Bulgarian Journal of Agricultural Science, 27 (No 2) 2021, 417–426

An analysis of the capacity building needs of rice farmers in Kwara State, Nigeria

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Abstract

Omotesho, K F., Akinrinde, A. F., Kayode, A. O. & Olabode, D. A. (2021). An analysis of the capacity building needs of rice farmers in Kwara State, Nigeria. *Bulg. J. Agric. Sci., 27 (2)*, 417–426

Farmers' continuous use of inefficient methods of production, coupled with the wrong application of improved methods plays a significant role in the rice production deficit in Nigeria. This study assessed the use of improved farming practices among the rice farmers; identified the areas of training need; identified the constraints to the use of advanced methods; investigated the determinants of training needs; and examined the relationship between farmers' training needs and their use of improved rice farming practices. A two-stage random sampling procedure was used to select 143 rice farmers on whom an interview schedule was administered. Data collected were analysed using descriptive statistics, Borich's needs assessment model, Pearsons' Product Moment Correlation, and the Multiple Regression Analysis. Results reveal that most of the respondents were males (92.3%), middle-aged (54years), and full-time rice farmers (62.2%). The level of use of improved farming practices among the farmers was high (MS=3.14). The most prominent areas of training need were; improved harvesting techniques, use of herbicides, row planting, optimum seed rate, flood control, land preparation, and levelling, planting depth, fertiliser rate, diseases control, and planting spacing. Inadequate extension contact (MS=3.30) was identified as the major constraints to the use of improved rice farming practices. At $p<0.05$, level of education (β=-4.373), frequency of extension contacts (β=-15.792), and membership of farmer-groups (β=-7.511) were the determinants of farmers' training need. Furthermore, there was an inverse relationship between farmers' training need and use of improved farming practices in rice production (r=-0.268, $p<0.05$). The study concluded by prioritising farmers' areas of training need and recommends among others, that extension and agencies, as well as other bodies involved in training of farmers, focus on the identified areas of priority needs in rice production.

Keywords: Borich's model; capacity building; competency; needs assessment; rice

Introduction

Rice is an important staple food in most developing nations and constitutes a large portion of household diet (Alarima et al., 2011; Ahmed et al., 2016). In Nigeria, rice production plays essential roles in food security, creation of employment and overall economic development. It is a significant source of carbohydrates, minerals, and vitamins. The cereal can be made into several delicious dishes served in homes, social and cultural events. It is also processed into snacks which are consumed by children and adults. Furthermore, starch is extracted from rice for industrial purposes. Two types of rice are grown by farmers in the country, the African rice (*Oryza glaberrima*) and the Asian rice (*Oryza sativa*). Both upland and lowland rice varieties are also cultivated.

Nigeria is one of the largest producers of rice in Africa, it also one of the continent's leading consumers of rice, and simultaneously one of the largest rice importers in the world (Udemezue, 2018.). In the last decade, rice consumption in the country has increased at an average rate of 10.3% per annum (Maji et al., 2015). Also, the per capita consumption

of rice has grown from 3 kg in the 1960s to an estimated 37.5 kg in 2014 (University of Arkansas, 2015) and is expected to increase due to the increase in population. FAO (2019) reported that annual rice production in Nigeria has risen from 5.5 million tons in 2015 to 5.8 million tons in 2017. However, this is yet to sufficiently meet the increased demand for rice which has cumulated in a massive gap between the local supply and its demand. Hence, the country incurred an import bill of about $2.41b on rice between 2012 and 2015 (CBN, 2017). This is in spite of the large quantity smuggled through the porous borders which have created a severe drain of the Nigerian foreign reserve. Though production has increased over the years from an average of 300 000 tonnes in the 1990s to above 5 million tonnes in the year 2018 (FAOSTAT, 2019), the increase in production has been by expansion in area cultivated as opposed to yield. Hence the focus on the efficiency of practices used by farmers' in rice production.

