

RESEARCH ARTICLE

Assessment of Contribution of Bauchi State Agricultural Development Programme on Rice Production in Dass Local Government Area, Bauchi State, Nigeria

A. A. Bose, H. A. Danwanka, B. C. Asani

Department of Agricultural Economics and Extension, Abubakar Tafawa Balewa University, Bauchi, Nigeria

Received: 15-10-2020; Revised: 25-11-2020; Accepted: 20-12-2020

ABSTRACT

The study assessed contribution of Bauchi State Agricultural Development Programme (BSADP) on rice production in Dass Local Government Area of Bauchi State, Nigeria. Multistage sampling procedure was used in the study and 80 farmers were randomly selected. Data were collected using structured questionnaire and analyzed using descriptive statistics. The result shows that 31.25% of the farmers fell within the age bracket of 31–40 years with average age of 42 years and majority (60%) of the farmers were male. Furthermore, majority (90%) of the farmers were married, and 50% of the farmers acquired tertiary education. The result reveals average farm land of 5.4 ha and 67.5% of the farmers sourced their working capital from their personal savings. The result shows that 37.5% of the farmers were not contacted by the extension agents and 23.8% were visited annually. The result also shows that 58.8% of the farmers sourced their information on rice production from BSADP. The result shows that 97.5% of the farmers adopted weed control technology and 91.3% adopted fertilizer, insect, and disease control technologies. The result also reveals that 91.3% and 62.5% of the farmers obtained extension services rendered by BSADP on source of Agro inputs and capacity building. Majority (61.3%) of the farmers adopted improved rice varieties and 65% of the farmers used broadcasting method in planting. The problems affecting rice farmers include inadequate extension services; difficulty in accessing credit; and difficulty in controlling weeds, pests, and diseases, among others. The study recommends that government should recruit adequate and competent extension workers and to be deployed in the study area. Furthermore, farmers should be encouraged to participate actively in farmers' organizations to enhance extension service delivery and ease access to credit facilities and inputs. Training should be intensified on appropriate utilization of agro-chemicals to reduce weeds, pests, and disease infestation on rice farms in the study area.

Key words: Bauchi State Agricultural Programme, extension service, rice production, technologies

INTRODUCTION

Bauchi State Agricultural Development Programme (BSADP) was established on the success of Gombe enclave project during midterm review of the Gombe State ADP; which cover some part of Bauchi State a conclusion was made by the world Bank and Bauchi State Government decided 4–5 years

development plan (1981–1986). BSADP seeks to carry through measures to ensure self sufficiency of food production for the state and more contribution toward the aim of ADPs. BSADP is an agency and extension arm of Bauchi State Ministry of Agriculture, saddled with the responsibility of carrying extension activities across the state. Its major objective is to impact knowledge of agricultural activities to farmers in such a way that their standard of living will be improved through assisting them in making efficient and judicious use of resources for increase productivity. It is not a

Address for correspondence:

A. A. Bose

E-mail: abdullahi.bose@yahoo.com

profit oriented organization, rather it tend to render economic and social services to the people living in the State.^[1]

Rice (*Oryza sativa*) is increasingly becoming an important staple crop in Nigeria that is rich and cheap source of carbohydrate to both man and animals. Rice has served as a major staple cushioning the effect of under-nutrition and severe hunger in Nigeria and many other developing countries of the world.^[2] In terms of comparative advantage, rice can be grown on non-flooded soil because it has low land and up land varieties that can be adapt to different agro-climatic and soil conditions.^[3] According to Omoare and Oyediran^[4] production is dominated by smallholder farmers who use rudimentary technology and traditional method in producing over 80% of our national production. The quality of the local rice has been a major issue in an effort to develop local rice acceptability and consumption among Nigerians. For the past one decade Nigeria has been a net importer of rice, which had also adversely affected local production tantamount to the enrichment of few rich people involved in the rice importation. Rice importation is seen as a waste of foreign exchange based on the comparative advantage of the country in rice production and the cost of these rice imports represents a significant amount of lost earnings for the country in terms of jobs and income.^[5] Recent agricultural policy provide enabling environment for rice production in Nigeria, where importation of the crop was restricted. Rice quality and standardization are not yet well developed in Nigeria because rice processing and milling are still primarily conducted at the cottage level.^[4] The research therefore, intend to assess the contributions, and roles of BSADP on rice production in Dass Local Government Area of Bauchi State.

