

Perceptual Evaluation of the Impact of Second National Fadama Project on Gender Income, Output and Decision-Making Power in Abuja, Nigeria

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Abstract

The study perceptually evaluated the impact of the Second National Fadama Development Project (Fadama 11) on the income, output and decision-making power of the male and female farmers who participated in the project. Simple random technique was adopted for sample selection while questionnaire was used for data collection. A sample of 284 (159 males and 125 female) farmers were randomly selected in 8 locations or Fadama Development Areas (FDAs) in Abuja. The data were analysed with two-way independent factorial analysis of variance. Results indicated that there was no significant difference ($p > 0.05$) in the impact of the project on the income, output and decision-making power of the male and female farmers who participated in the project. The mean responses for the male farmers on income, output and decision-making power were 3.37, 3.20 and 3.30 respectively while those of the female farmers were 3.35, 3.08 and 3.35 respectively. On the contrary, there were locational differences ($p < 0.01$) in the impact of the project on the income, output and decision-making power of the farmers. The mean response showed that farmers in Bwari and Karshi areas perceived the impact of the project on the three indicators more than farmers in other locations. Although, the interaction effect of gender and location was not significant ($p > 0.05$), the mean responses indicated that in some locations, the project impacted more on the male farmers' income, output and decision-making power while in some locations, the reverse was the case in favour of the female farmers. Based on the grand mean responses for income (3.36), output (3.13) and decision-making power (3.36), the paper concluded that the project had a moderate impact on gender in the study area.

Keywords: male farmers, female farmers, mean responses, Fadama Development Areas (FDAs)

1. Introduction

Nigeria is one of the countries in the world that is richly blessed with abundant human and natural resources (UKAID, 2012). The distribution of climate and ecological zones in the country allow for the production of a large number of agricultural raw materials. The tropical climate and equatorial savannah vegetation create admirable conditions which are conducive for the commercial production of some major agricultural produce with extensive potential for industrial utilization. In addition, the topography of the country allows for the distribution of different kinds of minerals (RMRDC, 1997). These abundant natural resources and suitable weather conditions are devoid of frequent natural disasters as experienced in several other countries of the World. Apart from agro-climatic conditions, the country occupies a total land area of about 923,769 square kilometres (RMRDC, 1997). But despite all the enormous resources, Nigeria is one of the poorest nations in the world that is threatened by food insecurity (Khan, 2000; World Bank, 1996). Ironically, over 70 percent of her population are farmers (Eboh, 2008) making it very difficult to believe that the country is not self-sufficient in food production.

With the abundant human and natural resources, one of the challenges facing Nigeria is how to develop effective policies and programmes/projects that would transform the enviable potentials into economic realities so that the country can be self sufficient in food and fibre productions. Attempts to address this challenge resulted in the establishment of many agricultural intervention programmes/projects for which the Second National Fadama

Development Project (Fadama 11) is one. The Fadama 11 Project derived its name from Hausa language *fadama* meaning wetland (Tanko, Jirgi, & Ogundeji, 2010). According to World Bank (2001), fadama refers to river valley areas which are seasonally flooded or have high water tables for all, or a large part of the year. The availability of fadama in the northern Nigeria (including Abuja) and other enviable features formed the rationale for establishing the fadama project that was implemented in phases (fadama 1, fadama 11 and fadama 111 projects). The project was funded by the Federal Government of Nigeria, the World Bank, State Governments, Local Government and the recipient communities. Fadama 1 and fadama 11 have been completely implemented while fadama 111 is currently being implemented. This study was centred on fadama 11 project which had among other objectives, to increase the income, output and decision-making power of the beneficiaries (World Bank, 2010).

