Factors influencing Adoption of improved Rice Production Technology (IRPT) Under Anchor Borrowers Programme (ABP) In Kebbi State

[*]Umar, S., [*]Hali, M.R. and [**]Bunza, F.S.

[*]Department of Agricultural Economics and Extension, Kebbi State University of Science and Technology, P.M.B. 1144 Aliero, Kebbi State - Nigeria
[**] Department of Animal Science, Kebbi State University of Science and Technology, P.M.B. 1144 Aliero, Kebbi State - Nigeria
Corresponding Author: Umar, S.

Abstract:*This study assessed the factors influencing adoption of improved rice production technology (IRPT)under Anchor Borrower Programme (ABP) that was established inKebbi State in the year 2015. Multistage sampling procedure was used to select four hundred and eighty (480) respondents for the study. The results of the study shows that about 35.8% of the farmers fall within the agerange of between41–50years. Householdsizeresponseindicatesthat28.3%and23.3%of the respondents respectively hadbetween6–10and16–20numbersin their house hold. The level of education of the respondents also shows that majority (47.3%)had secondary education,while17.5%hadprimaryeducation. The results of the study shows that majority of the respondents (51.7%) received between ₦100,000 – ₦300,000 as ABP loan. On the stages of adoption of improved rice production technology by respondents, broadcasting method had the highest entries followed by weeds management through the application of herbicides. Investigation of the socio-economic factors influencing the adoption of IRPT under ABP in Kebbi State produced the regression analysis resultsinTable4.The empirical results showed that year of education (P ≤ 0.041), farming experience (P ≤ 0.046), access to credit (P ≤ 0.044), farm machinery ownership (P ≤ 0.011), complexity of the technology (P ≤ 0.037) and contact with extension agents (P≤ 0.016) had significantly positive influence on adoption of improved rice variety, while age (P ≤ 0.023) had significantly negative effect. Based on the findings, the study recommended that additional financial sources of credit should be provided with easy access to compliment the on-going ABP. The study also recommend that public and private sectors should provide modern rice technology to farmers at affordable price in order to facilitate access to the technology and adoption. Kebbi State Government should also provide enabling environment for the service providers, such as private agro allied companies, agricultural input dealers to carry out their activities without hitches. This study also recommended that Anchor Borrower Programme in Kebbi should be enhanced and subjected to periodic review so as to provide more platforms for dissemination of improved rice production technology in order to achieve sustainability.*
Keywords*: Factors, Adoption, Anchor Borrower Program, Improved Rice Production Technology,*

Date of Submission: 15-07-2019   Date of acceptance: 30-07-2019

I. Introduction

One of Nigeria's foreign exchange challenges, culminating in speculative attacks, wholesale round-tripping and fallen value of the local currency is the high level demand for foreign legal tenders for importing food commodities like rice and wheat. Nigeria's food import bill is both exceptionally and unsustainably high, with the top four import commodities, consumes more than one trillion naira in foreign exchange yearly. Of course, relying heavily on food importation fuels domestic inflation, depletes our foreign reserves, displaces local production and creates unemployment in the country. In the theory of economics, import dependency, especially on commodities of comparative advantage is not only unacceptable, but also unsustainable fiscally. It is therefore, no gainsay that the huge foreign exchange bill on the import of agricultural products has contributed to the drain of the nation's foreign exchange reserves. According to Emefiele, (2016), the ABP aims at creating economic linkages between over 600,000 smallholder farmers and reputable large-scale processors with a view to increasing agricultural output and significantly improving capacity utilization of integrated mills. According to the CBN Governor, the fall in oil prices has given Nigeria a timely reminder that the country has no choice but to diversify its economy away from oil, and into agriculture, manufacturing, services, and other non-oil sectors.

