Adoption of Extension Packages Provided by the Nasarawa State Agricultural Development Programme (NADP)

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Abstract
The study examined the farmer's adoption of extension packages provided by the Nasarawa Agricultural Development Programme (NADP) in Nasarawa State. Four objectives were formulated to guide the study. The sampling technique employed in this study was purposive and random sampling. Fifteen farmers were randomly selected from each of the six agro-ecological districts in Lafia LGA under the NADP; this gave a total number of 90 respondents. Structured questionnaires were used for data collection, and were administered to the selected respondents from the selected districts. Data obtained were analysed using descriptive statistics. The study revealed that majority of the respondents were males, educated with farming experience of more than 21 years, and with household size of 7 persons, cultivating less than 3 ha of farm. Majority of the farmers received extension information from farmers' cooperatives societies, followed by farmers meeting, and visit by the extension agents. Extension technologies adopted by the respondents include those related to maize, rice, and cowpea productions respectively. The farmers also acquired technologies in the use of Herbicides, Pesticides and Fertilizer. The respondents adopted the technologies because they brought about high yield, early maturity, good quality and market value characteristics of the crops. It is, thus, recommended that agricultural information should be disseminated to the farmers through radio and television in order to supplement extension visits.

Keywords: Farmers, Technology Adoption, Extension Packages, Nasarawa Agricultural Development Project (NADP)

Introduction
The agricultural sector has over the years encountered a number of problems including inadequate trained extension workers at all levels, lack of new innovations, poor infrastructure facilities (such as road networks, housing, motor vehicles and other means of transport), inconsistent and unstable government policy on extension service delivery, poor input supply like seeds and seedlings, inadequate funding, de-motivated workforce and crude implements still in use by most farmers. Efficacy of any agricultural extension is judged by the level of mass adoption and spread of modern and scientific practices among farmers in the rural neighbourhood (Onweremadu and Matthews-Njoku, 2007).

To accelerate agricultural development, our farmers must adopt the increased use of improved inputs through the combined efforts of the inputs agencies and functional extension service delivery system. The goal of extension is to ensure that increased agricultural productivity is achieved by stimulating farmers to use modern and scientific production technologies developed through research (Ukaejiofo and Gao, 2013). The numerous problems associated with the agricultural development projects cannot be over-emphasized, but government has to support it through proper funding to propel active and effective extension as well as provision

of well managed input subsidy system to help rural farmers increase production and which will eventually lead to rural development. Farmers on their part must strive to be educated at least through formal method, which will encourage them to be proactive through modern farming techniques. Particularly that in the time past several technologies have been deployed by research to farmer and these have impacted positively on production and incomes (Idoko and Sabo, 2014).

For farmers to use or adopt the findings of research institutes, there are number of factors that influence the extent of adoption of improved practices such as characteristics or attributes of technology; the adopters or clientele, which is the object of change; the change agent (extension worker, professional, etc.); and the socio-economic, biological, and physical environment in which the technology adoption takes place. Farmers have been seen as major constraint in development process; adoption for them is viewed as a mental process which an individual passes through in deciding to use an innovation (Cruz 1987). For any innovation or technology to be adopted, Van Den Ban and Hawkins (1999) opined that it must pass through a process of adoption, which involves awareness, interest, evaluation, trial and adoption. The success of the adoption process depends very much on effective training by extension agents. Effectiveness of training is determined by the methods and techniques used.

Objectives of the Study

The broad objective of the study is to assess farmers' adoption of extension packages provided by the Nasarawa State Agricultural Development Programme (NADP). The specific objectives are to:

1- Determine the socio-economic characteristics of the farmers in the study area.
2- Find out the sources of extension packages/information for adoption by farmers.
3- Identify the extension packages (technologies) adopted by the farmers in the study area.
4- Identify the reasons for adopting extension packages by farmers in the study area.

