
EFFECTIVENESS OF SMALL PLOT ADOPTION TECHNOLOGY IN AGRICULTURAL DEVELOPMENT PROGRAMME, BIRNIN KUDU LOCAL GOVERNMENT, JIGAWA STATE, NIGERIA

*ALI ABDU GIGINYU¹, BALA ABDU², HAYATU MISBAHU ABDULLAHI³ AND DANLADI BALA⁴

¹ Faculty of Education, Federal University Dutse, Email: aliabdullahiginyu@yahoo.com

² State Universal Basic Education Board, Jigawa State Email: abdubala460@gmail.com

³ Department of Welding and Fabrication Engineering, Jigawa State Polytechnics Dutse
Email: mabdullahi8003@gmail.com

⁴ Nnamdi Azikiwe University, Anambra State, Nigeria, E-mail: danladibala2077@gmail.com

ABSTRACT

The study investigated the Effectiveness of Small Plot Adoption Techniques (SPAT) in Agricultural Development Programmes in Birnin Kudu Local Government, Jigawa State, Nigeria. The objectives of this study were to; identify the scope of small plot adoption technology programme in Birnin Kudu Local Government Area, determine effectiveness of the small pilot adoption technology on farmers' productivity in Birnin Kudu Local Government Area and to examine the challenge facing small plot adoption technology programme in Birnin Kudu Local Government Area. The sample for this study comprised seventy seven (77) farmers and ten (10) extension agents. A stratified random sampling technique was used in selecting the sample from each category. The method of analysis findings of the study small plot adoption technology was found to be effective in terms of irrigation practice, feed formulation, livestock management, and storage technique and marketing. Small Plot Technology improves farmers' income, accessibility of agricultural credit facility, accessibility of pest and herbicides respectively. The challenges facing SPAT in Birnin Kudu were inadequate number of extension agent's lack of technical knowhow by extension workers to introduce new packages to farmers. Based on findings it is recommended that SPAT should be more encouraged and made more popular by all extension services to stimulate adoption of improved technologies by farmers in Birnin Kudu Local Government Area, Jigawa State, Nigeria.

Key word: Adoption, Agricultural Development, Demonstration, Effectiveness, small plot adoption technology and training.

INTRODUCTION

Nigerian is blessed with abundant human and natural resources which are enough to develop the country and make the people live a comfortable life. In spite of the blessings, majority of people are still living in abject poverty, Awoyemi (2018) stated that Nigeria is now the country with the highest number of extreme poor, with 87 million Nigerians in abject poverty, but the small scale farmers who contribute majorly in the agriculture sector are noted for the traditional farming system of slash and burn clearance system use of manual labour and simple tools and increasing out modernization. Nwuba, (1987) noted that the Nigeria population is increasing and more mouth are to feed. But ironically more and more people are moving away from the village soil resulting in farming being left to the elders and weak people who can obviously produce very little. The only way to increase the farm power and restore prestige to farm work as well as to increase agricultural products is to mechanize agricultural practice. Before discovery of oil agriculture had powered the economy of the country.

Nigerian's great agricultural potential still remains untapped and the apparent efforts to place the sector on sound bearing various attempts have been made to address the challenges facing the sector by the federal government, among the approaches used to far includes, introduction of National Accelerated Food Production Programme in 1972, Operation Feed the Nation in 1980 and the National Agricultural Land Development Authority in 1991, these programmes were aimed at developing agricultural sector for increased food production. But the challenges have persisted because the country is still living in an age of outmoded value and primitive practices where in general the skills handed down to our farmers from generation to generation still represent the sum total of knowledge and experience which bring to bear on our primary industry of agriculture (NALDA, 1999) The concept of agricultural development is the degree to which farmers adopt farm technologies to increase production and income Ogbimi (1997) suggested that a critical factor in achieving sustainable development is in establishing an effective farmer's youth center extension programme. Adoption of innovation refers to the decision to apply an innovation and continue to use it (Roger & Shoemaker, 1971). Hodder, (1973) posited that credit is the key factor in the country's agricultural development. On improved seeds fertilizer and better irrigation facilities a cultivator is unlikely to use these to increase his total production unless the market for this increased production is seen to be there and is accessible. The narrowness of Nigerian market constitutes a formidable obstacle to small scale farmer's adoption of modern agricultural technologies that would increase their agricultural productivity (Hodder, 1973). An important component of the innovation decision making process that has received little research attention is discontinued adoption behaviour which is the decision to reject an innovation after having adopted it Roger, (1962) retorted two types of discontinuance behaviours which are rejecting an idea in order to adopt a better one that supersedes it or discontentment discontinuance behaviour where there is a decision reject an idea as a result of dissatisfaction with its performance. Finally determinant of adoption can be summarized into three (3) based on a serve of hypothesis. These include characteristics of the farmers, household and region. First farmers decide whether or not to adopt a high technology package or components of that package, secondly farmers decide how much to adopt and lastly they decide the intensity of use.