Objectives of the study

The specific objectives of the study were to;

- i. Describe the socio-economic characteristic of rice farmers in the study area
- ii. Identify various forms of services rendered to rice farmer by BSADP
- iii. Ascertain types of extension technologies provided to rice farmers by BSADP

- iv. Assess types of technologies/practices adopted by the rice farmers; and
- v. Identify constraints affecting rice farmers in the study areas.

METHODOLOGY

Study area

Bauchi State is located in the northeast part of the country, it lies approximately between 9°3 and 12°3 North and longitude 8°50–11°50 East. The state shares boundaries with Kano and Jigawa to the North; Yobe and Gombeto the east and with Plateau and Kaduna to the west.^[6] According to National Bureau of Statistics (2016), the state has a total land area of 49,119 km² representing 5.3% of Nigerian land mass.

The study was conducted in Dass Local Government Area of Bauchi State, Nigeria. The area is located at latitude 9°30 North and longitude 8°45 East and it has a population of 200,987.^[1] The climate is characterized by two distinct seasons, dry and wet seasons. It has temperature of 15 to 30°C. The area recorded an average rainfall of 1000 mm annually. The people of Dass local government area engages in farming activities for a livelihood because of the fertile land. Different varieties of crops are produced in the area including rice, millet, sorghum, cowpea, groundnut, and soybeans. Furthermore, livestock such as cattle, sheep, and goats are produced in the area.

Sampling technique and sample size

Multi stage sampling procedure was used for this study. First, four districts (Bununu, Bundot, Dot, and Wandu districts) were purposively chosen from the Local Government Area. The districts were selected on the basis of high quantity of rice production and extension services that is being carried out in these districts. Second, one community was selected from each district comprising Bununu-town, Bundot, Dot, and Wandu villages. At the final stage, 15% of the farmers were randomly selected from sampling frame of 531 registered farmers, making a total sample of 80 rice farmers in the study area. The sampling procedure is presented in Table 1.

Method of data collection

Primary data were used for the study and collected using structured questionnaires. Information that were collected include socio-economic characteristics; services rendered to farmers by BSADP; and extension technologies adopted by the farmers and constraints affecting the farmers on rice production in the area.

Method of data analysis

Descriptive statistics was used in analyzing the data. Descriptive statistics such as frequency distribution, percentage, bar chats, and mean were used in analyzing the specific objectives.

RESULTS AND DISCUSSION

The socio-economic characteristic conferred by this research includes age, sex, household size, education status, years of farming experience, and farm size. The result in Table 2 shows that the mean age of the farmers was 42 years. This implies that majority of the respondents were in their active age of production. This result is in line Adejoh *et al.*^[2] that a mean age of 43 years is an indication that most rice farmers in the area are still in their productive age. A similar result was obtained by Abdullahi^[7] who reported that majority (66.7%) of the adopters of rice varieties were actively young within the age range of 20–30 years hence, were more likely to adopt new technologies. The result further reveals that the majority (60%) of the farmers were male. This result is in conformity to Samuel *et al.*^[8] that male farmers (83%) participated more in rice production as compared to their female counterparts. Similarly, Nwalieji and Uzuegbunam^[9] reported that majority (66.0%) of the rice farmers were male in the study area. Furthermore, Adeola *et al.*^[10] observed that

rice production is dominated by male farmers (95%) with only 5% of female engaged in rice production and this could be attributed to the socio-cultural background the people in the area. The result further revealed that the average household size of the farmers was nine persons. This implies that farmers had relatively moderately family size which could be a source of family labor. The result also reveals that 81.2% of the farmers had formal education. This implies that the majority of farmers were literate and education is expected to directly influenced adoption of innovation as well as helping them to use production resources efficiently. This result is in agreement with Omoare and Oyediran^[4] that a large proportion (80.6%) of the respondents