With these laudable objectives and the strategies for implementation in place, a lot of studies have been conducted to determine if the project impacted positively on the beneficiaries or not. For instance, a study by Kudi, Usman, Akoko and Banta (2008) showed that majority of the farmers who participated in the project perceived increased changes in their income, yield and living conditions. In a similar study, Ajayi and Nwalieji (2010) and Adeolu and Taiwo (2004) revealed that the income and farm size of the fadama 11 farmers, among other issues, were significantly higher than those of the non-fadama 11 farmers. Again, Tanko, Jirgi and Ogundeji (2010) showed that fadama 11 project positively impacted on the income of tomato farmers and consequently improved their livelihoods. Other studies (Oladoja & Adeokun, 2009; Agwu & Edun, 2007) also made impressive remarks about the impact of fadama 11 project on the farmers.

Based on the available evidence on the impact of fadama 11 project, it may be erroneous to conclude that the project impacted positively on the income, output and decision-making power of the male and female farmers who participated in the project in all parts of Nigeria including Abuja. It will equally be deceiving to generalize that there was no locational differences in the impact of the project hence the need to evaluate the impact of the project on gender and in different locations (Fadama Development Areas) within Abuja. Evaluating the impact of the project on gender is vital because among the eight key points in the millennium development goals, gender issues were clearly highlighted (UN Millennium Project, 2003) indicating that it has formed an important theme in national and international treaties, covenants and declarations. Again, in the Nigerian National Gender Policy (2006), it was categorically stated thus: "There is need to pre-empt the likely differential impacts of government and other institutional policies on women and men through ex-ante analysis and also monitor the impacts of macro policies at the micro level, that is, on the lives of women and men at the grassroots". Furthermore, World Bank (1995) stated that, if disparities between men's and women's statuses, access to resources, control of assets and decision-making powers persist, sustainable and equitable development would be undermined.

2. Objectives

The main objective of the study is to evaluate the impact of fadama 11 project on income, output and decision-making power of the male and female (gender) farmers who participated in the project in different locations (FDAs) in Abuja, Nigeria. The specific objectives are to:

- 1) Evaluate the impact of fadama 11 project on the male and female farmers' income.
- 2) Evaluate the impact of fadama 11 project on the male and female farmers' output.
- 3) Evaluate the impact of fadama 11 project on the male and female farmers' decision-making power.
- 4) Evaluate the impact of fadama 11 project in different locations within Abuja.

3. Hypotheses

- 1) Ho: There is no significant difference in the impact of fadama 11 project on the male and female farmers' income, output and decision-making power ($\mu_{\text{male}} = \mu_{\text{female}}$).
- 2) Ho: There is no locational difference in the impact of fadama 11 project on the farmers' income, output and decision-making power ($\mu_{\text{Bwari}} = \mu_{\text{Wako}} = \mu_{\text{Karshi}} = \mu_{\text{Yaba}} = \mu_{\text{Gwagwalada}} = \mu_{\text{Kuje}} = \mu_{\text{Kwali}} = \mu_{\text{Abaji}}$).
- 3) Ho: There is no significant interaction effect of gender and location (FDAs) on the impact of fadama 11 project on the three indicators.

4. Research Methodology

This study was conducted in Abuja, Nigeria located between latitudes 8°25' and 9°25' N and longitudes 6°45' and 7°45' E. Abuja lies in the transitional zone between the savannah in the North and forest vegetation in the South which is endowed with tremendous potentials for supporting agricultural production (Adakayi, 2000). The population for the study comprised male and female farmers who participated in the Fadama 11 Project in