The major problems associated with rice production in Nigeria according to Ajetomobi et al. (2010) include flooding, drought, salt stress, and extreme temperatures. These are all expected to worsen with climate change. Drastic changes in rainfall patterns and rise in temperatures has introduced unfavourable growing conditions into the cropping calendars thereby modifying growing seasons which often, subsequently, reduce productivity. The continued changing pattern of climate gives rise to the necessity of adopting improved farming practices as the farming sector is more susceptible to this change (Matata et al., 2010). Climate change introduces uncertainties in the livelihoods of communities having a higher dependence on weather and climate (Al Hassan & Poulton, 2009; Athula & Scarborough, 2011). It is becoming a threat towards the world community through increasing temperatures, reduced precipitation, frequent droughts and scarcity of water (Adger et al., 2003; IPCC, 2007). FAO (2009), concluded that the essential elements of food production such as soil, water and biodiversity are negatively affected by climate change. Though rice farmers (as other farmers) have continually modifying their farming practices to better adapt to the effect of changing climate, traditional coping mechanisms are not sufficient for dealing with medium to long-term impacts of climate change (FAO, 2009). Hence the use of improved farming practices by rice farmers is therefore critical to meet the demand for rice and reduce the rate of rice importation in Nigeria (Saka & Lawal, 2009). The improved rice farming practices introduced to farmers in Nigeria include; land preparation methods to combat drought and flood, cultivation by transplanting of nursery raised seedlings as against direct sowing of seeds through broadcast method, improved fertilizer, and other agrochemical application, recommended numbers of plant stand, standardized harvesting, and processing techniques among others.

Improved farming practices remain a primary approach used by farmers to increase agricultural productivity and promote food and livelihood security (Nguthi, 2008). However, the dissemination of improved farming practices in the production of rice in Nigeria appears not to have produced the desired impact, particularly on yield. This is perhaps because the step-by-step guides of several aspects of the improved farming practices are often poorly understood despite being seen as an important route out of poverty in most of the developing countries (Bandiera & Rasul, 2010; Simtowe et al., 2011). This is a crucial gap that must be bridged if the problem of insufficient rice production will be solved. To keep farmers abreast of improved farming practices that will boost rice productivity in Nigeria, and to equip farmers with the skills required to put the practices to proper use, there is the need for training and capacity building programmes to assist farmers in understanding the concepts and apply new knowledge in farming adequately (Ibitoye & Onimisi, 2013). Also, given the inadequacy of funds for agricultural extension training in the country, it is important that specific priority areas of need are identified and given attention to the designing and implementation of training programmes. Knowledge of the determinants of training needs of farmers in improved rice farming practices will enable policymakers, and other stakeholders in agricultural extension understand the patterns and drivers of the needs. It is also possible that rice farmers face some challenges in the use of improved farm practices. Such challenges need to be identified and met. It is against this backdrop that the study sought to determine the training needs of rice farmers on improved farm practices in, Kwara State, Nigeria. Specifically, the study aimed to:

- assess the level of use of improved farming practices among the rice farmers;
- identify the improved farm practices in rice production that the farmers require training in; and
- identify the constraints to the use of improved farming practices among the rice farmers.

Hypotheses of the study

The hypotheses of the study were stated in the null form as follows:

$H0_1$: some selected socio-economic characteristics of farmers do not affect their training needs on improved farm practices in rice farming.

$H0_2$: there is no significant relationship between farmers' level of use of improved farming practices and their and training need.

Materials and Methods

The study area

The study was conducted in Kwara State, Nigeria. The state lies between latitudes 7° 45' and 9°30'North and longitudes 2° 30' and 6° 35' East. It covers a landmass of 36 825 square kilometres and a population of about 3.19 million (National Population Commission (NPC), 2016). There are 16 Local Government Areas divided into four (4) agro-ecological zones. The state has two main climate seasons (the wet and dry seasons) with an average daily temperature that ranges between 29°C and 37°C and annual rainfall which ranges between 1100 and 1500 mm. These climatic conditions, as well as the vast expanse of arable land and fertile soils, make the state favourable for agricultural production. The well-known crops cultivated in the state include rice, cassava, maize, sorghum, millet, onions, beans, sugarcane, and cotton.