Table 2: Socio-economic characteristics of the rice farmers

Variables	Frequency	Percentage	Mean
Age			
20–30	15	18.7	42 years
31–40	25	31.3	
41–50	20	25.0	
51–60	12	15.0	
61–70	08	10.0	
Sex			
Male	48	60.0	
Female	32	40.0	
Household size			
1–5	30	37.5	9 persons
6–10	24	30.0	
11–15	14	17.5	
16–20	12	15.0	
Educational Status			
Non-formal education			
Primary	11	13.7	
Secondary	14	17.5	
Tertiary	40	50.0	
Farming experience			
1–5	10	12.5	14.4 years
6–10	20	25.0	
11–15	13	16.2	
16–20	12	15.0	
21–25	25	31.3	
Farm size			
1–2	10	12.5	5.4 hectares
3–4	18	22.5	
5–6	30	37.5	
7–8	12	15.0	
9–10	10	12.5	

Source: Research findings, 2018

Table 1: Sampling procedure

Districts	Town/Villages	Sampling frame	Sample size (15%)
Bununu	Bununu	153	23
Bundot	Bundot	138	21
Dot	Dot	115	17
Wandi	Wandi	125	19
Total		531	80

had formal education out of which 26.6% had primary education, 36.6% had secondary education, and 17.5% had tertiary education. The result further reveals that the average years of farming experience were 14.4 years. This finding is in conformity with Adeola *et al.*,^[10] who reported that majority (66.6%) of the farmers had farming experience ranging between 5 and 10 years. The result also shows that the average farm land was 5.4 ha. This implies that farmers were operating on small scale production in the study area. This result is in agreement with the findings of Omoare and Oyediran^[4] who reported a mean farm land of 6.4 hectares in the study area. Furthermore, Ogundele and Okoruwa^[11] reported that farm size in Nigeria has been described as small, medium, and large scales if they fall into categories of <5 ha, between 5 ha and 10 ha and more than 10 ha, respectively.

Services rendered by BSADP

The result in Figure 1 shows the services rendered to farmers by BSADP, where majority (91.3%) of the farmers confirmed that BSADP provided agro-inputs for their rice farming. Furthermore, 83.8% and 80% of the farmers obtained extension technologies and advisory service from BSADP, respectively, while 58.8% of the farmers acquired marketing information. This implies that farmers acquired various form of extension services on rice production in the study area. This result is in agreement with findings of Abdulhamid *et al.*^[12] who reported that extension packages such as advisory services, input supply, and marketing information

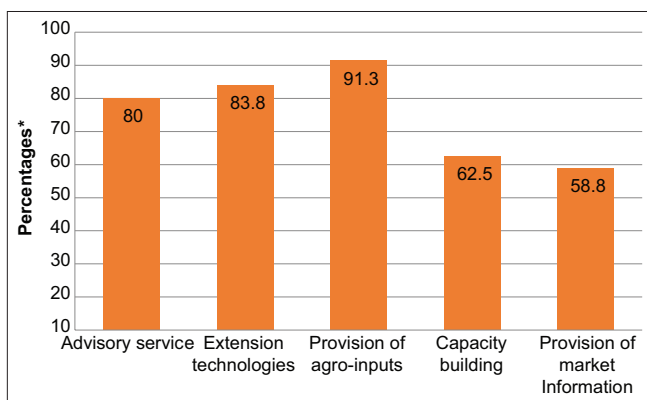


Figure 1: Farmers' perception on services rendered by BSADP; *Multiple Responses were recorded. (Source: Research findings, 2018)

were provided to the farmers by Nasarawa State ADP in the study area.