Smallholder agriculture is the dominant occupation of rural Nigerians which is mainly rain-fed and characterized by low land and labor productivity due to a combination of problems including poor macroeconomic and sector policies. Yet, Nigeria has a potential comparative advantage in the production of a variety of fresh and processed high value crops, especially vegetables during the dry season and livestock product (meat and milk) and fisheries products throughout the year. This is because the Country is endowed in underground and surface water reserves, rich pastures and favorable agro-ecological conditions in the Country's low-lying plans with alluvial deposit called Fadama. One peculiar paradox of poverty in Nigeria is that of poverty in the midst of plenty. Despite the rich endowment of Nigeria, especially rural Nigeria, with abundant natural and human resources, poverty is more acute in the rural area where about 70% of the total population of over 120 million live (NPC, 2005) than in the urban areas. The Fadama expansion program is considered to be an instrument for technical transformation in agriculture which would empower the small holder farmers to get out of the poverty trap. On the evaluation of success of Fadama 1, it was learnt that the project helped producers to increase output, but not to store, preserve and market their surpluses. As a result, much of the output was either not sold at all or sold at low prices due to supply glut (World Bank, 2003)

Available data reveals that Nigeria's economy relies heavily on food importation. For example, food products like wheat, sugar, milk, rice and fish accounted for ₦901 billion or 93.5% and ₦788 billion or 88.71% of total food importation bill in 2013 and 2014, respectively. These figures, according to CBN, are exclusive of the activities of smugglers. The Import bill of rice and wheat was estimated at ₦428 billion and ₦307 billion in 2013 and 2014, respectively. These huge amounts were expended on items that the country has the potential to produce locally, with the attendant losses of employment generation and wealth creating opportunities, while the allocation of foreign exchange to the importation of these items has continually depleted the foreign reserve, which has been on a steady decline in recent times (Nelson, 2015).

In a bid to address these challenges, the Central Bank of Nigeria launched Anchor Borrowers' Programme (ABP) in the year 2015. ABP have been pushed by 14 states of Kebbi, Sokoto, Niger, Kaduna, Katsina, Jigawa, Kano, Zamfara, Adamawa, Plateau, Lagos, Ogun, Cross-River and Ebonyi, for rice and wheat farmers to advance their status from small holder farmers to commercial or large growers. The Programme is expected to link over 200,000 rice and wheat farmers with reputable millers for up-take of every grain of paddy produced. The milling companies have adequate capacity to meet Nigeria's rice requirements, backed by installed state of the art processing equipment. Ultimately, the quantum of funds to be channeled and the number of farmers to benefit from this programme will increase as the programme is extended to other commodities (Akambi, 2015). The inadequacy in the sustenance of provision of rural infrastructure, lack of maintenance culture coupled with inconsistency in policies regarding infrastructural development is expected to have a negative impact on ABP. In this regards, it becomes pertinent to know how effectively Kebbi State Government has made provision to ensure the sustainability ABP.

Government made several efforts to increase rice cultivation area and per acre yield. The extensive researches and continued efforts by agricultural scientists over the last few decades in Pakistan has achieved better improvement in rice yield, which, however, is still much lower compared to the other rice producing countries. Adoption of improved rice technology is important to increase rice productivity and profit. Provision of improved agricultural technology, its adoption and sustainability for Nigerian peasant rice farmers is necessary due to the country's effort at achieving food security for the growing population. Since there is often time lag between the development of technology and adoption by farmers, experimenting factors that influence farmers' adoption behavior is very important in evaluating acceptability of technology because the information generated from such farmers provide understanding about subsequent adoption of a new technology. In furtherance of effort to reduce unemployment, fight inflation and ensure food security, the Central Bank of Nigeria in line with its developmental function established the Anchor Borrowers' Programme (ABP) in the year 2015 with a view to collaborate with anchor companies that are involved in the production and processing of important agricultural commodities. There are some expected advantage that ABP is expected to have conferred on the rice farmers in terms of increasing production, supply of feedstock to the processors, reduction in importation and conserve dissemination of skills and knowledge of improved rice production technologies through extension field agents. Therefore, the extent of adoption of improved rice production technologies by rice farmers in Kebbi State needs to be investigated. However, contemporary observations indicated that while some farmers adopt the use of improved technologies as a result of participation in ABP, a reasonable number still use traditional methods thereby subjecting them to low productivity. This situation creates doubts on the determinants of rice farmers' adoption of improved rice production technologies under ABP in Kebbi State, hence the need for an empirical study on the factors that affect adoption. This study was, therefore undertaken to fill this gap in scientific knowledge in the study area. The objective of the study was, thus to determine the factors that influence the adoption of improved rice production technologies among the farmers that participated in ABP in Kebbi State, Nigeria. Giving the foregoing, the objectives of this study is to there for ecritically:

i. Describe the socio - economic characteristics of rice producing farmers that participated in ABP in the study area.
ii. To determine the improved rice production technology available to the farmers that participated in ABP.
iii. To examine the level of awareness and rate of adoption of the improved rice production technology in the study area.
iv. To determine the factors influencing level of adoption of improved rice production technology under ABP.