Sampling procedure and sample size

The population for the study consisted of all rice farmers in Kwara State, Nigeria. A two-stage random sampling procedure was used to select respondents for the survey. The first stage involved the random selection of 30 percent of the 16 communities that are prominent in rice production in the state by dip hat method to give five villages. The five (5) selected communities include; Lade, Efagi, Ekko, Lafiagi, and Puta. The second stage was the random selection of 30 percent of rice farmers from the list of registered rice farmers obtained from KWADP in each of the selected communities. The distribution of the selected farmers in each community is as follows; Ekko (30), Efagi (25), Lafiagi (35), Puta (28), and Lade (25). A total sample size of 143 respondents was therefore used for the study.

Data collection

An interview schedule was used to collect data from the farmers. Both face and content validity of the instrument for data collection was carried out by experts in the field of agricultural extension and rural development. The test-retest method was used to ensure the reliability of the instrument for data collection. The consistency of the instrument was analysed using the Cronbach's alpha coefficient. A coefficient of 0.86 obtained was satisfactory for the reliability of the instrument.

Analytical techniques and measurement of variables

Data collected from the field survey was analysed using both descriptive and inferential statistical tools. Descriptive statistics such as frequency distribution, percentages, means, and standard deviation were used to present the findings from the objectives of the study.

The Pearson Product Moment Correlation was used to examine the relationship between use and training needs of farmers on improved practices in rice production.

The equation for the model is written as follows;

$$\rho X, Y = \frac{E[XY]-E[X]E[Y]}{\sqrt{\sqrt{E[X^2]-E[X]^2}\ \sqrt{E[Y^2]-E[Y]^2}}}, \quad (1)$$

where: X= use of improved practices among rice farmers; Y= training need of farmers in improved practices in rice production.

The Multiple Regression Analysis (Ordinary Least Square method) was used to identify the socio-economic determinants of training needs of farmers on improved practices in rice production.

The equation for the model is specified as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots\ldots + \beta_6 X_{6+} \beta_7 D_1 + \beta_8 D_2 + u_i, \quad (2)$$

where: β_0 = intercept, β_1- β_8 = coefficients;

Y= (Training needs of farmers on improved practices); X_1 = age (in years); X_2 = level of education (Number of years of schooling); X_3= average annual income (amount in ₦); X_4 = rice farming experience (years); X_5= farm size (acres); X_6= frequency of extension contact (number of contact in the immediate past 6 months period of the study); X_7 = household size (number of people living under the same roof and feeding from the same pot); X_8 = cosmopoliteness (farthest distance travelled); D_1= Sex (1= male, 0= otherwise); D_2= primary occupation (1= rice farming, 0= otherwise); u_i= error term.

Training needs of farmers on improved practices were determined using the Borich's Needs Assessment Model. According to Borich (1980) training needs is a function of the mean weighted discrepancy score (MWDS). It is calculated using the following formula:

$$\text{Training need (MWDS)} = \text{I.S} - \text{C.S} \times \text{M.I}, \quad (3)$$

where: *MWDS* = Mean Weighted Discrepancy Score; *I.S* = Importance score; *C.S* = Competence score; *M.I* = Mean of Importance.

For the purpose of this study, a threshold of two-fifth (2/5) of the Mean Weighted Discrepancy Score (MWDS) was adopted for the establishment of respondents' need for training in any of the improved practices. Hence, a respondent with MWDS of greater or equal 4.80 in any of the improved farming practices requires training in such area. Fur-

thermore, a respondent with MWDS lesser than 4.80 in any of the improved practices does not require training in such an area. A four-point Likert-type scale was used to measure respondents' perceived importance of the improved practices and also the level of the respondents' competence in the improved practices. The scale was graded as follows:

Perceived importance of improved practices: Not important = 1: Mildly important = 2: important = 3: very important = 4.