Jigawa State Agricultural, Rural Development Authority (JARDA) was established in 1992 together with Jigawa State Agricultural Supply Company (JASCO), since its creation JARDA has been engaged in the identification, development and dissemination of sample and cost effective agricultural technologies to Jigawa state farmers, major project and programme implemented by JARDA includes National Fadama Development Programme (NFDP) mass

production of industrial sugarcane, cash crops production, orchard establishment programme, National Agricultural Technology Support Programme (NATSP). In addition to the routine, Agricultural Extension Services to Jigawa state farmers, JARDA also implement special programme which is peculiar to training and visit (T&V) in collaboration with the expert from the people's Republic of China, micro credit scheme for agriculture production DFID assisted seed production programme and UNDP supported soybean production and processing project, presently JARDA is implementing Small Plot Adoption Technology (SPAT) in Birnin Kudu Local Government Area which is the area of the study (JARDA, 2019).

The Small Plot Adoption Technology (SPAT) is a programme to extension management under Training and Visit System (T&VS) in Nigeria and has been developed to bring extension message to the farmers and thus facilitate faster adoption of the improved technology. Each farmer is expected to supply the small quantities and input required for the small plot. The Village Extension Agent (VEA) shows the farmers how to apply the input and teach him the culture practice involved. This method enable a number of SPATs to be established within a sub cell Carrying more several extension message can be design for both sole and crop mixture as well as for non technologies. Each VEA expected to establish a specific number of Small Plot Adoption Technology (SPATS) in his area of jurisdiction. SPATP is a contact technique, it is a teaching laboratory aimed at enhancing communication on proven agricultural technologies, and it is a demonstration, which is organized by field extension workers at farm level in order to enhance increased knowledge and skill acquisition of the relevant agricultural technologies among the farmers. Necessary farm input implementing SPAT is provided by the farmers, except in situations where such technologies are entirely new in the farming communities (JARDA, 2019). The Agricultural Development Programme is responsible for planning, organizing, implementation as well as supervising the Training and Visit System (T&VS) in Birnin Kudu Zonal Extension Office. The system is based on the total number of the farm families to be assisted in given area, and in defining the number of farm families which one Village Extension Agent (VEA) can reasonably be expected to cover. The VEA are trained also and supervised in the field by Block Extension Supervisor (BES) who in turn are guided and supervised by the Zonal Extension Officer (ZEO). The ZEO are supervised by Chief Extension Officer (CEO) via the Deputy Chief Extension Officer (DCEO) who are both located at the programme headquarter (JARDA, 2019).

Statement of the Problem

Small Plot Adoption Technology is a programme to extension system was introduced in all the Jigawa State Agricultural Development Programme (JSADPS) which the farmers are shown how to improve over what they are currently doing. This aimed at ensuring food security and provision of gainful employment as well as improvement of foreign exchange earnings. The SPAT is based on the premise that a combination of factors, such as the right technology, effective and timely delivery of message, regular extension farmers' contact and regular training are pre-requisite for an effective agricultural development programme. In spite of the abundant modern technologies and guidelines available for farmer brought from Jigawa State Agricultural and Rural Development Authority (JARDA), under the SPATP in the state, most of the small farmers who constitute the majority in farming cannot adopt these new innovations (JARDA, 2019). Abalu and Yayuock, (1980) reported that the low rate of Agricultural technology adoption was usually due to inappropriateness and limited access to recommended technologies. In view of this, the study sought to investigate the effectiveness

of Small Plot Adoption Technology Programme (SPATP) in Birnin Kudu Local Government Area.