II. Hypothesis

Ho: Thereisnosignificant relationshipbetween socio-economiccharacteristicsof thefarmers,institutionalvariablesandattributesof improved technologyand adoptionof improved riceproduction technology.

III. Methodology

Study Area

The study was conducted in Kebbi State, Nigeria. Kebbi State is located in north-west geopolitical zone of Nigeria and occupy land mass of 36,229 square kilometers. Kebbi State was created out of the old Sokoto State in 1991 with headquarter at Birnin Kebbi. The state is divided into four emirate councils (Gwandu, Argungu, Yauri and Zuru) and twenty one local government areas which include Aliero, Arewa, Argungu, Augie, Bagudo, Birnin-Kebbi, Bunza, Dandi Kamba, Danko/Wasagu, Fakai, Gwandu, Jega, Kalgo, Koko-Besse, Maiyama, Ngaski, Sakaba, Shanga, Suru, Yauri and Zuru.Kebbi State has a population of 3,351,831 people as at 2006 (National Population Commission, 2006). The State lies between latitude $10^0\ 05^1$ and $13^0\ 27^1$ N of the equator, and between longitude $3^0\ 35^1$ and $6^0\ 03^1$W of the Greenwich.

Method of Data Collection

A multi-stage sampling technique was used to draw samples for the study. The first stage,eight (8) Local Government Areas (LGAs) were randomly selected for the study. In the second stage, five (5) Farmers' Cooperative Associations (FCAs) were randomly selected from the list of all the associations using a random number table, making a total of 40 FCAs. In the third stage, the list of the beneficiaries of the programme were collected for each of the selected associations.Random sampling was used to select 12 Anchor Borrowers' Programme rice farmersfrom each of the selected FCAs, to obtain a total of four hundred and eighty (480) beneficiaries. Ballot system in which papers were numbered, squeezed and rolled to have equal chance of being selected, was adopted for the selection. The selected beneficiaries were interviewed with a structured questionnaire for generating data.

Analytical Technique

Probit regression model has been widely utilized to evaluate the functional association among the probability of adoption and its determining elements (for example education, farm size, resource ownership and social status). The binary econometric models enable a more specific analysis of farmers' adoption of improved technology (Mariano et al., 2012). This type of analysis provides more detailed information on the characteristics of the farmers who tend to adopt a specific technology. In this study, probit regression model analysis was used to identify the factors influencing IRPT in Kebbi State.

$AIRV=\beta0+\sum i=\beta ixi+\mu$

β_0, Coefficients to be estimated; β_i, Parameters to be estimated; x_i, Value of the determination; μ, Stochastic error term.

IV. Results And Discussion

Farmer's Socio-economicandInstitutionalFactors

These are personal features of the farmers which have direct or indirect relation with adoption of improved rice production technology. Results from Table 1 shows that results in table 1 shows the distribution of therespondents accordingtotheirage. About 35.8%ofthefarmers fall within theagerangeof between41–50years.Thisshowsthatmostoftherespondentsarerelatively within the middle age bracket,whichcouldberegardedasactiveandproductive stage, whichm a y s e r v e a s a n o p p o r t u n i t y to utilize the energy tocopewiththerigorsofriceproductionandalsowillingtoexperimentwith newly introducedproductionpractices. This is an indication that rice production in the area is dominated by farmers that are more likely to handle risks involved in adopting improved technology in rice agricultural production.

