Global Scientific JOURNALS

GSJ: Volume 8, Issue 9, September 2020, Online: ISSN 2320-9186
www.globalscientificjournal.com

FARMERS' CHARACTERISTICS AND ADOPTION OF RECOMMENDED PRACTICES BY DRY SEASON FARMERS IN MANGU L.G.A OF PLATEAU STATE

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JULY, 2020

ABSTRACT

The study examined dry season (Fadama) Irrigation farmers in Mangu L.G.A of Plateau State with emphasis on the relationship between farmers' characteristics and adoption of recommended practices and technologies. Analysis of data obtained from a random sample of 80 respondents revealed that Fadama farming was dominated by males (62.5%) most of whom were married (77.5%) and between the ages of 25 – 45 with reasonable level of education. Genders, educational and household characteristics of the respondents were significant determinants of respondents' adoption of Irrigation – related technologies. High cost of water pumps and spare parts, agro-chemicals such as fertilizers and insufficient funding were the major challenges to respondents' adoption of recommended technologies. Training and retraining of dry season farmers and organization of the farmers into cooperatives were recommended among other recommendations.

INTRODUCTION

Background of the Study

Agricultural development is driven by improved management practices at all levels. The term ''improved practices'' at farmers' level has been used to refer to farmers adoption of new technologies coming from various farm innovations incubation centres. Improved agricultural

practices and technologies are new ideas, methods, techniques etc which provide a means of achieving sustained increase in agricultural productivity (Idachaba, 2009).Use of improved crop production practices produce crop varieties which are better in yield, quality, adaptation to climatic conditions, nutritional content, harvesting qualities and competitiveness (Contado, 1997). This assertion has been corroborated by Akpan, 2009) who maintained that the use of improved practices by farmers entails creating an effective and efficient agricultural systems that supply food through the use of natural resources in a sustainable manner.

Food production in Nigeria since the mid 1960s failed to respond adequately to increases in food demands. According to Umoh and Adegeye, (2000a) the increasing demand for food due to increased population growth has resulted in the increased demand for land for agricultural production. In addition, Kolawale, (2001) reported that the increase in demand for food made the federal government to establish the River Basins Development Authority (RBDA) in 1975 in order to harness the country's water resources and enhance crop cultivation all through the year. Furthermore the federal government in order to fully harness and utilize the ground water potentials that abound in the country established the National Fadama Development Project (NFDP) in the year 1993. The project which was under the Agricultural Development Programmes (ADP^S) targeted small holder farmers and its major objective was to empower this group of farmers by constructing tube wells, wash bores, distribution of power pumps as well as the introduction and adoption of improved Irrigation practices and technologies (Ingawa, 1998).

Dry season can be described as a period between the end of one wet season and the beginning of another wet season. However, this period varies from place to place due largely to vagaries of climate. In the Guinea Savanna for instance it usually starts from October to April and any farming activity carried out within this period is referred to as Dry season farming and the Agricultural Entrepreneurs involved are called Dry season farmers. These groups of farmers make use of pumps, channels, canals and generators to draw water and apply it to the crops (irrigation) depending on the system or method in use.

The operation of the Fadama Development Project (FDP) began in Plateau State in the year 1996 with its defined objectives of improving small scale irrigation management, organization of Fadama users Association (FUA) and training of farmers in the use of improved irrigation practices and technologies in the production of crops such as maize, rice, wheat, Irish potatoes, cocoyam, sweet potatoes and variety of vegetables. Adoption and use of improved crop production practices and technologies is critical to the success of the Fadama scheme. This is in

line with opinion of Nonyelu, (1997) who emphasized that dry season farming practices must be improved if the objectives of increased food production is to be attained.