Methodology

The study location was the Lafia Local Government Area (L.G.A) which is located in the middle belt region of Nigeria. It shares boundaries with Nasarawa Eggon L.G.A to the West, Obi local government area to the South, Doma local government area to the North and Quanpan local government area of Plateau state to the East. Lafia town is the capital of Nasarawa state. Lafia LGA is located at Latitude 8^{o} N and Longitude 8^{o} E. The rainy season of the area occurs from April to September, while dry periods occur from October to March. A maximum rainfall of about 1500mm to 2000mm per annum is observable in the local government. The temperature ranges sometimes between 25^{o} C and 30^{o} C daily (NADP, 2007). The local government has vast lands for farming, thus the inhabitants are predominantly farmers hence massive agricultural activities are being carried out. The grasslands were also utilized by the Fulani (pastoral) for grazing animals such as goats, sheep and cattle; which are located in some districts. Further, cereals, roots and tuber crops, legumes among others were obtained as part of agricultural produce in the area. The entire study area consists of six (6) districts, which are Lafia central, Lafia west, Lafia east, Lafia north, Lafia Akunza, and Agyaragun Tofa districts, (NADP, 2007).

The sampling technique employed in this study was purposive and random sampling. The entire six districts were purposively selected on the basis of many agricultural activities and extension service taking placed in the areas. Then 15 farmers were randomly selected from each district, this give a total number of 90 respondents. Data were collected using structured

questionnaires which were distributed to the farmers in the study area. The data collected from the farmers were on socio-economic characteristics and services rendered. Simple descriptive statistics such as frequency distribution, percentages and means were used for the analysis of the data obtained from the respondents

Results and Discussion

Socio-economic Characteristics of Respondents

The socio-economic characteristics of the respondents studied include; age, gender, educational level, household sizes, years of farming experience, other occupation in addition to farming as well as farm sizes. Ajala (1992) reported that age, sex, education, herd size, nature of farming, organizational participation, experience and management system were positively related to adoption of Extension packages.

Age is among the important demographic variables that affect farmers' rate of adoption. The results in Table 1 indicated that majority (67.77%) of the respondents in the study area falls between the ages of 30-49 years, which means they were in their economically active ages, and as such will respond positively to any intervention aimed at improving their productive capacity. The mean age of the respondents is 42.7 years. This agreed with the findings of Ukaejiofo and Gao (2013) who reported in their study that 67.5% of the respondents were between the ages of 31 – 50, implying that the respondents were youthful and active, but matured.

Table 1 revealed that farming activities in the study area were dominated by males as the management system is strenuous. The finding shows a magnificent improvement in women participation recently with respect to the study area. This is also in line with the findings of Miller (1997) who reported that most of agricultural activities are performed by males, females were not allowed to go in search for food because of cultural and religion believes.

In Table 1 can be seen that all most all the respondents did acquire one form of education or the other, and which plays a vital role in decision making with regards to their primary occupation. Ukaejiofo and Gao (2013) supported this finding as they reported that most of their respondents had one form of education or the other. Education is expected to enhance adoption of farming techniques and it is a measure for judging the quality of human resources and development stage of a society. Majority (41.11%) of the respondents have family's size of between 1-5 persons, followed by 38.89% of the farmers have a household size of 6-10. The mean household size of the respondents was found to be 7 persons. Idoko and Sabo (2014) reported a fairly large (6-10) household size in their study. This ensures readily available household labour with reduced labour cost required for groundnut production (Ndanitsa and Umar, 2007).

Table 1 also shows that majority of the farmers, constituting 70%, has farm size of between 0.5-3 hectares. This implies that the respondents operated on small scale farming, with mean farm size of the respondents is 2.3 hectares; this may be attributed to their mode of land acquisition. This was supported by Agwu, Ekwueme and Anyanwu (2008) who reported that a greater proportion (66.6%) of farmers cultivated between 1- 4 hectares of land. The mean farm size was 1.5 hectares. This implies that the study area comprises of small-scale farmers. This also agrees with Olayide (1992) who reported that Nigerian farmers are small-scale farmers that cultivated small areas of land. Rabinowicz (2002) reported that small – scale farmers do not have adequate capital to expand their production level to take advantage of profitable packages of technologies to boost productivity.

Table 1 reveals that majority (64.5%) of the respondents have above 10 years farming experience. It is possible to observe an improvement in a farmer's production activities based on experience (Bivan, 1995). This implies that majority of the respondents in the study area have reasonable experienced on farming. Similarly, majority (60.00%) of the respondents cultivate maize, followed by (34.44%) who grown yam, and those that cultivate rice constituted 33.33%, while 18.89%, 15.56% and 13.33% of the respondents cultivates groundnut, cassava and sorghum respectively. It is a clear indication that most of the respondents practiced mixed cropping.

