

# Farmers' Characteristics and Adoption of Recommended Practices Under the Fadama Project Scheme in Edo State, Nigeria

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## Abstract

*The study focused on farmers under the Fadama Project Scheme in Edo State, Nigeria with emphasis on the relationship between farmers' characteristics and adoption of recommended technologies. Analysis of data obtained from a random sample of 80 respondents reveals that Fadama farming is dominated by females (62.5%), most of whom were married (77.5%), above 32 years (77.5%), and poorly educated. Gender, educational and household characteristics of respondents were significant determinants of respondents' adoption of Fadama-related technologies, accounting for about 39% of variability in adoption. High costs of water pumps, lack of agro-chemicals (fertilizers) and inadequate funds were major constraint to respondents' adoption of recommended practices. Farmer organization into cooperatives and increased agricultural extension education to enhance communication were recommended.*

**Key words:** Farmers, Recommended Farm Practices, Fadama, Nigeria

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## Introduction

Food production in Nigeria since the mid 1960s has failed to respond adequately to increases in food demand. According to Umoh and Adegeye (2000), the pressure from the expanding population and the concomitant increasing demand for food have resulted in exploitation of previously unused land resources, including wetlands (Fadama), for the production of additional food. This exploitation was intensified in 1975 when the Federal Government established the River Basin Development Authorities (RBDAs) to harness Nigeria water resources for increased agricultural production and improved quality of life in the rural areas.

Further actions by the Federal government to fully utilize the ground water potential and the moisture reserve in the Fadama resulted in the establishment of the National Fadama Development Project (NFDP) in 1993, which focused on small-scale farmers. The scheme,

coordinated by the Agricultural Development Programme (ADP), sought to empower farmers by constructing tube wells, wash bore, purchase of petrol-driven water pumps for lifting water from the shallow (tube) well, as well as encouraging adoption of improved technologies (Ingawa, 1998; Babalola, 2002). The operation of the Fadama Development Project (FDP) commenced in Edo State in 1996, having as objectives the improvement of small-scale irrigation management, organization of Fadama Users Associations (FUAs) and training of farmers in use of improved farm technologies. Crops like rice, maize, cowpeas and vegetables are cultivated in the FDP.

The assertion that it would take almost 30 years before the full potential of the Fadama scheme is realized (World Bank, 1992) justifies an investigation into Fadama farmers response to improved farming practices recommended under the programme. Studies on the Fadama project

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are scanty, especially in Edo State. A study on Kebbi State Fadama project focused on its impact on the wealth status of farmers by employing such qualitative indices as ownership of transport (e.g. motor bike, camel and bicycle), media facilities (television and radio) and personal house (Ramalan *et al.*, 1998; Babalola, 2002). Concerns over farmers' response to recommended farm practices hinges on the realization that if the full potential of the scheme is to be realized, then they must be willing and be seen to adopt recommended innovations. Agricultural development, inclusive of Fadama development, is sometimes perceived as the degree to which farmers adopt recommended technologies (Ogbimi, 1997), which shows how critical innovation adoption is to Fadama development. Buttressing this point Nonyelu (1997) also emphasized the need to improve farmers' practices if the objective of increased food production or land (Fadama land inclusive) productivity is to be attained.

Studies on adoption have been primarily concerned with crops cultivated on dryland areas and examining factors (social and economic characteristics of farmers) affecting adoption (Obinne, 1991; Odiaka *et al.*, 1997). An important question that arises is: what are the farmers' responses to modern farm practices recommended in wetland farming i.e. the Fadama programme, and how are their adoption decisions affected by their personal characteristics with particular reference to Edo State? The answers to these questions are hinged on the objectives of the study as stated below:

- (1) To find out the personal characteristics of farmers involved in Fadama project in the study area.
- (2) To assess farmers' adoption of improved technologies associated with Fadama farming.
- (3) To examine limitations to farmers' adoption of these practices and
- (4) To determine how farmers' adoption decisions are influenced by their personal characteristics.

This study addressed the null hypothesis that personal characteristics of farmers are not significant determinants of their adoption of recommended technologies.

## Materials and Methods

The Fadama project in Edo State is implemented in the south and north zones of the State. The South zone, which was purposively chosen, has 4 communities in which the Fadama project is implemented. These are Orogbó with 6 registered Fadama Users Associations (FUAs), Ogbá with 2 FUA, Idundolor (1) and Ugbokulu/Emma (1). Orogbó and Ogbá communities were purposively chosen because of their larger concentrations of Fadama users (farmers).