Respondents' perceived level of competence in improved practices; Excellent = 4: Good = 3: Poor = 2: not all = 1

On a scale of 4, a benchmark of 2.0 was set for the indication of the importance of and competence in improved practices in rice production.

Use of improved practices among rice farmers: This was measured using a 4-point Likert scale. A list of improved practices in rice farming was drawn and respondents were required to indicate their level of use on a scale of 1-4. The scale was graduated as follow; Never use=1, rarely use= 2, Often use = 3, Always use = 4

Constraints to the use of improved practices: A four-point Likert-type scale was used to measure the constraints to the use of improved practices among rice farmers. A list of possible constraints was drawn and respondents were required to rate their level of severity on a scale of one to four graduated as follows; Not a constraint = 1, Not severe = 2, Severe = 3, Very severe = 4.

Results and Discussion

Socio-economic characteristics of the rice farmers

This section presents the discussion on the socio-economic characteristics of the rice farmers in the study area. The results are presented in Table 1.

Table 1 reveals that the modal age range was 46-55 years. With a mean age of 54 years, the result implies that majority of the respondents were within their middle, active and productive ages and hence can engage efficiently in rice production. The farmers' age range is within such as could be open to learning new farming practices in order to increase their yield. This agrees with the findings of Onyeneke, (2017) who reported that farmers in this age category may be more likely to handle risks involved in adopting improved technologies in rice agricultural production. The result also shows that more males (92.3%) involved in rice production than females. This could be as a result of the intense nature, energetic and time requirements of rice production which female farmers could not afford because of their involvement in domestic duties. Hence their focus on processing and marketing of rice (Mustapha et al., 2012; Omotesho et al., 2017). Majority (86%) of the respondents were committed to family responsibilities through marriage with an average of seven (7) household members. Higher household members could provide family labour in rice production and therefore reduce the cost of labour in rice production. On the contrary, higher household size could indicate that families may consume a major part of their produce realized on the farm with little for sale to earn income (Omotesho et al., 2017). Most of the respondents (62.2%) were full-time farmers who produce on a small-scale (2.16acres), earn an average of ₦ 300 328 (834 USD) per annum and have an appreciable years of farming experience (20 years). The educational qualification of the respondents shows that majority of the rice farmers constituting 86% had various levels of education ranging from primary to tertiary education. Most (44.8%) having just secondary school education. The literacy level of farmers could help to broaden the farmers' knowledge and make the use of improved technologies easy. This agrees with the findings of Sofoluwe et al. (2011) and Saliu et al. (2016). Extension agents were the major source of information to the majority of the rice farmers (99.3%) with an average of two (2) extension visits within the past 6 months prior to data collection for the study. Similar findings were reported by Omotesho et al., (2017). This low frequency of extension contact could negatively affect farmers' knowledge and the level of use of improved farm practices in rice production. Furthermore, the majority (81.8%) of the rice farmers were members of farmer-groups. As posited by Rahji & Fakayode (2009), membership of association is expected to assist farmers to get easy access to credit and other production inputs. Only (41.3%) had access to credit or loans. According to Ibrahim (2014), the ability to access credit helps the farmers procure improved technologies such as improved seeds, fertilizers, and chemicals, which in the long run will motivate and increase the level of use of improved farm practices.

Level of use of improved farm practices

This section discusses the farmers' level of use of improved farm practices in rice production. The results are presented in Table 2.

The use of various improved rice production practices is presented in Table 2. From the result, it could be inferred that the improved farming practices majorly used by rice farmers are tied to pre-planting operations. These practices include; improved application of herbicide for weed control (MS=3.72), improved land preparation and levelling techniques (MS=3.71), use of improved seed varieties (MS=3.62), use of recommended fertiliser rate (MS=3.59) and improved seed selection (MS=3.53). Karaye et al. (2017), opined that pre-planting operations are the bedrock