Sources of Extension Information for Adoption by the Respondents

Table 2 shows the common channels through which information was were made to reach the farmers in Lafiya Local Government Area of Nasarawa state. Majority (24.56%) of the farmers received information through farmer's cooperatives societies, while 18.71% indicated that farmers meeting are the sources of their information, 17.54% of the respondents disclosed that visits by the extension staff were the most readily available source of agricultural information. The study further revealed that 12.87% sourced information from neighbour at home/office. Whereas, 7.60% received information through newspaper, 5.85% used radio and television as sources of their information, while 8.89% of the respondents indicated that they did not have access to extension message. This shows that the level of awareness of the respondents can lead to adoption of new technology.

Minot *et al.* (2006) reported that information is relevant in adoption particularly in designing geographically targeted programmes for addressing disparities. Information sources are stimulants for adoption (Rogers, 1995), implying that there were hopes for greater adoption in this era of information and communication technology (Spore, 2006). A large number of farmers got information from other farmers, 39% got information from the agricultural extension service of Agricultural Development Programme, 4% of the respondents received information from the Ministry of Agriculture, while 8% were informed through the NGOs. (Idoko and Sabo, 2014)

Table 1: Socio-economic Characteristics of Respondents

Age group	Frequency	Percentage	X
20-29	7	7.78	**42.7years**
30-39	30	33.33	
40-49	31	34.44	
50-59	16	17.78	
60-69	6	6.67	
Sex			
Male	73	81.11	
Female	17	18.89	
Level of Education			
Non-formal Education	17	18.89	
Primary	11	12.22	
Secondary	32	35.56	
Adult education	10	11.11	
Tertiary	20	22.22	
Household size			
1-5	37	41.11	**7 persons**
6-10	35	38.89	
11-15	12	13.33	
16-20	4	4.45	

21-25	2	2.22	
Farm size (ha)			
0.5-1.5	43	47.78	**2.3 hectares**
2-3	29	32.22	
4-5	12	13.33	
6-7	6	6.67	
Years of Farming Experience			
1-10	32	35.55	**15.6 years**
11-20	33	36.67	
21-30	17	18.89	
31-40	8	8.89	
Crops Cultivated			
Maize	54	60.00	
Yam	31	34.44	
Rice	30	33.33	
Cowpea	21	23.33	
Cassava	14	15.56	
Groundnut	17	18.89	
Sorghum	12	13.33	

Table 2: Distribution of Respondents Based on Sources of Information

Sources	Frequency	Percentage
Extension agent	30	17.54
Neighbour at home/office	22	12.87
Farmers meeting	32	18.71
Cooperatives societies	42	24.56
Radio and television	10	05.85
Newspapers	13	07.60
No awareness	22	12.87
Total	**171**	**100**

Extension Packages Adopted by the Respondents.

1. Maize Technologies Adopted by the Respondents.

Table 3 shows the various Maize Technology adopted by the respondents

Table 3: Distribution of the Respondents Based on Maize Technologies Adopted

Varieties	Frequency	Percentage
QPM	23	30.66
ACR97	13	17.33
SWAN YELLOW	7	09.33
DMSR	32	42.66
Total	**75**	**100**

Data in Table 3 revealed that majority (42.66%) of the respondents adopted DMSR maize technology, followed by (30.66%) who adopted the QPM maize variety. While those that adopted the ACR97 and SWAN YELLOW maize technologies constituted 17.33% and 9.33% respectively. This shows that the maize technology was adopted the by majority of the respondents

2. Rice Technologies Adopted by the Respondents.

Table 4 shows the various varieties of rice adopted by the respondents. The result in table 4 shows that majority (25.00%) of the respondents adopted the Nerica rice 1; while 19.44% adopted FARO 44CP rice technologies and 13.88% adopted Nerica rice 4. The study further revealed those that adopted FARO52 WITHER4, Nerica rice 2, Nerica rice 5 and Nerica rice 3 technologies constituted 12.50%, 11.12%, 9.73% and 8.33% respectively. This implies that majority of the total respondents adopted the improved rice varieties.

Table 4: Distribution of Respondents Based on Rice Technologies Adopted

Varieties	Frequency	Percentage
FARO 44CP	14	19.44
FARO52 WITHER4	9	12.50
Nerica rice 1	18	25.00
Nerica rice 2	8	11.12
Nerica rice 3	6	08.33
Nerica rice 4	10	13.88
Nerica rice 5	7	09.73
Total	**72**	**100**

3. Cowpea Technologies Adopted by the Respondents

Table 5 shows the cowpea variety adopted by the respondents.