Mangu L.G.A is situated in the central part of Plateau State. It covers an area of about 1653km^2 with a population of 294,931 based on the 2006 National Census figures. The local government shares common boundaries with Pankshin LGA to the East, Barkin Ladi LGA to the West, Jos – East LGA and Bauchi State to the North while Bokkos and Quan-pan LGAs are to the South. (NPC, 2006) Topographically Mangu is a table land (Plateau) with plains, rocks and thick with trees and other vegetation. Agriculture is the major occupation of the people. The area has a semi – temperate climate coupled with the optimal rainfall usually recorded in the area favour the cultivation of a variety of crops such as maize, Irish potato, sweet potato, cowpeas, sugarcane and cocoyam while crops like cassava, yam and Guinea corn are grown at the Gindiri axis. Some of the crops grown during the dry season are Irish potato, maize, cocoyam, carrot, lettuce, cabbage, cucumber and a host of other temperate vegetables (PADP, 2005). The local government area is dominated by the Mwaghavul people and has two other ethnic groups namely Pyem and Jipal found in Gindiri and Japal areas of the LGA. In addition, there are pockets of all the major tribes in the State and the nation living together peacefully in the area and engaged in agricultural and other occupations or trades. (Wikipedia, 2009).

Statement of the Problem

A myriad of problems are known to plague the adoption of recommended practices by dry season farmers in the study area. The problem varies from place to place and each LGA has its peculiar problem. However, the dry season farmers in Mangu LGA are facing a lot of problems which affect their crop production during the dry season. These problems include shortage of source of water supply for irrigation purposes, inadequate finance, and poor technical knowhow on the part of the farmers, improper use of irrigation methods, salt accumulation etc (FAO, 2005a). It is in the light of the above that this study intends to examine the rate of adoption of recommended practices by farmers in the study area with a view to finding out how extension through innovative measures and incentives can ameliorate the problems facing the farmers with a view to enhance and increase their crop production activities.

Objectives of the Study

The main objective of this study was to examine the impact of adoption of recommended practices by Dry-Season farmers in Mangu L.G.A of Plateau State. The specific objectives are:

1. To identify the personal characteristics of dry season farmers in the study area

2. To assess the impact of the adoption of improved recommended practice/ technologies by dry season farmers on their crop production activities.

3. To determine the problems or limitations militating against the farmers' adoption and use of these improved recommended practices.

4. To determine how farmers adoption of these recommended practices are influenced by their personal characteristics.

Research Questions

The following research questions guided the study:

1. How did the personal characteristics of dry season farmers influence their production ?

2. What impact does the adoption of the improved recommended practices / technologies by dry season farmers have on their crop production activities?

3. What are the problems or limitations militating against the adoption and use of these improved recommended practices?

4. How can farmers' adoption of these improved recommended practices be influenced by their personal characteristics?

Hypotheses

The study will address the null hypothesis that personal characteristics of farmers are not significant determinants of their adoption of recommended practices and technologies.

Methodology

The research design used in this study was the opinion survey. An opinion survey research is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative sample of the entire group.The population of the study was made up of 25 dry season farmers each from four of the eight districts in the local government area these are Mangu, Panyam, Langai and Gindiri districts, thus making a finite population of 100 randomly selected across the four districts of local government area.

The instrument used for collection of data from the respondents was a structured questionnaire designed by the researchers which consist of four sections A –D. Section A sought for information on the personal characteristics of the respondents while sections B - D sought for responses that addressed the research questions and hypotheses . The data collection instrument (questionnaire) was first evaluated for validity through experts consultation while its reliability was tested using the test - retest method. The reliability coefficient (r = o. 91) confirmed the instrument reliability. The dry season farmers in Mangu Local Government Area are found in all

the eight (8) districts of the L.G.A but larger concentrations are found in Mangu, Langai, Gindiri and Panyam. Proportional random sampling was used in the selection of 25 dry season farmers each who are members of Fadama Users Association (FUA) were randomly sampled giving a total of 86 respondents (Table 1). Fourteen (14) copies of the retrieved questionnaires were not filled correctly hence rejected in the final data analysis. The sampling protocol adopted are presented on Table 1 below:-

Table 1: Sampling protocol

District	FUA Members	Sample
Mangu	25	23
Langai	25	20
Gindiri	25	21
Panyam	25	22
Total	100	86