Thefindingsof the study also reveals that a majority of the respondents were males (81.7%), while females constitute only 18.3%. This implies that rice production in the study areas is not balanced between the genders. The predominance of males in rice farming may be connected with socio-cultural and religious values in the area, which emphasize women's roles as managers of household domestic and agricultural processing

activities. The results furtherrevealsthat96.7%weremarried,whileonly 3.3%ofthemwere single. The dominance of married men in rice farming might be connected withstruggletomeettheneedsof their families.Householdsizeisone of themajor indicators/determinantsofsocialstatusof a farmer, whichinturninfluencethefarmer'sability toadoptimproved riceproductiontechnology.Householdsizeresponseindicatesthat28.3%and23.3%of the respondentsrespectively hadbetween6–10and16–20numbersin their household.Thisimpliesthattherespondentshadmediumhouseholdsize that can be utilizedas sourceof labourfor rice production.

The levelofeducationof the respondents also showsthat majority(47.3%)hadsecondary education,while17.5%hadprimaryeducation. The status of the education of the respondents can influence adoption of improved rice production technology. There are adequate findings such as Fafunwa 1984; Olaitan 1996 and Toby 1997, suggesting that education can improve productivity of rural households. It is evident that education promotes the efficiency of resource use at the farm level in response to resource scarcity. It affects the smallholders' state of knowledge of available technology and management practices and helps them generate ideas at the right times and places to keep resource scarcity from negatively affecting their wellbeing.Onthevariablerelatingtofarming experience,the findingshowsthat6.7%ofthe respondentshadbeeninto riceproductionfor over 15years, while25.0%beeninriceproductionforbetween11–15years.The prolong years of experience in rice farming may play an important role in providing knowledge and shaping the behaviors and attitude of the farmer towards analyzing his farm situation andadopt improvedriceproductiontechnology.

The results in table 1 also shows that majority of the respondents (50.4%) had a farm size between 1-3 hectare of land, while only 4.4% of the respondents had 10 – 12 hectares of land. Agbamu (2006) lamented that, there exists a significant relationship between the adoption of new farm practices and size of land of farmers. Therefore, lack of adequate farm lands by the majority of the respondents in the study area might hinder the adoption of improved technology.Considering land as one of the major factors of production, Abu et al., (2011) reported that small farm size could be a factor which prevents farmers from adopting innovation because of the inappropriateness of modern technology to the economic realities of small scale farmers.

Table 1: Distribution of Respondents according to Socioeconomic Factors

Item	Frequency	Percentage
Age		
21 – 30	40	8.3
31 – 40	148	30.8
41 – 50	172	35.8
Above50	120	25.0
Total	480	100.00
Sex		
Male	392	81.7
Female	88	18.3
Total	480	
Marital status		
Married	464	96.7
Single	16	3.3
Total	480	100.00
Householdsize		
1 – 5	88	18.3
6 – 10	136	28.3
11 – 15	112	23.3
16 – 20	108	22.5
21 and above	36	7.5
Total	**480**	**100.00**
Educational qualification		
No formal education	27	5.6
Adult education	66	13.8
Qur'anic education	48	10,0
Primaryeducatory	84	17.5
Secondaryeducatory	227	47.3
Tertiaryeducation	28	5.8
Total	**480**	**100.00**
Years offarming experience		
1 – 5	72	15.0
6 – 10	40	8.3
11 – 15	120	25.0
Above15	248	66.7
Total	480	100.00
Farm Size		
1 – 3	242	50.4
4 – 6	122	25.4
7 – 9	95	19.8

10 – 12	21	4.4
Total	480	100.00

Source: Field survey 2017

Institutional Factors
Level of extension contact received by farmers
        Results of the study in table 2 shows that majority of the respondents (66.3%) indicated that they usually had contact with the extension agents on fortnightly basis (fortnightly),while 27.9% of the respondents indicated that they had contact with the extension agents on monthly basis. This may result to efficient use of the improved rice production technology Discussion with the respondents reveals that the promptness of extension contact with the farmers encourage awareness and adoption of improved rice production technology. The more higher number of contacts are plausible because the farmers who have more contacts with extension agents could get case – by - case suitable guidance encouraging the application of fertilizers or prevention of insects and diseases etc.(Haq et al., 2003). Accordingly, it is possible to ascertain in the context of all villages that adequate contacts with extension agents contributed to increased productivity of the rice farmers.