Table 1. Socio-economic characteristics of rice farmers

Variables	Frequency	Percentage	Mean	SD
Age (years)				
≤ 25	5	3.5		
26-35	28	19.6	54.27	9.56
36-45	32	22.4		
46-55	74	51.7		
≥56	4	2.8		
Sex				
Female	11	7.7		
Male	132	92.3		
Educational level				
No formal education	20	14.0		
Primary education	56	39.2		
Secondary education	64	44.8		
Tertiary education	3	2.1		
Marital status				
Single	20	14.0		
Married	123	86.0		
Primary occupation				
Otherwise	54	37.8		
Rice farming	89	62.2		
Rice farming experience (years)				
≤10	36	25.12	20.39	7.47
11-25	99	69.23		
26-45	8	5.60		
Farm-size (acres)				
≤ 3	134	93.7	2.16	0.89
4-6	9	6.3		
Extension contact				
≤ 3	127	88.8	2.60	0.99
4-7	16	11.2		
Household size				
≤ 4	52	36.4	7.26	3.10
5-9	82	57.4		
10-14	9	6.2		
Annual income				
≤ 150,000	45	31.5	300 328.67	
150,001-450,000	84	58.8		
450,001-1,500,000	12	8.4		
≥1,500,001	2	1.4		
Membership of farmer group				
No	26	18.2		
Yes	117	81.8		
Access to credit				
No	59	41.3		
Yes	84	58.7		
Major Source of information				
Extension agents	142	99.3		
Friends and families	1	0.7		

Source: Own research results

Table 2. Level of use of improved farm practices

Improved farm practices	Always Used F, %	Often Used F, %	Rarely Used F, %	Never Used F, %	Mean Score
Use of herbicide for weed	116 (81.1)	13 (9.1)	12 (8.4)	1 (0.7)	3.72
Improved Land preparation and levelling techniques	108 (75.5)	29 (20.3)	5 (3.5)	1 (7.0)	3.71
Improved seed varieties	102 (71.3)	29 (20.3)	10 (7.0)	2(1.4)	3.62
Recommended fertilizer rate	106 (74.1)	19 (13.3)	14 (9.8)	4 (2.8)	3.59
Improved seed selection	98 (68.5)	27 (18.9)	13 (9.1)	5 (3.5)	3.53
Row planting	91 (63.6)	35 (24.5)	15 (10.5)	2 (1.4)	3.50
Recommended plant spacing	89 (62.2)	36 (25.2)	17 (11.9)	1 (0.7)	3.49
Recommended/optimum seed rate	93 (65.0)	27 (18.9)	19 (13.3)	4 (2.8)	3.46
Use of chemicals to control insects and pests	86 (60.1)	37 (25.9)	14 (9.8)	6 (4.2)	3.42
Use of chemicals to control diseases	77 (53.8)	36 (25.2)	25 (17.5)	4 (2.8)	3.31
Recommended planting depth	73 (51.0)	38 (26.6)	24 (16.9)	7 (4.9)	3.25
Rice bund preparation	70 (49.0)	44 (30.8)	21 (14.7)	8 (5.6)	3.23
Improved harvesting techniques	68 (47.6)	43 (30.1)	17 (11.9)	15 (10.5)	3.15
Recommended planting calendar	71 (49.7)	28 (19.6)	18 (12.6)	26 (18.2)	3.01
Irrigation farming/water management	53 (37.1)	45 (31.5)	25 (17.5)	20 (14.0)	2.92
Flood control measures	54 (37.8)	37 (25.9)	30 (21.0)	22 (15.4)	2.86
Record keeping	65 (45.5)	24 (16.9)	20 (14.0)	33 (23.1)	2.85
Thinning	51 (35.9)	32 (22.5)	32 (22.5)	27 (19.5)	2.75
Nursery preparation/practices	44 (30.8)	41 (28.7)	35 (24.5)	23 (16.1)	2.74
Transplanting/improved planting method	56 (39.2)	17 (11.9)	44 (30.8)	26 (18.2)	2.72

Source: Own research results

to increase in farm yield hence the much-needed attention farmers pay to it. This results further reveal that improved farming practices associated with planting and post-planting operations in rice production were less used than pre-planting improved practices. This is evident in the use of irrigation facilities/water management techniques (MS=2.85), transplanting/improved planting method (MS=2.35), improved harvesting techniques (MS=), improved threshing techniques (MS=2.74), flood control measures (MS=2.75), and record keeping (MS=2.72). Omotesho et al. (2017) identified inadequacy of irrigation facilities and inadequate government funding as major inhibitors to water management techniques in rice farming. Bora and Hansen (2007), similarly reported that rice harvesting is mostly done manually by using hand sickle, handheld knife, and other crude implements.