Table 5: Distribution of Respondents Based on Cowpea Technologies Adopted

Varieties	Frequency	Percentage
ITI 98	26	28.89
Total	**26**	**28.89**

The results in Table 5 show that only 28.89% of the total respondents adopted the cowpea technology. This may be due to the respondent's preference to other technologies.

4. Herbicides Technologies Adopted by the Respondents

The type of technology used by farmers, determined the level of their productivity and improvements on farm practices. Table 6 shows the various types of herbicides technology used by the respondents.

Table 6: Distribution of Respondents Based on the Technologies of Herbicide Adopted

Herbicides	Frequency	Percentage
ROUNDUP	21	19.44
DELSATE	18	16.66
SAROSATE	27	25.00
HERBICA	19	17.59
ATRAZ LIQUID	5	04.64
ATRAZ POWDER	2	01.85
DIUTOP	16	14.82
Total	**108**	**100**

In Table 6, majority (25.00%) of the respondents adopted the herbicide technology of SAROSATE, followed by (19.44%) adopted ROUNDUP, 17.59% adopted HERBICA

technology and 16.66% adopted the DELSATE technology. While those that adopted the DIUTOP, ATRAZ LIQUID and ATRAZ POWDER technologies constituted 14.82%, 4.64% and 1.85% respectively. This implies that weed constitute among the problems been faced by the respondents.

5. Pesticide Technologies Adopted by the Respondents

The results in table 7 show that majority (43.14%) of the respondents adopted the SNIPER technology of pesticides, 15.69% adopted the ATTACK and APRONSATE respectively.

Table 7: Distribution of Respondents Based on the Technologies of Pesticide Adopted

Pesticides	Frequency	Percentage
DELTRINE	7	06.86
SNIPER	44	43.14
KARATE	6	05.88
ATTACK	16	15.69
POLYTRINE	7	06.86
APRONSATE	16	15.69
PHOSOXIN	6	05.88
Total	**102**	**100**

On the other hand, 6.86% adopted the DELTRINE and POLYTRINE, 5.88% KARATE and PHOXSOXIN technologies. This implies that most of the respondents adopted more than one technology in order to control pest infections.

6. Fertilizer Technologies Adopted by the Respondents

Table 8: Distribution of Respondents Based on the Technologies of Fertilizer Adopted.

Fertilizers	Frequency	Percentage
NPK	48	45.28
UREA	40	37.74
SSP	18	16.98
Total	**106**	**100**

In Table 8, majority (45.28%) of the respondents adopted the NPK fertilizer technology, followed by (37.74%) of the respondents who adopted the UREA technology and the remaining 16.98% of the respondents adopted the SSP fertilizer technology.

Reasons for Adoption of Technologies and Farming Practices by the Respondents.

The study further reveals the reasons why farmers adopted a particular technology or the other. Farmers can only adopt a technology that will help in solving their production problems.

Table 9: Distribution of Respondents Based on Reasons for Adoption

Reasons	Frequency	Percentage
High yield	60	30.00
Early maturity	39	19.50
Disease resistant	26	13.00
Market value	29	14.50
Simplicity	28	14.00
Observable	18	10.00
Total	**200**	**100**

Table 9 shows that majority (30%) of the respondents adopted a technology because of its high yield, followed by 19.5% who use recommended practices for it early maturity, while 14.5% adopted a technology that has good quality and market value. The study further showed that 14% of the farmers used a technology for its simplicity in application, while 13% and 10% used a particular technology because of its disease resistance and it degree of observable.

Conclusion

The study has shown that in spite of the level of the success recorded by the NADP, there were problems that militate against the effective adoption of extension packages which include but not limited to inadequate number of extension staff, and lack of incentives for the extension agents.

Recommendation

Based on the findings in this study, it is hereby recommended that more and competent extension workers should be recruited to reduce the number of farmers per extension agent. In the same vein there should be provisions of more input supply such as chemical, fertilizers, herbicides, pesticides in the local area to reduce the purchase of inputs from open market at exorbitant price. Also it is recommended that farmers and all stakeholders in Agriculture in its value chains should be encouraged to form more cooperative societies and rural farmers' associations so as to participate in such cooperatives to ease the problem of input purchase, loan acquisition, creation of awareness and other benefits derivable from the organisation. Finally, this study recommends that farmers should be involved in problem identification and technology generation for easy adoption of new technologies in Agricultural production.

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