different locations or Fadama Development Areas (FDAs) in Abuja. A simple random technique was used for sample selection while structured questionnaires were used for data collection. There were 10 locations (FDAs) in Abuja. Out of the 10 locations, 8 were randomly selected through balloting and questionnaires were randomly distributed to different fadama User Groups (FUG). The 8 locations (FDAs) and the number sampled are: Bwari (23 males and 15 females), Karshi (16 males and 14 females), Kwali (15 males and 10 females), Yaba (19 males and 11 females), Gwagwalada (19 males and 14 females), Abaji (24 males and 21 females), Kule (22 males and 25 females) and Wako (21 males and 15 females). It should be noted that some of the questionnaires distributed were not returned and some that were returned were rejected because they were not properly filled hence, the number recorded here are those ones that were properly filled. In all, a total of 159 male and 125 female farmers in the 8 locations were used for the study giving a total of 284 respondents. In the questionnaires, the farmers were asked to state the changes that occurred in their farm income, output and decision-making power because of their participation in the fadama 11 project using: very highly appreciable change (5), highly appreciable change (4), moderately appreciable change (3), fairly appreciable change (2) very little appreciable change (1) and, no appreciable change at all (0). The above scores were used to run the analysis in line with the method adopted by Andy (2005), Robert (2011), Gray and Kinnear (2011) and Ajah (2012). SPSS 15.00 was used to run the analysis and it was tested at 5 percent probability level using Bonferroni model (Andy, 2005). The model for data analysis is expressed mathematically as:

$$Y_{ij} = \mu + G_i + L_j + GL_{ij} + e_{ij}$$

Where:

Y_{ij} = Individual male and female farmer's response to the impact of fadama 11 project on his/her income, output and decision-making power.

μ = Population mean

G_i = Refers to the impact due to gender

L_j = Refers to the impact due to location or Fadama Development Areas (FDAs)

GL_{ij} = Interaction effects of gender and location

e_{ij} = error term.

This is a two-way independent factorial analysis of variance (ANOVA) model (Andy, 2005). The two independent factors captured in the model are gender and location while the dependent variable is the impact of fadama 11 project. Gender has two levels (male and female) while location has 8 levels (Bwari, Karshi, Kwali, Yaba, Gwagwalada, Abaji, Kule and Wako). The combination gave 2x8 independent factorial analysis of variance with 16 treatment conditions. By interpretation, the model tests the hypotheses that the impact of fadama 11 project on the farmers' income, output and decision-making power (Y_{ij}) depends on the gender of the farmer (G_i), the location (FDA) of the farmer in Abuja (L_j) and the interaction effect of gender and farmer's location (GL_{ij}). The μ is the population mean that is empirically obtained and it does not contribute to any variation in the observed differences (Aggarwal, 2002) while e_{ij} is the error term.

5. Results and Discussion

Table 1. ANOVA results on the impact of Fadama 11 project on farmers' income

Sources of Variation	Df	SS	MS	F-cal	P-value	Sig
Gender	1	0.43	0.43	0.11	0.74	NS
Location (FDA)	7	100.10	14.30	36.68	0.00	S
Gender *Location	7	2.33	0.33	0.85	0.54	NS
Error (between factor)	268	104.46	0.39			
Total	283	213.64				

Source: field data, 2012.

The analysis of variance (ANOVA) results of the impact of fadama 11 project on gender income in the eight locations are shown on Table 1. The "Gender" row of the ANOVA table shows the main effect of gender and it tests the hypothesis that there is no significant difference in the income of the male and female farmers who