Table3: Distributionoftherespondentsbasedonfrequency ofextensioncontactwith farmers

Item	Frequency	Percentage
Contact with extension agents		
Daily	6	1.3
Weekly	22	4.5
Fortnightly	318	66.3
Monthly	134	27.9
Quarterly	-	-
Total	480	100

Source: Field survey 2017

Access to credit facility
        In furtherance to her past efforts to fight inflation and unemployment, the Central Bank of Nigeria in line with its developmental function established the Anchor Borrowers' Programme (ABP) in year 2015 with a view to collaborate with anchor companies involved in the production and processing of key agricultural commodities. The Programme is targeted toward helping local farmers increase production and supply of feedstock to the processors, reduce importation and conserve Nigeria's external reserves.The Scheme involves a finance model whereby the anchor firms, CBN, NIRSAL and State Governments organize the out-growers and ensure that they comply with contractual terms thereby reducing the incidence of side-selling. The financing institutions serve as veritable channels for delivering credit to the out-growers. The results of the study reveals that all respondents that participated in the ABP benefitted from the credited facility.
        The results of the study in table 4 shows that majority of the respondents (51.7%) received between ₦100,000 – ₦300,000 as ABP loan while only 9% of the respondents indicated that they received more than ₦1,200,0000 as loan. The loan scheme involves an arrangement whereby the anchor firms, CBN, NIRSAL and State Governments organize the farmers and ensure that they comply with contractual agreement. The financing institutions serve as veritable channels for delivery of credit to the out-growers.

Table 4: Distribution of Respondents based on Access to credit facility

Amount accessed (₦)	Frequency	Percentage
100,000 – 300,000	248	51.7
300,001 – 600,000	126	26.3
600,001 – 900,000	65	13.5
900,001 – 1,200,000	32	6.7
Above 1,200,0000	9	1.9
Total	480	100.0

Source: Field survey 2017

Awareness, Trial and Adoption of Improved Rice Production Technology (IRPT)
        Diffusion of improved technology to farmers is an essential pre-requisite for crop production prosperity in Nigeria. In many developing nations, a huge amount of resources have been devoted to extension service in order to educate farmers about new agricultural practices. Table 3 shows the stages of adoption of improved IRPT through awreness of the technology, trial of the technology in a small proportion to determine its relative advantage over the traditional method and the final stage of full scale adoption of the technology.
        The results of the study in table 3 indicated that broadcasting method of sowing rice seeds uniformly on the surface of the field had the highest entries in which 98.8% of the rice farmers became aware about the technology, 95.2% tried the technology on small scale to ascertain performance while 91.3 adopted the

technology. Outcomes of focus group discussion with the farmers reveals that eighty to one hundred kilograms of seeds per hectare can be broadcasted uniformly on the field or in furrows in a one-hectare field.

Weeds management through the application of herbicides had the second highest entries in which 98.8% of the rice farmers became aware about the technology, 95.2% tried the technology on small scale to ascertain performance while 91.3 adopted the technology and sustain it. The result in table 3 further shows that the use of early maturing and high yielding varieties of rice seeds were the 3rd and 4th ranked technologies adopted by the farmers respectively. Mechanical transplanting was the least technology in which only 6.7% indicated awareness about it, 5.8% tried it while only 4.4% adopted it in full.

Table 3: Distribution of Respondents according to Awareness, Trial and Adoption of Improved Rice Production Technology (IRPT)

(n=480)

Rice Production Technology	Aware	Tried	Adopted	Rank
Improved rice varieties				
High yielding varieties	428 (89.2)*	415 (86.4)	402 (83.8)	4th
Disease resistant varieties	298 (62.1)	274 (57.1)	253 (52.7)	9th
Early maturing varieties	465 (96.9)	443 (92.3)	420 (87.5)	3rd
Improved pest/disease control				
Bacterial control method	194 (40.4)	176 (36.7)	153 (31.9)	12th
Fungi control method	114 (23.8)	102 (21.3)	92 (19.2)	13th
Virus control method	63 (13.1)	41 (8.5)	35 (7.3)	14th
Rodent control method	402 (84.4)	382 (79.5)	361 (76.9)	5th
Birds control method	412 (85.8)	382 (79.5)	351 (73.1)	6th
Improved planting technology				
Broadcasting method	474 (98.8)	457 (95.2)	438 (91.3)	1st
Mechanical planting	262 (54.5)	231 (48.1)	222 (46.3)	11th
Transplanting				
Mechanical transplanting	32 (6.7)	28 (5.8)	21 (4.4)	15th
Weed management				
Herbicides application	468 (97.5)	436 (90.8)	412 (85.8)	2nd
Improved harvesting and processing				
Use of combined harvester	294 (61.3)	189 (39.4)	156 (32.5)	10th
Mechanical processing	366 (67.9)	192 (40.0)	144 (30.0)	8th