Sources of information on rice production

Figure 2 shows that the majority (75.0%) of the farmers sourced their information on rice production from fellow farmers and friends. This was followed by 58.8% who sourced information on rice production from BSADP. Furthermore, 22.50% sourced information through radio/television and only 18.8% of the farmers obtained information from social media (Facebook and WhatsApp). This implies that majority of the farmers obtained information from friends/fellow farmers and BSADP. This could be attributed to timely and ease access to production information. This result is in line with Bose *et al.*^[13] who reported that majority of the farmers received their information on extension packages through extension agents, farmers meeting, and cooperative societies which constituted 86.67%, 75.56%, and 70.00%, respectively, of the farmers' responses. A similar result was obtained by Fabiyi^[14] that major sources of farming information include extension contact; social group; friends/neighbors; and radio/television in the study area.

Information on extension contacts

The result in Table 3 shows that 37.5% of the farmers were not contacted by extension agent, 23.7% were contacted annually, 15.0% were visited monthly, and 8.8% of the farmers contacted weekly and

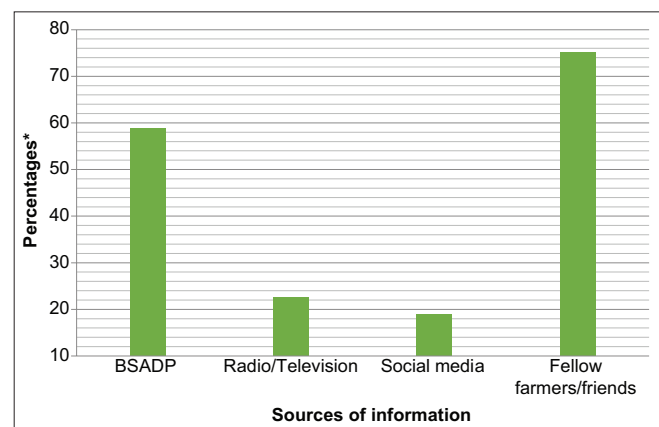


Figure 2: Sources of information on rice production; *Multiple Responses were recorded. (Source: Research findings, 2018)

fortnightly each. Only 6.2% were visited quarterly by the extension agents. This implies that extension staff was not adequate in the study area to visit all the farmers as required. This result is in conformity with Abdullahi^[7] who reported that majority (78%) of non-adopters of rice variety had no contact with extension agents which in turn affect adoption of technologies and rice production in general.

Rice cultivation and planting methods

The result in Table 4 shows that 50% of the farmers grown rice on upland and 37.5% of the farmers cultivated rice on lowland; only 12.5% cultivated rice using irrigation. This implies that rice production was mainly rain-fed in the study area. Furthermore, the result reveals that majority (65%) of the farmers adopted broadcasting planting method, 30% of the farmers used dibbling and only 5% of the farmers used transplanting method. The implication of this finding is that the rate of planting method adopted affects the yield and the number of hectares a farmer may put under cultivation, for instance, a farmer can put more hectares into cultivation when he uses broadcasting method due to less stress and less expensive. This result is in agreement with Omoare and Oyediran^[4] that

Table 3: Extension contacts by the village extension agents in the study area

Extension Contacts	Frequency	Percentage
Weekly	7	8.8
Fortnightly	7	8.8
Monthly	12	15.0
Quarterly	5	6.2
Annually	19	23.7
No contact	30	37.5
Total	80	100.0

Source: Research findings, 2018

Table 4: Nature of rice cultivation and planting methods

Rice cultivation	Frequency	Percentage
Lowland	30	37.5
Upland	40	50.0
Irrigated	10	12.5
Methods of planting		
Transplanting	4	5.0
Broadcasting	52	65.0
Dibbling	24	30.0

Source: Research findings, 2018

broadcasting was the predominant method (84.4%) used for rice cultivation in the in the study area.