Proportional random sampling was used in the selection of 50% of the FUAs, which translates into 3 and 1 FUAs from Orogbó and Ogbá communities, respectively. Eighty percent (80%) of members of each Association were randomly sampled, giving a total of 86 respondents (Table 1). The data collection instrument (questionnaire) was first evaluated for validity through expert consultation, while its reliability was tested using the test-retest method. The reliability coefficient ( $r = 0.91$ ) confirmed the instrument reliability.

**Table 1: The sampling protocol adopted**

| Community | Membership | Sample |
|-----------|------------|--------|
| Orogbó    |            |        |
| A         | 21         | 17     |
| B         | 16         | 13     |
| C         | 38         | 30     |
| Ogbá      |            |        |
| A         | 32         | 26     |
| Total     | 107        | 86     |

Six (6) of the retrieved questionnaires were improperly filled and therefore rejected in the final data analysis.

## Model Specification

Multivariate regression analysis (Olayemi, 1998) was used to isolate the effect of farmers personal characteristics on adoption of Fadama – related practices. The explicit form is specified as

$$Y = a + b_1 X_1 + B_2 X_2 + B_3 X_3 + b_4 X_4 + b_5 X_5$$

where:

Y = Dependent Variable (Number of improved practices used by respondents);

$X_1$  = Sex (Dummy: Male = 1; Female = 0)

$X_2$  = Age (years)

$X_3$  = Education (years)

$X_4$  =Marital Status (Dummy: Married = 1; Single = 0)

$X_5$  =Household size

$a$  =Intercept

To determine the best fit model four functional forms were evaluated based on the following criteria (Olayemi, 1998): magnitude of the adjusted  $R^2$ , significance of the estimated parameters, and standard error of estimates.

Based on these criteria the linear function was chosen as the lead equation. To test for the significance of the parameters the t-test statistic was used while the F test was used to assess the significance of the adjusted  $R^2$ .

## Results and Discussion

### Personal characteristics of respondents

Result of Table 2 shows that females constituted the dominant participant in the Fadama project scheme in the study area, implying that they are major producers of vegetables (vegetable is the dominant crop cultivated in the Fadama Programme) in the study area. Several studies have shown that women constitute almost 90% of farmers in developing countries (Omokhudu, 1999) and about 70% in Nigeria (Deji *et al.*, 1996). This finding confirms the importance of women in agricultural production.

**Table 2. Personal characteristics of respondents**

| Variable                             | Freq. (n = 80) | %    |
|--------------------------------------|----------------|------|
| <b>Sex</b>                           |                |      |
| Male                                 | 30             | 37.5 |
| Female                               | 50             | 62.5 |
| <b>Marital Status</b>                |                |      |
| Married                              | 62             | 77.5 |
| Single                               | 18             | 22.5 |
| <b>Age (years)</b>                   |                |      |
| Less than 32                         | 18             | 22.5 |
| Above 32                             | 62             | 77.5 |
| <b>Education</b>                     |                |      |
| No formal education                  | -              | -    |
| Below Primary Six                    | 36             | 45   |
| Completed Primary education          | 22             | 27.5 |
| Secondary education/Teacher Training | 12             | 15   |
| Tertiary Education                   | 10             | 12.5 |
| <b>Household Size</b>                |                |      |
| 4 and below                          | 12             | 15.0 |
| 5 – 8                                | 41             | 51.3 |
| 9 – 12                               | 22             | 27.5 |
| Above 12                             | 5              | 6.2  |

Most respondents were married (77.5%) with a modal household size of 5 – 8 members (51.3%), which suggests they have responsibility of catering for household members. The majority (77.5%) of respondents were above 32 years old and their mean age of about 37 years confirms that they are relatively young and active farmers. Old age is known to limit productivity of farmers. The results also reveal that the respondents are largely illiterate with many (45%) not having

completed their primary education. Low education limits farmers' adoption of improved farm practices.

### Adoption of recommended practices by respondents

The recommended practices associated with Fadama Project in the study area and adopted by respondents are presented in Table 3. Recommended plant spacing (100% of

respondents), washbores (97.5%) and recommended harvesting methods (72.5%) were widely adopted by respondents.