Objective of the Study

The general objective of the study is to assess the effectiveness of Small Plot Adoption Technology Programme (SPAT) in Birnin Kudu Local Government Area, Jigawa State, Nigeria, the study sets out to achieve the specific objectives as follows, to:

1. Identified the scope of Small Plot Adoption Technologies Programme on farmers productivity in Birnin Kudu Local Government Area, Jigawa state, Nigeria;
2. Determine the effectiveness of Small Plot Adoption Technologies Programme on farmers productivity in Birnin Kudu Local Government Area, Jigawa state, Nigeria;
3. Examine the challenges facing Small Plot Adoption Technologies Programme on farmers productivity in Birnin Kudu Local Government Area, Jigawa state, Nigeria;

Methodology

Jigawa state is made up of 27 local government areas which are grouped into four agricultural zones namely Birnin kudu zone, Gumel zone, Hadejia zone and Kazaura zone. The state has two distinct climate seasons, the dry season and rainy season, millet, sorghum, cowpea, groundnut, coco yam, sugar cane and vegetables were among the crops grown in the state. Apart from crops the state has a number of livestock and water bodies. 80% of the state population engage in farming as their main economic mainstay (JARDA, 2019). Birnin Kudu is a town and a Local Government Area in the south of Jigawa state, Nigeria, some 120 kilometers south-east of Kano. As of 2006 national head count the town of Birnin Kudu had estimated population of 419,800 (NPC, 2006), nicknamed BK, is an old historical city renowned for its rocks and drawings found in some of them dating centuries before the colonization of northern Nigeria and establishment of Native Authority (NA). The city was an NA headquarters during the British rule and has been the capital of Birnin Kudu LGA is the most populous LGA in Jigawa state, it is also the city where Gwaram and Buji LGAs were separated from in 1996, it is home to one of the oldest schools in Northern Nigeria, Government College Birnin Kudu from where many Northern leaders and businessmen emerged including Aliko Dangote (Richest man in Africa). In recent politics, BK has produced two governors of Jigawa state (Alhaji Ali Sa'adu BK, first civilian governor of the state) and Alhaji Sule Lamido who was a governor of Jigawa state from 29th May, 2007 to 29th May, 2015, it has 11 political wards (The world Gazetteer, 2019). The population of the study comprised the population of farmers and extension agents (instructors) of SPATP in the five (5) blocks and sub-cell of the BK zonal extension office, the areas are Birnin Kudu, Chiyako, Kafin Gana, Jangargari and sundumina.

The total number of the population from the blocks and sub-cells is 250, out of this figure 200 were farmers and 50 of them were extension agents (BKZEO, 2019). A Stratified Sample Random Sampling Tecnnique was used to select 77 farmers and 10 extension agents. This number was arrived at based on taking 88.5% of the total population in farmers' category and 11.5% in extension agent category respectively. Gay, (1992) asserted that descriptive survey research 10% of the total population is acceptable. Therefore, based on this submission the sample size selected is deemed to be appropriate. Primary data were used for the study. The data were analysed through the use of descriptive statistics which include frequency distribution and percentages and cross tabulation as a means of explaining the outcome of findings. For that reason, the study will provide vital information on how to promote SPATP, it also stimulate further studies in the area of extension services delivery method on SPATP.

RESULTS AND DISCUSSIONS

Table 1: the scope of Small Plot Adoption Technology Programme in Birnin Kudu LGA

S/N	Plot Adoption Technology Programme	Frequency	Percentage
1.	Irrigation practice	38	43%
2.	Feed formulation	24	27.6%
3.	Livestock management	9	10.3%
4.	Storage Technique	8	9.2%
	Marketing	8	9.2%
Total		87	100%

The result in table 1 indicated that 43.7% of the respondents say irrigation practice is the commonest programme of small plot technology in Birnin Kudu, this is followed by Feed Formulation (27.6%); Livestock management (10.3%) and Storage technique and marketing (9.2%) respectively.

Table 2: The level of awareness of the Small Plot Adoptions Technology Programme in Birnin Kudu LGA

Level of Awareness	Awareness	Frequency	Rate of Adoption Frequency	Percentage
Aware	39	56	53	73.7%
Not aware	31	44	17	24.3%
Total	70	100	70	100%

The result in table 2 indicated that the majority of the respondents (56%) were aware about the technology brought by the Small Plot Adoption Technology (SPAT) and over 75 had adopted this technology. This is supported the finding of Chukwendu et al (1996) for the adoption of new improved technology for millet production by farmers that the higher the level of awareness the higher the rate of adoption.

Table 3: The effectiveness of the Small Plot Adoption Technology Programme in Birnin Kudu LGA

S/N	Effectiveness of the SPATP	Frequency	Percentage
1.	Improved farming income	34	39.1%
2.	Accessibility of agricultural credit	33	37.9%
3.	Accessibility of agricultural input	12	13.8%
4.	Accessibility of pest and herbicides	8	9.2%
Total		87	100%

The result in table 3 indicated that 39.1% of the sample say Small Plot Adoption Technology improve farmers' incomes; 37.9% reported that the programme improve farmers accessibility of agricultural credit facility; Hodder (1973) posited that credit is the key factor in the country's agricultural development. 13.8% opined that the programme improves farmer's accessibility of agricultural inputs and 9.2% deposed that the programme improved farmers' accessibility of pesticides and herbicides respectively. On improved seeds fertilizer and better irrigation facilities a cultivator is unlikely to use these to increase his production unless the market for this increased production is seen to be there and is accessible.