Technologies/practices adopted by the rice farmers

Result in Table 5 reveals that 97.5% of the farmers adopted chemical weed control technology (herbicides) and 91.3% of the farmers adopted chemical control on insect and disease technologies (insecticides/pesticides). Improved rice varieties technology was adopted by 87.5% of the farmers. Furthermore, 71.3% of the farmers adopted planting techniques and harvesting method, 66.3% and 62.5% of the farmers adopted on marketing strategies and improve rice varieties, respectively. This implies that majority of the farmers adopted one form of technology or the other to boost production in the study area. This finding conforms to Samuel *et al.*^[8] who reported that farmers adopted various form of improved rice technologies comprising nursery, harrowing, line planting, spacing (20 cm×20 cm), and urea briquette among others. A similar result was obtained by Bose *et al.*^[13] that the majority of farmers adopted improved varieties of rice of NERICA–L-42 and NERICA–L-41 which constituted 95.56% and 72.22%, respectively; while 91.11% the farmers used N.P.K.15:15:15 fertilizer on their farms. In line with this, Raju *et al.*^[15] reported that improved seed technology allows farmers to save labor and managerial time, thereby improving efficiency of farming operation. Similarly, developing and promoting the adoption of yield increasing crop varieties in a sustainable manner helps improve livelihood of rural farmers.^[15,16] The

Table 5: Types of technologies adopted by the farmers

Rice production technologies	Frequency*	Percentage*
Improved rice varieties	70	87.5
Chemical weed control	78	97.5
Insect and diseases control	73	91.3
Fertilizer application	73	91.3
Planting method	57	71.3
Harvesting techniques	57	71.3
Processing	44	55.0
Marketing strategies	53	66.3
Land preparation	64	80.0
Zero tillage	35	43.3

*Multiple Responses were obtained. (Source: Research findings, 2018)

high percentages of responses recorded for adoption of technologies in this study, was traceable to the importance and relevance of these technologies in rice production. Thus, technologies are complementary and if any of the technologies is left out, may affect rice yield. The adoption of improved rice production and processing technologies leads to increased productivity, product quality and thus, higher income to farmers.^[2]

Constraints affecting rice farmers in the study area

Constraints in any form need to be mitigated especially on rice production. The results in Table 6 shows that the majority (65.0%) of the farmers complained on inadequate extension agents and 62.3% mentioned difficulty in obtaining credit, 61.3% of the farmers reported difficulty in controlling weeds, pests, and diseases. Furthermore, 60% mentioned high cost of technologies, 57.5% of the farmers opined that poor access to fertilizer and difficulty in marketing, among others. The findings imply that the major constraint facing farmers were inadequate extension agent contact and difficulty in obtaining credit facilities. This result is in agreement with Abdullahi^[7] who reported that high cost of improved seeds (80%) was the most serious problem encountered by rice farmers; 78% complained on lack of extension contact; while 72% reported problem of inadequate finance. Furthermore, the result is in conformity with the findings of Omoare and Oyediran^[4] that pest and diseases incidence was 86.3%, land degradation and poor soil fertility (65.3%), inadequate agricultural extension support on training and capacity building (75.9%), and poor market system (69.4%) among other constraints that affected rice farmers in the study area.

Table 6: Constraints affecting rice farmers in the study area

Constraints	Frequency*	Percentage*
Difficulty in accessing credit	50	62.3
High cost of fertilizer	46	57.5
Difficulty in marketing	46	57.5
High cost of herbicides	20	25.0
Inadequate extension agents	52	65.0
High cost of technology	48	60.0
Difficulty in controlling weeds, pests, and diseases	49	61.3

*Multiple Responses were obtained. Source: Research findings, 2018

CONCLUSION AND RECOMMENDATIONS

BSADP plays important roles in providing extension advisory services on rice production in Dass Local Government Area of Bauchi State, such as provision of agricultural inputs; information on market access; and capacity building. The findings established that the majority of the farmers adopted the use of herbicides, insecticides/pesticides, improved seed varieties, planting, and harvesting methods, among other rice technologies/practices. Despite provisions of vital extension services, the program and farmers faced some challenges such as inadequate extension agents and difficulty in accessing credit, among other constraints. Based on the findings of the study, the following recommendations were made:

1. Government should recruit adequate and competent extension workers and deployed, this may help greatly in promoting rice production in the study area
2. Since poor access to credit was one of the prominent challenges face by farmers and that rice production is capital and labor intensive enterprise, hence, government should come up with policy on timely and ease access to credit facilities for rice production in the study area
3. Extension agents should intensified training on proper use of agro-chemicals to reduce weeds, pests, and diseases infestation
4. Farmers should be encouraged to participate actively in farmers/social organizations and cooperative societies to promote effective channels for extension services delivery system in the study area.

REFERENCES

1. BSADP. Bauchi State Agriculture Development Programme: Annual Report for Zonal and Development Area Statistics Bauchi, Nigeria. Nigeria: BSADP; 2013.
2. Adejoh SO, Madugu N, Shaibu UM. An assessment of the adoption of improved rice processing technologies: A case of rice farmers in the federal capital territory, Abuja, Nigeria. *Asian Res J Agric* 2017;5:1-9.
3. FAO. Food and Agricultural Organization. FANRice Information 3; 2013. Available from: <http://www.fao.org.rice-infomation>. [Last accessed on 2012 Sep 15].
4. Omoare AO, Oyediran WO. Assessment of factors affecting rice (*Oryza Spp.*) value chain (RVC) in Ogun

- and Niger states, Nigeria. *Glob J Agric Res* 2017;5:43-59.
5. Oyediran WO. Assessment of paddy rice (Ofada) processing in ensuring rural women livelihood sustainability in Ogun state, Nigeria. *Int J Res Agric Res* 2016;2:59-70.
 6. Wikipedia. Bauchi State: Wikipedia Foundations Inc.; 2019. Available from: <http://www.en.wikipedia.org/wiki/bauchi/state/nigeria>. [Last accessed on 2019 Nov 15].
 7. Abdullahi A. Comparative economic analysis of rice production by adopters and non-adopters of improved varieties among farmers in Paikoro local government area of Niger state. *Niger J Basic Appl Sci* 2012;20:146-51.
 8. Samuel AD, Shaibu BA, Joseph AA. Adoption of improved agricultural technologies among rice farmers in Ghana: A multivariate probit approach. *Ghana J Dev Stud* 2019;16:42-67.
 9. Nwalieji HU, Uzuegbuman CO. Effect of climate change on rice production in Anambara state, Nigeria. *J Agric Exten* 2012;16:85-91.
 10. Adeola RG, Adlebayo OO, Oyelere HO. Effects of the federal government special rice programme On Rice yield. *Int J Agric Econ Rural Dev* 2008;1:1-6.
 11. Ogundele OO, Okoruwa VO. Technical Efficiency Differential in Rice Production Technologies in Nigeria. (AERC) Research Paper 154, African Economic Research Consortium, Nairobi. Available from: <http://www.Aecrating.Org/documents/rp154.pdf>. [Last accessed on 2019 Mar 15].
 12. Abdulhamid A, Bose AA, Abdullahi J. Adoption of extension packages provided by Nasarawa state agricultural development programme (NADP). *J Agric Food Environ* 2016;3:1-10.
 13. Bose AA, Abdu Z, Idi S, Adlu F. An assessment of agricultural technology packages adoption among farmers in Hawul LGA, Borno state, Nigeria. *Savannah J Agric* 2012;7:93-102.
 14. Fabiyi EF. Impact of agricultural extension on adoption of soybean innovations in Bauchi, Nigeria. *Case Stud J* 2015;4:71-7.
 15. Raju G, Huang W, Rudra BS. Factors affecting adoption of improved rice varieties among rural farm households in Central Nepal. *Rice Sci* 2015;22:35-43.
 16. Asfaw S, Shiferaw B, Simtowe F, Lipper L. Impact of modern agricultural technologies on smallholder welfare: Evidence from Tanzania and Ethiopia. *Food Policy* 2012;37:283-95.