participated in the project ($\mu_{\text{male}} = \mu_{\text{female}}$). The result $F(1, 268) = 0.11, p = 0.74$, indicated that there was no significant ($p > 0.05$) difference in the impact of the fadama 11 project on the income of the male and female farmers who participated in the project hence the null hypothesis was accepted. In other words, irrespective of location, there was no significant difference ($p > 0.05$) in the mean responses of the male and female farmers on the impact of fadama 11 project on their income. This result is in line with the millennium development goals that lays emphasis on the minimization of the disparity between men and women in every society. (Millennium Development Goal, 2003) Again, the "Location" row of the ANOVA table contains the result of the impact of fadama 11 project on the different locations (the main effect of location). It tests the hypothesis that the impact of fadama 11 project is perceived the same in all the locations in Abuja ($\mu_{\text{Bwari}} = \mu_{\text{Wako}} = \mu_{\text{Karshi}} = \mu_{\text{Yaba}} = \mu_{\text{Gwagwalada}} = \mu_{\text{Kuje}} = \mu_{\text{Kwali}} = \mu_{\text{Abaji}}$). The result, $F(7, 268) = 36.68, p = 0.00$, revealed that there were locational differences ($p < 0.05$) in the impact of fadama 11 project on the income hence the null hypothesis was rejected. In other words, irrespective of gender, the mean responses revealed that some locations perceived higher income than others. The result calls for further investigation to find out the causes of disparity in some of the locations because the organizational setup was the same. Furthermore, the "Gender*Locations" row of the ANOVA table contains the result of the interaction effects of gender and location. It tests the hypothesis that the impact of fadama 11 project on gender income in each of the eight locations is the same. The result, $F(7, 268) = 0.85, p = 0.54$, showed that there was no significant interaction effects ($p > 0.05$) of gender and location on the income of the fadama 11 farmers. In other words, both the male and female farmers in each of the locations perceived no difference in the impact of fadama 11 project on their income. This is contrary to the findings of Dauda (2002) which showed that gender biases are widely prevalent in the rural areas of Nigeria. This goes to prove that the fadama 11 project was implemented with fairness to gender.

Table 2. Mean responses of the farmers on the impact of fadama 11 project on their income

Location	Gender		Locational mean
	Male	Female	
Bwari	4.52	4.07	4.29 ^a
Karshi	4.13	4.10	4.12 ^{ab}
Kwali	3.86	3.88	3.87 ^b
Yaba	3.06	3.27	3.16 ^c
Qwaqwalada	3.16	3.14	3.15 ^c
Abaji	2.86	2.87	2.86 ^{cd}
Kuje	2.75	2.86	2.80 ^{cd}
Wako	2.63	2.57	2.60 ^d
Gender mean	3.37	3.35	3.36

Source: field data, 2012.

The mean responses of the male and female farmers on the impact of Fadama 11 project on income is shown on Table 2. Irrespective of the location (Fadama Development Area), the mean responses for the male and female farmers were 3.37 and 3.35 respectively. The mean values indicated that there was a marginal difference in the mean responses of the male and female farmers with that of the male being very slightly higher than that of the female. On the other hand, irrespective of gender, the mean responses indicated that farmers in Bwari FDA (4.29^a) and Karshi (4.12^{ab}) perceived the impact of the project on their income more than the farmers in other FDAs. Farmers in Wako FDA (2.60^d) perceived the least impact on their income. The locational differences in the impact of fadama 11 project on income may be attributed to the differences in the commodities produced by the farmers and the prevailing market prices for the commodities in those areas. Comparing the mean responses of the male and female farmers in each of the locations (FDAs), the result showed that the male farmers in Bwari (4.52), Wako (2.63), Karshi (4.13) and Gwagwalada (3.16) perceived the impact of the project on their income more than the female farmers while the reverse is the case in favour of the women farmers in Yaba (3.27), Kuje (2.86), Kwali (2.88) and Abaji (2.87). This shows that both the male and female farmers had comparative advantages in some of the locations (FDAs). Generally, based on the response options in the questionnaire, the grand mean response (3.36) indicated that the impact of the project on the farmers' income was moderate.

Table 3. ANOVA results on the impact of Fadama 11 Project on the farmers' output

Sources of Variation	Df	SS	MS	F-cal	P-value	Sig
Gender	1	0.78	0.78	1.77	0.19	NS
Location (FDA)	7	115.21	16.46	35.52	0.00	S
Gender *Location	7	1.98	0.28	0.65	0.72	NS
Error (between factor)	268	117.55	0.44			
Total	283	237.08				

Source: field data, 2012.