Table 4: challenges facing Small Plot Adoption Technology Programme in Birnin Kudu LGA

S/N	Challenges facing SPATP	Frequency	Percentage
1.	Inadequate number of extension agent	39	44.8%
2.	Lack of technical knowhow to introduce new packages to farmers	26	29.9%
3.	Innovation is expensive and difficult to understand	13	14.9%
4.	Lack of adequate incentive to extension agents	9	10.32%
Total		87	100%

The results in table 4 indicate that, 44.8% deposed that inadequate number of extension agents is the major challenge of the programme, 29.9% said extension agents lacked technical knowhow to introduce new packages to farmers; 14.9% said the innovation brought to farmers by SPAT is expensive to implement considering the farmers income and sometime difficult to understand and 10.3% said lack of adequate incentive to extension agents respectively.

Conclusion

Findings of the study can be outlined as follows: SPATP in BK LGA involves the following activities irrigation practices; feed formulation; livestock management; storage techniques and marketing. SPATP was found to be effective especially in the area of improving farmers' income; accessibility of agricultural credit facilities; accessibilities of agricultural inputs and accessibility of pest and herbicides respectively. Some of challenges facing SPATP in BK LGA thus inadequate numbers of extension agents; extension agents lacked technical knowhow to introduce new packages to farmers; the innovation brought to farmers is expensive to implement considering the farmers' incomes and sometime difficult to understand and lack of adequate incentive to extension agents respectively.

Recommendation

Based on the findings of the study the following recommendations are made: SPATP should be more encouraged and made more popular by all extension services to stimulate adoption of improved technologies by farmers in BK LGA, Jigawa state and Nigeria in general. There is need for adequate provision of information and supervision by extension agents during SPATP to enable farmers to witness the benefits of the programme. There is need government to support farmers with inputs such as fertilizer, access to agricultural loans, accessible road and market linkages.

REFERENCES

- Abalu G.O.I; and Yayuock, J.Y. (1980). Adoption of Improved Farm Technology in Northern Nigeria Germany AGRIS Journal FAO [.agris.fao.org](http://agris.fao.org)
- Awoyemi, F. (2018). Investimate in Human Capital Remains Key to Unlocking Nigeria's Economic. Retrieved on 28 march 2019 www.proshareng.com/news/nigeri%20economy
- BKZEO (2019). Birnin Kudu Zonal Extension Office, Brnin Kudu Local Government Area, Jigawa State, Nigeria.
- Chukwendu et al. (1996). Analysis of the adoption of tube well technology.
- Gay, L.R. (1992). Educational Research Competencies for Analysis and Application (4th ed) New York, Macmillan Publishing Company
- Hodder B.W. (1973). Economic Development in Tropics Methuen and Company Ltd New Felter Lane, London ec4 1973 second edition
- JARDA, (2019). Jigawa Agricultural Rural Development Authority Kiyawa Road Dutse, Jigawa State, Nigeria, Extension Work Department.
- NALDA (1999). National Agricultural Land Development Authority (1991),
- NPC, (2006). National Population Commission 2006 Population and Housing census of the Federal republic of Nigeria, population and housing table, kano state, march 2006 (vol. 1 T – D – S: 1. 19)
- Nwuba, EIU, Fashina, A.B. (1987). Agricultural Land Clearing in Nigeria; Problems and Implementations. Samaru. J Agric.
- OFN (1980). Operation Feed and Nation. National Agricultural Extension and Mobilization Programme Instituted by military government of Nigeria in 1976 lasy edit 28th July, 2019 en.m.wikipedia.org
- Ogbimi G.E. (1997). *Women in Agriculture: the need to include childcare extension service* proceeding of the 3rd Annual National Conference of AESON Pp57-58.
- Roger E.M. & Shoemaker, F.F. (1971). *Communication of Innovation: A Cross Culture Approach* New York Free Press.
- Roger E.M. (1962). *Diffusion of Innovations*, 1st Ed, New York: The Free Press of Glencoe
- World Gazetteer (2007). The World Gazetteer Stefan Holders Achieved from the originals. Retrieved on 27 November, 2019