supply of water pumps. Various companies were awarded the contract at different times within the project life span.

The farmers that did not benefit from the loan are mostly those that were unable to pay the required deposit of N2, 000.00 for the washbore which was later reviewed to include part of the cost of water pump to N10, 000.00. This review affected many members of groups especially those with low income level.

c) Physical and Social Infrastructures

Infrastructure here refers to the Fadama access roads and tubewell/wash bore provided by the project.

The table below (table 2) indicates that before the project roads were not constructed in the Fadama area. The 54.1% that have access road included villages or areas that were opened – up by roads construction activities of the Fadama project.

Table 2 Fadama Access Road

Availability of Fadama Access Road	Respondents	%
Before	0	100
After	152	54.1

Source field survey of 2003.

Farmers interviewed are of the opinion that roads constructed under the Fadama project are too small compared with track of Fadama land in the state. The roads constructed by the Fadama project have fewer culverts and bad side drains. The roads width is small to allow two vehicles to pass at the same time. The maintenance of the road has become a problem as most communities were not involved in the construction. The Local Government Councils have developed a sit and watch attitude towards the roads. These have made it difficult for farmers to use the roads in some remote areas where there are no joint efforts to maintain the roads.

d) Wash bore/tube well conditions

Fifty three percent of the respondents have their washbores or tubewells in good working condition while 47% of the respondents have problems with their washbores. The problems associated with the wash bore/tube wells are listed in table 3 below.

Table 3: types of problem of washbores/tube wells.

Problem	Respondents	%
No water in the washbores/tube wells	22	7.8
Damage by people	71	25.3
Need servicing	30	10.7
Other	9	3.2
	132	47.0

Source field survey of 2003.

Majority of the problems (25.3%) are cases of damage by people as indicated in table 3. Farmers claimed that most of the damages are done by the pastoralists. They uproot the pipes after destroying the cover. They also block pipes whereby the suction pipe couldn't reach the water level in the wash bore or tube well while in the some place they bury the wash bore or tube well completely. They also remove the pipes so as to keep their arrows in them.

About 11% are those with problems that require servicing of the washbores/tubewells (table 3). This is usually done by the drillers by flushing the washbore and removing sand particles in the screen. Farmers are often reluctant to make request for servicing of washbore by the ADP's staff. This could be the reason for the high percentage.

Lack of water in the washbore of the respondents (7.8%) could be attributed to the poor drilling by the contracting firm, very low recharge rate and blockage of the

washbore screen. Areas that have a low or deep water table usually dry up quickly as the water can not be drawn up by the pump. From the 47% (table 3), 13.2% have other problem like damaging of the washbore cap, uprooting of pipes halfway, filling back the pipe with sand and other forms of damage. Most of these are attributed to either pastoralists or fellow villagers that are not in good term with their colleagues.

Table 4; Increased Production Outputs by Washbore/Tubewell

Increased Output	Respondents	%
Yes	217	77.2
No	64	22.8
	281	100

Source field survey of 2003.

Majority of the respondents (77.2%) agreed that the washbores or tubewells have increased their production output while 22.8% of the respondents said there is no increase of output by the washbore/tubewell (table 4).

The increase output claimed by 77.2% of the respondents could be as a result of improved irrigation water availability and high valued crops are being planted. Maize is grown for grain and fresh harvest, which fetch more money for the farmers. Farmers in Punjab, Pakistan also reported increment in cropping intensity as well as changes in cropping pattern (Kerry, 1992). Most farmers interviewed are of the opinion that the washbores have influenced the dry season farming around them. Water being a critical factor in the dry season is made available by the washbore or tubewell.

The 22.8% of the respondents that had no increase in production output by the washbores are mostly those farmers that were not able to collect their water pumps because they did not pay the required deposit for the pumps. In such situation the farmer, cannot use the washbore. There are farmers that have disposed their pumps and were only left with a washbore in their farms. Some farmers have their washbore damaged. These could be the factor for this high percentage.

Income Levels of Loan Benefiting Farmers

The mean income realized from the dry season farming before the Fadama loan (income Before) and the amount of money realized after benefiting from Fadama loan (income After) were presented in table 5.

Table 5: Result of the T – test on Farmers Income Before and After Fadama project

Parameter	N	Mean	Stdev	SE Mean	T – Value	P – Value	DF
Income Before	281	39585	392527	2342			
Income After	281	85865	74588	4450	-9.20	0.000(99.9)	424

From the table 5, one can deduce that there is difference between income before Fadama and that of after the Fadama at a significant level of $P > 0.01$. The mean income rose from about ₦ 40,000 to ₦ 86,000 after the project.