Multiple responses
*Figures in brackets are percentages
Source: Field survey 2017

FactorsInfluencingAdoption of Improved Rice Production Technology(IRPT)

Adoption of improved rice production technology results in significant increase in rce productivity. Research institutes such as International Institute for Tropical Agriculture (IITA) and National Cereal Research Institute (NCRI) introduced varieties of rice that are accompanied by other management practices in order to produce higher yield to boost food security. Despite all these efforts, research findings indicate that rural farmers in some cases find it difficult to obtain improved rice production inputs that are suitable to their local conditions (Awotide et al., 2012). Reasonable proportions of the farmers are aware of the existence of improved rice production technology, but they have not adopted them. Therefore, certain socioeconomic conditions differentiate farmers who are aware but have not adopted and those who are aware and adopted. Various studies on rice technology adoption have been conducted in developing nations including Nigeria (Mustapha et al., 2012; Kijima and Sserunkuuma, 2013). However, because of variability in natural resources, culture, political system, traditions, beliefs and socio-economic factors, the factors affecting technology adoption differs across the locations. For instance, in a review of technology adoption studies in Africa Heissey and Mwangi (1993) showed that factors that affect technology adoption vary across the locations.

The estimated results of the Probit regression model in Table 4 shows that the age of rice farmers has a significantly negative effect on adoption of IRPT. This result implies that an increase in the age of the farmer would lead to decrease the likelihood of adoption of IRPT significantly. In other words, young farmers are more likely to adopt rice production technologies on their farms than older farmers, because they are likely to take risk in decision making. The result shows that a unit increase in the age of the rice farmers decreased the likelihood of using improved technologies by 0.023 (2.3%). This agrees with Adesina and Baidu-Forson (1995), who reported that that age was negatively related with probability of participation in Rice Development Projects.

Education plays a very important role in promoting agricultural technology adoption. The education variable has a significant ($P \leq 0.041$) and positive influence on adoption of IRPT, suggesting that more educated and informed rice farmers seems to be positive in adoption of improved rice technology than the others. Further, education level of the farmer not only increases his rice productivity but also improves his ability to understand

and evaluate new rice production technologies. The finding is consistent withNamara et al., (2013) who reported that doption of new technology is influenced by education level of a farmer because as his education level increases his ability to obtain; process and use.

The estimated coefficient for family size is positive but not significant, while the coefficient of farming experience(0.046) is significantly positive, which imply that a unit increase in farmingexperience will results to improvement in the farmers' making decision to adopt improved rice technology. Farming experience improves farmers' skills of production, which implies that more experienced farmers may may be able to evaluate the advantages of new rice technology. He can also employ experience to assess the uncertainty that may likely results from adoption of the new rice technology.

Farm machinery ownership is an important indicator of farm household resources. The coefficient of machinery ownership (0.011) is showing significantly positive relation to the adoption of IRPT. This suggests that rice farmers who have farm machinery such as tractor, planter, and tube welland combine harvester are more likely to adopt some new rice technology than others.

According to this study, agricultural extension service was found to be an important factor in adoption of innovation among rice farmers. In this study, extension contact has a significant and positive relation with adoption of IRPT. Farmers who have significant extension contacts have better chances to be aware of various modern rice technology that they can use to increase production. The result shows that a unit increase in the number of visits of extension agents to the farmers increased the likelihood of adopting improved rice technology by 0.016 (1.6%). This means that farmers that had more contact with extension agents are more likely to adopt the improved rice technology. Information that are disseminated by extension agents play a very important role in strengthening a farmer's decisions associated with farming activities by improving skills and knowledge about modern rice technology Farmers need up-to-date information regarding inputs, new technology developed and released by research institutes for utilization by farmers.