**Table 3. Recommended practices adopted by respondents**

| Practices          | *Freq (n=80) | %     |
|--------------------|--------------|-------|
| Plant Spacing      | 80           | 100.0 |
| Washbores          | 78           | 97.5  |
| Harvesting Methods | 58           | 72.5  |
| Fertilizers        | 42           | 52.5  |
| Water Pump         | 32           | 40.0  |
| Tube wells         | 20           | 25.0  |
| Improve Varieties  | 18           | 22.5  |

\*Multiple response hence sample size exceeds 80

Washbores help to keep the harvested vegetables clean and attractive for consumer purchase; proper plant spacing increases yields as it prevents over-crowding while correct harvesting methods ensure multiple harvest from a single stand crop. Fertilizers were moderately used by almost half (52.5%) of the respondents. However, water pumps and improved varieties were adopted by only 40% and 22.5% of respondents, respectively. The reasons for the low adoption rates are given in Table 4.

### Constraints to respondents' use of Fadama-related technologies

Major limitations to respondents' adoption of recommended practices include inadequate capital, high cost of water pumps and non-availability of chemical fertilizer. Lack of improved varieties was not considered a serious constraint yet its adoption was very low (Table 3). This suggests respondents' preference for the local variety. When probed, the reason given by respondents for this preference was that the local varieties taste better than the improved varieties when prepared in condiment.

**Table 4. Constraints to respondents' use of Fadama-related technologies**

| Constraints                | *Freq | %    |
|----------------------------|-------|------|
| Inadequate capital         | 80    | 100  |
| High cost of pumps         | 70    | 87.5 |
| Lack of fertilizer         | 62    | 80.0 |
| Lack of improved varieties | 20    | 25.0 |

\*Multiple response

### How technology adoption is influenced by personal characteristics

Table 5 reveals that sex, education and household size were significant determinants of respondents' adoption of recommended Fadama-related practices. Sex was negatively signed, which means that female Fadama farmers were more positively disposed to use of the improved practices. This result calls to question the assumption that women are not positively disposed to use of improved practices. The low rate of male adoption of improved practices could be related to the fact that there were few males involved in the Fadama scheme in the study area, as revealed in Table 2.

**Table 5: Multivariate regression of personal characteristics of respondents affecting adoption of recommended practices**

| Variables               | Standardized beta | t value |
|-------------------------|-------------------|---------|
| Education               | 0.465             | 2.979*  |
| Age                     | -0.147            | 0.013*  |
| Household size          | 0.137             | 1.831** |
| Sex                     | -0.062            | 2.115*  |
| Marital Status          | 0.258             | 1.299   |
| Intercept               | 1.865             | 1.299   |
| Adjusted R <sup>2</sup> |                   | 0.386   |
| Standard Error          |                   | 0.33    |
| F                       |                   | 3.78    |

\*Significant at 5% (t = 2.015); \*\*10% (t = 1.476); critical F = 3.17.

The positive and significant coefficient for education (0.465) implies that education enhances respondents' use of improved practices, in this case by 46.5%. This result corroborates that of Tshiunza *et al.*, (2001). Household size (0.137) was marginally significant at the 10% probability level and positively related to use of improved farming practices. Deji *et al.*, (1999) obtained a positive relationship between both variables. Having large households may motivate the farmer to increase production, through use of improved technologies, to cater for the family and to supplement income from non-farm sources.

The explanatory variables accounted for close to 39% variability in respondents adoption of improved Fadama - related practices as indicated by the adjusted R<sup>2</sup> value (0.386), while

the computed F value (3.78) shows that the influence of the explanatory variables on adoption was significant at the 10% level (critical F statistic was 3.17).

## Conclusion and Recommendations

Respondents' response to improved farm practices recommended under the Fadama Project Scheme was generally low, and their adoption level was significantly affected by such personal characteristics as gender, educational attainment and household size. An important implication of this result is that farmers personal characteristics needs to be taken into consideration when planning developmental programmes for them.

Major limitations to adoption of the recommended farm practices were capital-related (i.e. inadequate funds and high pump cost) and lack of agro-chemicals. In view of these, the following are recommended:

Extension effort should target male Fadama farmers to boost their adoption rate in addition to female farmers who were presently more significantly disposed to adoption of recommended Fadama farming practices.

Education level of farmers should be improved upon through adult literacy classes and/or extension education. The essence is to enhance their ability to understand, use and adapt improved practices.

Farmers should be advised to organize themselves into cooperatives to pool their financial resource and solve the problem of inadequate capital required to purchase inputs. Joint purchase of water pumps should equally be encouraged.

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