Before the Fadama project crops like sugarcane, sweet potatoes, okra leafy vegetable, tomatoes, peppers and onions were grown on small scale basis in few locations that have perennial water source. However with the Fadama loan package, water which is a critical factor for dry season farming was made available. More farmers were able to plant in the dry season. More youths were employed as more land was put under cultivation. High value crops with good yields were cultivated. These have fetched more money for the farmers. Generally, ownership of the some basic properties like housing, means of transport, equipment and other assets are indicators that farmers are able to make some profit especially after the inclusion of dry season farming.

Effects of increased income on standard of living

Correlation analysis shows that there is a positive correlation of 0.405 between the amounts spent on the health of the family with the income of farmers after the Fadama project. This shows that the more the farmers income the more he is able to spend on the health of his family (Table 6).

The amount spent on the children education is also positively correlated with the income of the farmer after the Fadama project as indicated in the table below.

Table 6; Correlation between Income after Fadama and Amount Spent on Education and Health by Farmers

Education	Income A 0.210*	Education
Health	0.405*	0.335*

*Significant at 0.01 significant level.

Table 7; Summary of Regression Analysis of Income after Fadama with Amount Spent on Children Education and Family Health

Function Form	Predictor	Coef	Stdev	T-ratio	P	R ²
Linear	Constant (Education, x1)	1134.9	474.4	2.39	0.017**	4.4%
	Income After	0.015007	0.004174	3.60	0.000** *	
	Constant (Health, x2)	5783.5	882.2	6.56	0.000** *	16.4%
	Income After	0.057431	0.007763	7.40	0.000** *	

*** = P > 0.001 ** = P > 0.01 * = P > 0.1

The regression equation is $Y = 1135 + 0.0150x_1$ where Y = income after the project and x_1 = amount spent on children education. $Y = 5783 + 0.0574x_2$. X_2 = amount spent on health of the family.

The linear regression form shows that there is a significant relationship between farmer's income after the Fadama project with the amount of money spent on

children's education and amount spent on health of the family. Income after the fadama activities accounted for 4.4% of the variation in the amount spent on education and 16.4% of the variation on amount spent on health of the farmer's family.

Generally, more farmers spend on health more than education in the Fadama areas. This could not be unconnected with the availability of few primary and post primary schools within the Fadama areas. However health is of utmost importance as farmer's can travel long distances to seek for medical assistance while in some villages' private health workers do visit the villages on selected days of the week to attend to their customers.

As indicated in table 7, the influence of income after the Fadama on amount spent on children's education is significant at $P > 0.01$ with R^2 value of 4.4% while amount spent on health of the family is significant at $P > 0.001$ with R^2 value of 16.4%.

Impact of Farmer's Income on Possession of some Basic items

The impact of farmer's income after the Fadama project on basic and social infrastructures of the Fadama farming families was assessed through the ownership of housing, livestock, means of transport and other personal belongings. The findings are shown in table 8 below:

Table 8: Ownership of some Items by farmers before and after Fadama Project

Items Owned by Farmers	Before the Fadama Project		After the Fadama Project		% Change
	Respondents	%	Respondents	%	
1. Housing					
Mud with zinc roof	123	48.62	190	70.11	14.4
Mud with thatch roof	84	33.20	49	18.08	54.45
Cement with zinc roof	4	1.58	30	11.07	700.8
Stalk with thatch roof	42	16.60	2	0.74	4.45
2. Livestock					
1 – 5	124	71.26	63	28.76	49.35
6 – 10	49	28.16	73	33.33	118.35
Over 10	1	0.58	83	37.91	64536.29
3. Means of Transport					
Bicycle	170	82.12	100	35.59	43.33
Motorcycle	25	12.08	61	21.71	179.72
Pick-up Van	1	0.48	12	4.27	889.58
Bull with Cart	11	5.32	108	38.43	722.37

Source field survey of 2003.

Most of the respondents owned mud houses with zinc roof (48.62%), 33.20% of the respondents owned mud house with thatched roof while 16.60% and 1.58% owned stalk with thatched roof and cement bricks with zinc roof respectively (table 8) before the Fadama project.

After the Fadama project farmers that owned mud houses with zinc roofs increased by 14.4% (48.62 % before to 70.11% after). This could be due to increase in income of the farmers which were used to improve the standard of their housing. Farmers that owned mud houses with thatched roof dropped from 33.20 to 18.08% (table 9) after the project. This shows an improvement in the quality or standard of their housing. Those that owned houses build with cement brick and zinc roof also increased after the project to 11.07%, which represents 700.8% change (table 8). Those that owned houses made of stalk with thatched roofs dropped from 16.60% to 0.74% after the project (table 8). These indicate that as the level of income increased the housing quality of the farmers also improved.