The techniques employed for data analysis was multivariate regression analysis used to isolate the effect of farmers' personal characteristics on adoption of improved recommended practices. The explicit form is specified as y = a+b1,x1+b2x2+b3x3+b4x4+b5x5.
Where:
Y = Dependent variable (Number of improved practices used by respondents)
X1 = sex (Dummy Male = 1 Female = 0)
X2 = Age (years)
X3 = Education (years)
X4 = Marital status (Dummy married = 1 single = 0)
X5 = Household size (No of household) members eating from the same cooking pot)
a = Intercept.
To determine the best fit model four functional forms were evaluated based on the following criteria:
Magnitude of the adjusted $R^{2.}$ Significance of the estimated parameters standard error of estimates.
Based on those criteria the linear function was chosen as the lead equation.
To test for the significance of the parameters, the t-test statistics was used while the f-test was used to evaluate the significance of the adjusted R^2 .

Results and Discussion

Research question 1

How can farmers' personal characteristics influence their production?

Table 2: Farmers' Personal Characteristics

Variables	Freq. n=80	%
Sex		
Male	50	62.5
Female	30	37.5
Marital status		
Married	62	77.5
Single	18	22.5
Age		
18 -25	18	22.5
25 – 45	62	77.5
Education		
No formal education	+	_
Below primary six	10	12.5
Completed primary educ.	22	27.5
SSCE/Grade 11	36	45
Tertiary Education	12	15
Household Size		
2-4	12	15
5-8	41	51.3
9-12	22	27.5
Above 12	5	6.2

Source: Field Survey2019

Table 2 above shows the male farmers constitute the larger group among the dry season farmers in Mangu L.G.A. which implies that they are the major producers of Irish potato and vegetables. This is in tandem with the findings of Umoh and Adegeye (2000b) who reported that males constitute almost 70% of dry season farmers in developing countries. Similarly, most of the respondents were married (77.5%) with a modal household size of 5-8 members representing 51.3% which suggests that they are responsible and cater for their families. In the same vein, majority of the respondents are between 25 - 45 representing 77.5% which indicates that they are relatively young, active and productive. This is in line with the opinion of Abbas (as cited in

Alabura, 2015) who opined that the youths are the most mobilizable social group consisting about 60% of the national population of most developing countries…

The result also revealed that majority of the respondents (45%) have completed secondary school education which is an indication that the farmers are not only young but can read and write as it is very difficult to train illiterate farmers. This finding has been corroborated by Ironkwe and Ajayi, (2007) who conducted a study on the impact of extension services on livestock production in Rivers state and reported that livestock production being handled by non- professionals with little or no education are always suspicious of innovations and find it hard to accept and adopt new technologies a situation which led to the poor development of the livestock industry in Nigeria.

Research question 2

What impact does the adoption of improved recommended practices/technologies by dry season farmers have on their crop production activities?

Table 3: Impact of Improved Recommended Practices/Technologies Adopted by Dry Season Farmers.

Dry season farmers		
Practices	Freq(n=80)	%
Crop spacing	80	100
Wash bores	78	97.5
Harvesting methods	58	72.5
Fertilizers	42	52.5
Water pumps	32	40.5
Tube wells	20	25.0
Improved varieties	18	22.5

Multiple responses hence sample size exceeds 80

Source: Field survey, 2019

According to table 3 above recommended crop spacing (100%), Wash bore 97.5% and harvesting methods 75.5%. these show the three practices were widely adopted by the

respondents. This result is in tandem with that of FAO, (2005b) which reported that Fadama farming activities carried out by trained farmers with optimal level of education that allows them to accept new ideas and technologies from extension workers usually record high yields.

However, Erhabor (2000) lamented that farmers in Nigeria generally record low yields due largely to low purchasing power, low level of development in terms of education and training and are not enlightened on the importance of forming cooperative societies to help them access agricultural finance, in line with the findings and the above assertion, wash bores help to keep the harvested crops clean and attractive to buyers, correct crop spacing help to increase crop yield as it lowers overcrowding and competition for plant nutrients while proper harvesting methods ensures multiple harvest.. Fertilizers were moderately used by about half of the farmers (52.5%). However, use of water pumps and improved varieties were adopted by only 40% and 22.5% of the respondents respectively. The reasons for these low adoption rates are presented in table 4 below:

Research question 3:

What are the limitations or problems militating against the adoption and use of these improved recommended practices?