The analysis indicated that credit accessibility has positive relationship and significant with adoption of IRPT as it is used to purchase necessary farm inputsfor crop production such as improved and certified seedvarieties, fertilizers, pesticides and farm machinery. In Anchor Borrowers Programme provide loans to farmers in 2016 in order to boost production. Credit give the farmers more chance for adopting modern rice production technology. Similar findings was reported by Baker (2005) who asserted that most successful programmes of agricultural change are those that tie adoption to credit policy.

Complexity of technology indicated a positive and significant relationship (0.037) with adoption of modern rice technology. The complexity of improved technology could be a serious constraint militating adoption as implied by this study. Outcomes of discussion with the rice farmers revealed that modern rice production technology that was relatively easy to understand and follow are readily accepted and adopted than a technology that has complex procedural process.

Table 4: Multiple Regression Resultof theFactorsInfluencingAdoption of Improved Rice Production Technology (IRPT)

Variable	Coefficient	Standarderror	z-value	P	R^2	Remark
Experience (year)	0.03482	0.01783	2.04	0.046	0.724	*
Accessibility to credit	0.07763	0.18742	0.43	0.044	0.913	*
Age (year)	-0.02738	0.01846	-1.95	0.023	0.911	*
Contact with extension agents	0.24265	0.08731	2.74	0.016	0.786	*
Farm size (ha)	0.00146	0.00753	0.22	0.833	0.904	
Complexity of the technology	0.38262	0.18721	1.94	0.037	0.784	*
Relative advantage	0.34724	0.19346	1.79	0.078	0.812	
Household size	0.01145	0.03832	0.27	0.782	0.824	
Membership of cooperative	0.37684	0.19521	1.94	0.055	0.844	
Years of education	0.03761	0.02762	1.67	0.041	0.845	*
Farm machinery ownership	0.87316	0.19321	4.93	0.011	0.907	*
Constant	-1.24897	0.5742	-2.08	0.036		

* Significant at $P \leq 0.05$ LR statistic (10 df)
Source: Field survey 2017

V. Conclusion

Based on the objectives of the study to describe the socio - economic characteristics of rice producing farmers that participated in ABP in the study area; determine the improved rice production technology available to the farmers that participated in ABP; examine the level of awareness and rate of adoption of the improved rice production technology in the study area and determine the factors influencing level of adoption of improved rice production technology under ABP Kebbi state, the results of the shows that Anchor Borrower Programmes (ABP) significantly improves contact with the extension agents on fortnightly basis (69.1%), while 27.9% of the respondents indicated that they had contact with the extension agents on monthly basis. The result also shows that majority of the respondents (51.7%) indicated that they received between ₦100,000 – ₦300,000 as ABP loan while only 9% of the respondents indicated that they received more than ₦1,200,0000 as loan. On the

stages of adoption of improved rice production technology by respondents, broadcasting method had the highest entries in which 98.8% of the rice farmers became aware about the technology, 95.2% tried the technology on small scale to ascertain performance while 91.3 adopted the technology. Weeds management through the application of herbicides had the second highest entries in which 98.8% of the rice farmers became aware about the technology, 95.2% tried the technology on small scale to ascertain performance while 91.3 adopted the technology and sustain it. Probit model was applied to assess the factors influencing the adoption of IRPT and the empirical resultsrevealedthat age, education,experience,access to credit, contact with extension agents and ownership of farm machinerywerepositivelysignificant in influencing the adoption of IRPT.In this study, access to credit accessibilitywas found to positively contribute to improved rice production technology Age was found to have negative coefficient, but influence the adoption of improved rice production technology.

Based on the findings, the study recommended that additional financial sources of credit should be provided with easy access to compliment the on-going ABP. The study also recommend that public and private sectors should provide modern rice technology to farmers at affordable price in order to facilitate access to the technology and adoption. Kebbi State Government should also provide enabling environment for the service providers, such as private agro allied companies, agricultural input dealers to carry out their activities without hitches. This study also recommended that Anchor Borrower Programme in Kebbi should be enhanced and subjected to periodic review so as to provide more platforms for dissemination of improved rice production technology in order to achieve sustainability.

Reference

[1].   Abu, I.A., Pur, J.T. and Ogunbameru, B.O. (2011), "Analysis of socio economic factors influencing the adoption of rice technologies by farmers in Borno State, Nigeria", *Adamawa State University Journal of Agricultural Sciences,* Vol. 1 No. 1, pp. 40-45.