Table 3 shows the impact of fadama 11 project on the farmers' output. The "Gender" row of the ANOVA table 3 contains the main effect of gender on output. It tests the hypothesis that there is no significant difference in the output of the male and female farmers who participated in the Fadama 11 Project. ($\mu_{\text{male}} = \mu_{\text{female}}$). The result $F(1, 268) = 1.77, p = 0.19$, indicated that there was no significant difference ($p > 0.05$) in gender output hence the null hypothesis was accepted. In other words, irrespective of the farmers' location in Abuja (FDA), there was no significant difference in the mean responses of the male and female farmers on the impact of fadama 11 project on their output. This shows that the output of the female farmers competed favourably with those of the male farmers and this is contrary to an earlier report by Bamberger (1994) which indicated that many agricultural projects were designed to favour men with little or no emphasis on women. In addition, the "location (FDA)" row of Table 3 contains the result of the impact of fadama 11 project at the locational level (the main effect of location). It tests the hypothesis that the impact of fadama 11 project on the output of the farmers in the eight locations (FDAs) are the same ($\mu_{\text{Bwari}} = \mu_{\text{Wako}} = \mu_{\text{Karshi}} = \mu_{\text{Yaba}} = \mu_{\text{Gwagwalada}} = \mu_{\text{Kuje}} = \mu_{\text{Kwali}} = \mu_{\text{Abaji}}$). The result, $F(7, 268) = 35.52, p = 0.00$, revealed that there were locational differences ($p < 0.01$) in the output of the farmers in some of the locations hence the null hypothesis was rejected. This shows that irrespective of gender, the mean responses on the impact of the fadama 11 project on the farmers' output was not the same in some of the locations in Abuja. Furthermore, the "Gender*Location" row of Table 3 contains the result of the interaction effects of gender and location. It is the statistical measure of how the male and the female farmers within a particular location perceived the impact of fadama 11 project on their output. The result, $F(7, 268) = 0.65, p = 0.72$ shows that there was no significant interaction effect ($p > 0.05$) of gender and location. This implies that in each of the eight locations, there was no significant difference in the impact of fadama 11 project on gender output.

Table 4. Mean responses of the farmers on the impact of fadama 11 project on their output

Location	Gender		Locational mean
	Male	Female	
Karshi	4.13	4.30	4.23 ^a
Bwari	4.17	4.07	4.12 ^a
Kwali	3.59	3.36	3.48 ^b
Qwaqwalada	3.11	2.79	2.95 ^c
Abaji	2.62	2.47	2.54 ^{cd}
Yaba	2.66	2.36	2.52 ^{cd}
Kuje	2.88	3.00	2.94 ^c
Wako	2.31	2.29	2.30 ^d
Gender mean	3.20	3.08	3.13

Source: field data, 2012.

The mean responses on the impact of fadama 11 project on the farmers' output are reflected on Table 4. The values indicated that irrespective of location, the male farmers mean response (3.20) was relatively higher than

that of the female farmers (3.08). Although there was no significant difference in the mean responses, the values showed that the male farmers felt the impact of fadama 11 project on their output more than the female farmers. On the other hand, irrespective of gender, the mean responses indicated that farmers in Karshi (4.23^a) and Bwari (4.12^a) felt the impact of the project on their output more than farmers in other locations. The least impact was felt by farmers in Wako FDA (2.30^d). Within each of the eight locations, the mean responses showed that the male farmers in Bwari (4.17), Wako (2.66), Gwagwalada (3.11), Kwali (3.59) and Abaji (2.62) felt the impacts of the project on their output more than the female farmers while in Kuje (3.00) and Karshi (4.30) the reverse is the case in favour of the female farmers. Based on the options provided for the farmers in the questionnaire, the grand mean response (3.13) showed that the impact of the project on the farmers' output was moderate.

Table 5. ANOVA results on the impact of Fadama 11 project on the farmers' decision-making power

Sources of Variation	Df	SS	MS	F-cal	P-value	Sig
Gender	1	0.27	0.27	0.50	0.48	NS
Location (FDA)	7	72.79	10.39	19.39	0.00	S
Gender *Location	7	3.78	0.54	1.01	0.43	NS
Error (between factor)	268	143.74	0.54			
Total	283	224.20				

Source: field data, 2012.