Table 4: Limitations to Farmers use of Fadama-related Technologies.

Limitations	Freq	%
Low capital	80	100
High cost of irrigation equipment/spare parts	70	87.5
Supply of fertilizer issues	62	80.0
None or little provision of improved crop varieties	20	25.0

Source: Field Survey, 2019

The items on the table indicated that the major limitations to farmers' adoption of improved recommended practices include inadequate capital, high cost of irrigation equipment/spare parts, poor access to fertilizer supply. None or little provision of improved crop

varieties which though not considered as a major limitation but was rated very low which implies that the farmers prefer their local varieties to the improved varieties.

Hypotheses

There is no significant difference between personal characteristics of farmers and their adoption of improved recommended practices.

Table 5: Multivariate Regression of Personal Characteristics of Farmers Influencing Adoption of Improved Recommended Practices.

Variables	Standardized beta	E-value
Education	0.465	2.979
Age	- 0.147	0.013
Household size	0.137	1.8331
Marital status	- 0.062	2.115
Intercept	1.865	1.299
Adjusted R^2	0.386	1.299
Standard Error	0.33	
F	3.78	

Significant at 5% (t = 2.015) 10% (t = 1.476), critical f =3.17

Source: Field Survey, 2019

In the table 5 above it has been revealed that sex, education and household size were significant determinants of dry season farmers' adoption of recommended irrigation-related practices. Sex was negatively signed which means that the female farmers were more positively disposed to the use of the improved practices. The result also revealed that despite the fact that there are more male farmers to females involved in irrigation farming in the study areas as shown in table 2, the female farmers are more receptive and adaptive to change agent's advice and ideas. This finding is similar to that of World Bank, (2010) who found out that farmers need to acquire skills to enable them undertake improved agricultural operations and this can only be made possible through making available to them timely information, improved practices in an easily understandable form suited to their level of literacy and awareness….

The positive and significant coefficient for education (0.465) implies that quality education enhances to a great extent farmers use of improved recommended practices and in this case by 46.5%. household size (0.137) was marginally significant 10% probability level and positively related to adoption of improved farming practices. This finding is in tandem with the findings of Deji, (1999) who conducted a similar study and obtained a positive relationship between both variables that keeping large households may ginger the farmer to increase production through the use of improved practices and technologies. Furthermore, the explanatory variables was close to 39% variability in farmers' adoption of improved irrigation practices as indicated by the adjusted R^2 value of (0.386) while the computed F value of (3.78) showed that the influence of the explanatory variables on adoption was significant at the 10% level (critical F statistics was 3.17).

Conclusion

From the result of the analysis it was observed that the influence of extension on dry season farming in Mangu L.G.A was not only affected by demographic characteristics of the farmers but also by the frequency of extension visits to the farmers and their continues adoption and usage of new ideas and technologies. However, dry season farmers' response to improved farming practices recommended under the Fadama irrigation scheme was generally high among the female farmers and their adoption level was significantly affected by such personal characteristics as gender, educational status and household size. One important implication of this finding is that farmers' personal characteristics need to be taken into consideration when planning any agricultural programme.

Recommendations

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

1. Extension should build the capacity of dry season farmers through adult literacy classes, agricultural training and retraining with a view to enhancing their ability to understand, adopt and use improved farm practices.
2. Extension services should focus more on the male farmers to make them more receptive to farm innovations.
3. Female dry season farmers should be encouraged to expand their farm holdings in order to increase their income levels.
4. The dry season farmers in the study area should be organized to form farmers' cooperative societies so as to solve the problem of funding to procure water pumps, spare parts etc.
5. The Panyam fish farm with its vast water resources should be developed into a multi-purpose project to cover fisheries, tourism and irrigation.

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