[2].   Adesina AA, Forson JB (1995). Farmers' perceptions and adoption of new agricultural technology: Evidence from analysis in Burkina Faso and Guinea, West Africa. Agric. Econ. 13(2):18-19.

[3].   Agbamu, J.U. (2006), *Adoption and diffusion process for Agricultural Innovation Communication in Nigeria. Department of Agricultural Economics and Extension, Delta State, Asaba, Nigeria*, Matthouse Press Ltd. Victoria Island Lagos, pp. 47-81.

[4].   Akambi, F. (2015). How to Benefit from CBN's Loan: "The dynamics of the Central Bank of Nigeria's AnchorBorrowers' Programme.*Nov 22, 2015* .http://www.financialwatchngr.com/2015/11/22

[5].   Awotide, B. A., Diagne, A. Awoyemi, T. T., and Ojehomon, V. T. (2012). Farm level constraint and adoption of improved rice varieties in Nigeria. *Journal of Agricultural and Environmental Studies,***1** (2), 12-29.

[6].   Baker (2005). Institutional barriers to technology diffusion in rural Africa. University of Massachusetts. Amherst 30pp.

[7].   *Emiefile, G. (2016). Anchor Borrowers Programme: 78,000 Farmers Reap Gains.* BukolaIdowu— *Apr 11, 2016 4:39 am, leadership.ng.*

[8].   Fafunwa, A.B. (1984). *History of Education in Nigeria.* London: George Allen. 43pp

[9].   Haq, A. Z. M., A. Ishida, S.Yokoyama and K.Taniguchi. 2003. Outcomes and issues of agricultural extension services in Bangladesh. J. of Agric. Ext. Res. 8(17): 17- 22

[10].   Heissey, P. and Mwangi, W. (1993).An Overview of Measuring Research Impacts Assessment, in Heisey, P. and Waddington, S. (Eds.). Impacts on Farm Research. Proceedings of a Net workshop on Impacts of Farm Research in Eastern Africa. CIMMYT Eastern and Southern Africa on Farm Research Network Report No. 24. Harare. Zimbabwe, pp. 28-36.

[11].   Kijima, Y., and Sserunkuuma, D. (2013). The adoption of NERICA rice varieties at the initial stage of the diffusion process in Uganda. African Journal of Agricultural and Resource Economics, 8 (1), 45-56.

[12].   Mariano, M.J., R. Villano, E. Fleming. Factors influencing farmers' adoption of modern rice technologies and good management practices in the Philippines. Agric Syst, 110 (2012), pp. 41-53. ArticleDownload PDFView Record in ScopusGoogle Scholar

[13].   Mustapha, S. B., Undiandeye, U.C., Sanusi, A. M., and Bakari, S. (2012). Analysis of adoption of improved rice production technology in Jeer local government area of Borno state, Nigeria", International Journal of Development and Sustainability, 1 (3), 1112-1120.

[14].   Namara, R. E., Weligamage, P., & Barker, R. (2003). *Prospects for adopting system of rice intensification in Sri Lanka: A socioeconomic assessment* (Vol. 75). International Water Management Institute (IWMI).

[15].   National Population Commission (2006). Population figure. Federal Republic of Nigeria, Abuja. Retrieved from http://www.npc.gov.

[16].   Nelson, C. (2015). agricultureAnchor borrowers scheme: Raising stake in agric financing. The Guardian 24 November 2015. https://www.cbn.gov.ng/FeaturedArticles/2015/articles/PresBuhariLaunchABP.asp

[17].   Olaitan SO 1996. *Vocational and Technical Education in Nigeria: Issues and Analysis.* Onitsha: Noble Graphic Press. 57pp.

[18].   Toby, T.U. (1997). *Essentials of Management and Leadership in Vocational Technical   Education:* Jos: NigeriaAssociation of Technology Teachers, University of Jos. 43pp.

[19].   Williams, S.K. T., Fenley, J.M., & Willaims, C.E. (1984). A Manual for Agricultural Extension workers inNigeria. Ibadan: Shyraden Publisher.

[20].   World Bank (2003) "Glossary," Development Education Program, World Bank Group. http://www.worldbank.org/depweb/english/modules/glossary.html.