The results of the impact of fadama 11 project on the farmers' decision-making power are shown on Table 5. The "Gender" row of the ANOVA table contains the result of the impact of fadama 11 project on the male and female farmers. It tests the hypothesis that there is no significant difference in the decision-making power of the male and female farmers who participated in the Fadama 11 project ($\mu_{\text{male}} = \mu_{\text{female}}$). The result compared the mean responses of the male and female farmers in all the locations combined. The result, $F(1, 268) = 0.50$, $p = 0.48$, showed that there was no significant difference in the impact of fadama 11 project on the male and female farmers' decision-making power hence the null hypothesis was accepted. In other words, irrespective of the location, there was no significant difference ($p > 0.05$) in the mean responses of the male and female farmers who participated in the project regarding decision-making. This is contrary to the findings of Mundi (2009) and Reach (1995) which indicated that men dominated farm production decision-making compared to women. Also, the "Location (FDA)" row of Table 5 contains the result of the impact of fadama 11 project in the different locations. It is a measure of how the farmers at the locational level perceived the impact of fadama 11 project on their farm production decision-making (the main effect of location). The result, $F(7, 268) = 19.39$, $p = 0.00$ indicated that there were locational differences ($p < 0.01$) in the impact of fadama 11 project on the decision-making power of the farmers. In other words, some locations (FDAs) significantly ($p < 0.01$) improved in their farm production decision making more than others because of the project. Again, the "Gender *Location" row of Table 5 shows the result of the interaction effect of gender and location. The result, $F(7, 268) = 1.01$, $p = 0.43$, implied that in each of the eight locations, there was no significant difference in the impact of fadama 11 project on the male and female farmers' decision-making power.

The mean responses on the impact of fadama 11 project on the farmers' production decision-making power are shown on Table 6. The mean responses indicated that irrespective of location, the female farmers' mean response (3.35) was very slightly higher than that of the male farmers (3.30). This implies that the female farmers relatively improved on their farm production decision-making more than their male counterparts because of the project. In terms of location, the mean responses indicated that the farmers in Bwari (4.16^a) and Karshi (4.00^{ab}) improved on their farm production decision-making more than farmers in other locations while improvement in farm production decision-making was least in Abaji FDA (2.71^c). Comparatively, women in Gwagwalada (3.57), Kuje (3.05), Wako (3.14), Yaba (2.82) and Abaji (3.60) improved on their decision-making power more than their male counterparts while the reverse is the case in Bwari (4.26) and Kwali (3.68) areas.

Table 6. Mean responses of the farmers on the impact of fadama 11 project on their decision-making power

Location	Gender		Locational mean
	Male	Female	
Bwari	4.26	4.07	4.16 ^a
Karshi	4.00	4.00	4.00 ^{ab}
Kwali	3.68	3.60	3.64 ^{bc}
Qwaqwalada	3.21	3.57	3.38 ^{cd}
Kuje	2.97	3.05	3.00 ^{de}
Wako	2.63	3.14	2.88 ^{de}
Yaba	2.79	2.82	2.80 ^{de}
Abaji	2.81	3.60	2.71 ^e
Gender mean	3.30	3.35	3.32

Source: field data, 2012.

6. Conclusion

The role of World Bank, Nigerian government and other donors are worth commending in the initiation and implementation of the fadama 11 project because it is a means of agricultural transformation. As an intervention project, the study perceptually evaluated the impact of the project on gender income, output and decision-making power. The result indicated generally that there was no significant difference in the impact of the project on the male and female farmers' income, output and decision-making power but on the contrary, there were locational differences in the impact of the project on the farmers' income, output and decision making power. Furthermore, the mean responses indicated that in some locations, there were marginal differences in the impact of the project on the male and female farmers' income, output and decision-making power. Based on the grand mean responses on income, output and decision-making power, the paper concluded that the impact of the project on the beneficiaries was moderate. The paper recommended that the study should be replicated in other states to see if the same results apply so that the organizational pattern of the project can be copied for subsequent projects.

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