As shown in Table 3, the overall mean of the respondents' use of improved farm practices in rice production was 3.14. The result shows a commendable level of use of improved farm practices in rice production among the farmers. Ngailo et al. (2013) similarly reported that one of the major drivers of rice yield improvement in recent times is the use of improved seeds, improved fertiliser use, adequate water management, enough and appropriate use of insecticides, use of herbicides and mechanization.

Table 3. Distribution of respondents based on their level of use of improved farm practices in rice production

Use	Frequency	Percentage	Mean
Low (<2.00)	1	0.7	
Fair (2.00-3.99)	45	31.5	3.14
High (>2.99)	97	67.8	

Source: Own research results

Training need for farmers in the use of improved farm practices

This section discusses the training need of farmers on the use of improved farm practices.

As shown in Table 4, all the identified improved farm practices in rice production were perceived as important by the farmers. This is based on the benchmark earlier set at 2.00. The mean score on the importance of all the improved farm practices as shown in the table is higher than 2.00. These findings imply that rice farmers in the study area have a good understanding of the significance of improved rice farming practices at the pre-planting, planting and post-planting phase of production in boosting their yield and hence their income. This corroborates with the findings of Ojo et al. (2018).

However, despite the farmers' recognition of the importance of the improved farm practices in rice production, Table

Table 4. Training need of farmers on the use of improved farm practices

Improved Farm Practices	Level of Importance		Level of Competence		Training Need	
	Mean	Remark	Mean	Remark	MWDS	Remark
Improved harvesting techniques	3.85	Important	1.66	Not competent	8.43	Needed
Use of herbicides for weed	3.31	Important	1.47	Not competent	6.09	Needed
Row planting	3.25	Important	1.50	Not competent	5.69	Needed
Recommended /optimum seed rate	3.25	Important	1.60	Not competent	5.36	Needed
Flood control measures	3.27	Important	1.66	Not competent	5.26	Needed
Land preparation and leveling	3.22	Important	1.63	Not competent	5.12	Needed
Recommended planting depth	3.11	Important	1.47	Not competent	5.10	Needed
Recommended fertilizer rate	3.20	Important	1.62	Not competent	5.06	Needed
Use of chemicals to control diseases	3.20	Important	1.68	Not competent	4.86	Needed
Recommended planting spacing	3.06	Important	1.48	Not competent	4.83	Needed
Recommended planting calendar	3.10	Important	1.59	Not competent	4.68	Not Needed
Nursery preparation/practices	3.15	Important	1.67	Not competent	4.66	Not Needed
Improved seed varieties	3.22	Important	1.81	Not competent	4.54	Not Needed
Improved seed selection	3.09	Important	1.66	Not competent	4.42	Not Needed
Rice bund preparation	3.00	Important	1.53	Not competent	4.41	Not Needed
Irrigation farming/water management	3.00	Important	1.53	Not competent	4.41	Not Needed
Use of chemicals to control insects	3.01	Important	1.57	Not competent	4.33	Not Needed
Transplanting/improved planting	3.11	Important	1.75	Not competent	4.23	Not Needed
Thinning	3.04	Important	1.66	Not competent	4.19	Not Needed
Record keeping	3.03	Important	1.65	Not competent	4.18	Not Needed

Source: Own research results

4 further shows that the farmers were not competent in carrying out these activities. Therefore, high use of improved farm practices as revealed in Table 3 and a low competency of the farmers as shown in Table 4 implies that the farmers do not use the improved farm practices appropriately and hence the need for training in the methods. This agrees with the findings of Alexander et al. (2018). Table 4 further reveals the improved farming activities in order of severity of training need. Accordingly, the most crucial area of training need was the use of improved harvesting techniques. It could, therefore, be deduced that on-farm post-harvest loss is very high among the farmers. Other identified areas of training need include use of herbicides for weed control, row planting, use of recommended optimum seed rate, flood control measures, land preparation and levelling, use of recommended planting depth, use of recommended fertiliser rate, use of chemicals to control diseases and recommended planting spacing.