The 3.6% that owned no houses include those respondents that stay with their parents, those that stay in houses owned by their parents and women farmers who by culture and tradition depend on their husband's houses.

Most farmers interviewed agreed that their housing has changed as a result of the Fadama project intervention.

Before the Fadama project 71.26% of the respondent owned 1-5 livestock's, 28.6% owned 6-10 livestock's while only 0.58% owned over 10 livestock's.

After the Fadama project 37.91% of the respondents owned over 10 livestock, while 28.76% owned 1 – 5 livestock. The number of farmers that owned 1 – 5 dropped after the project, while the number rose in the other two levels (table 8) indicates an improvement in the ability of farmers to own livestock.

There is an increase of 25.86% in the ownership of livestock when compared to the ownership before the Fadama project. This could be as a result of increased farmer's income after the project as indicated by T – test. This has enabled them to acquire more livestock which can be disposed of when the need arises.

Majority of the respondents (82.12%) owned bicycles, 12.08% owned motorcycles while 5.32% and 0.48% own bull with cart and pick-up respectively before the Fadama project (table 8).

About 38.43% of the respondents owned bull with cart, 35.59% owned bicycle while 21.71% and 4.27% of the respondents owned motorcycles and pick-up vans respectively after the Fadama project.

Majority of the farmers owned bicycles before the Fadama. However after the Fadama there is a drop in the number. This can be attributed to the increased in output by farmers and increase in income usual enabled the farmers to purchase either a motorcycle or pick-up van or bull with cart. The drop in the percentage is an indication of improvement after the Fadama project (table 8).

Those that owned motorcycles increased from 12.08% before the project to 21.71% after the project. This also indicates that the farmers got more from the farming activities during the project.

The highest change is in those that own pick-up before and after the project (0.48% to 4.27%) with a change of 889.58% (table 8). most of the respondents are personal owners while some farmers own the vehicle jointly.

The bulls with cart are generally owned by the farmers as savings account. Once there is problem that needs financial solution the bulls are hired out or disposed of. This could be contributing factor for a large number of farmers that owned them after the project.

General Problem's facings the Fadama farmers

The general problems of the dry season farmers in the Fadama areas include: high cost of petrol, lack of good markets, inputs availability in the rural areas, damage and attacks by migratory pastoralist year in year out on Fadama farms and farmers. Loan recovery by ADP commences at the end of wet season, this has forced beneficiaries to dispose their food crops at low prices. Lacks of modern storage facilities also cause losses to farmers. The number of farmers trained by ADP is small; some associations have not benefited the training.

The ADP experience problems during implementation such as inadequate and late release of counterpart funding, delay in the procurement of pumps, farmers/pastoralist conflicts and non flexibility of the loan.

Group Problems

The group problems refer to generalized problems that affects the Fadama users association within the State these includes inadequate funds, conflicts involving farmers and pastoralist. High cost of petrol use by the water pumps. Small size of holdings due to the land tenure system, low savings and contribution by member, lack of active apex associations and poor government support for the farmers. Lacks of formal credit, technical know how, storage facilities and good marketing also affects associations and their members.

RECOMMENDATION

To improve the gains of the Fadama project, the following recommendation are proffered:

The farmer – pastoralist conflict should be addressed by reviewing the existing edict in the State. A committee should be formed at the village level to settle disputes and make recommendation to the local government and the State. A research work should be undertaken in order to understand the roots and magnitude of the problem and recommend solutions. There is a need for the state government to make a policy on water. The policy should cover water for agricultural purpose, domestic and industrial uses. Further research should be done on the Fadama users associations in the state to evaluate their ability and ways to sustain them. Research work should be done on the potentials of the underground water in the state to sustain the dry season farming for a long period of time. The State government should re – establish the agricultural inputs supply company. This will reduce the hardship farmer's encounter in their farming activities especially in the rural areas.

CONCLUSION

It could be concluded based on the forgoing that the Fadama project has impacted positively on the farming communities of Gombe state in the following ways

Farmer's income has increased significantly.

Physical infrastructure e.g. roads, irrigation well, pumps and other farming input were made available to farmers.

The standard of living of the farmers has been transformed in terms of possessions of more personal belongings, modern housing and social infrastructure.

However loan recovery at the end of wet season has forced beneficiaries to dispose their food crops at low prices.

On the negative side the Fadama project has generated more conflicts between the farmers and the pastoralists in the study area.

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