With an average MWDS of 4.78, most of the farmers require training in the use of improved farm practices in rice production.

Constraints to the use of improved farm practices

This section discusses the challenges to the use of improved farm practices by the farmers. Results in Table 5 shows the severity of the constraints to the use of improved farm practices in rice production. Ineffective extension service/poor extension agent farmers contact (MS=3.30) was identified as the major constraints to the use of improved farm practices in rice production. The Ineffectiveness of extension service, as well as poor extension agent farmers contact, could be said to have birth other constraints identified by the farmers. Poor market channels, as well as low technical know-how of improved rice farming practices, could be solved by the effectiveness of extension service delivery which had been identified to be the primary source of information to the farmers. The result further reveals that awareness of improved farm practices is not a constraint. This is evident in the high use of improved practices. Damola (2010) reported that lack of rice development policies, inadequate irrigation, low level of farming technologies, inadequate agricultural input supply system, delay in disseminating improved seeds, inadequate and weak agricultural extension and poor accessibility to institutional credits, among others constitute constraints to the use of improved farm practices in rice production. However, the awareness of the practices doesn't inform appropriate and competent use of the practices.

Table 5. Constraints to the use of improved farm practices

Constraints	NC	LS	S	VS	Mean Score	Rank
Poor market	80 (55.9)	31 (21.7)	26 (18.2)	6 (4.2)	3.29	2nd
Poor technical know how	37 (25.9)	58 (40.6)	40 (28.0)	7 (4.9)	2.88	3rd
Low literacy level	38 (26.6)	53 (37.1)	42 (29.4)	10 (7.0)	2.83	4th
Climate change/ irregular rainfall pattern	20 (14.0)	59 (41.3)	52 (36.4)	12 (8.4)	2.61	5th
High cost of improved seed varieties	9 (6.3)	18 (12.6)	81 (56.6)	35 (24.5)	2.01	12th
Unavailability of improved seeds	32 (22.4)	29 (20.3)	56 (39.2)	26 (18.2)	2.47	7th
Inaccessibility of fertilizer	23 (16.1)	20 (14.0)	68 (47.6)	32 (22.4)	2.24	9th
High cost of agrochemicals	5 (3.5)	16 (11.2)	61 (42.7)	61 (42.7)	1.76	14th
High cost/unavailability of other equipment e.g. farming implements, machines etc	10 (7.0)	24 (16.8)	48 (33.6)	61 (42.7)	1.88	13th
High cost/unavailability of labour to carry out the essential farming activities	18 (12.6)	33 (23.1)	70 (49.0)	21 (14.7)	2.48	6th
Inadequate extension service/poor extension agent-famer's contact	81 (56.6)	30 (21.0)	26 (18.2)	6 (4.2)	3.30	1st
Unavailability of finance/high interest rate on loan boost production	13 (9.1)	45 (31.5)	40 (28.0)	45 (31.5)	2.18	10th
High preference of imported rice	23 (16.1)	46 (32.2)	40 (28.0)	34 (23.8)	2.41	8th
Poor awareness of improved farm practices	7 (4.9)	19 (13.3)	31 (21.7)	86 (60.1)	1.63	15th
High incidence of pest and diseases infestation	5 (3.5)	43 (30.1)	65 (45.5)	30 (21.0)	2.16	11th

Source: Own research results. NC-Not a Constraint, LS- Less severe, S-Severe, VS- Very Severe

Results of Tested Hypotheses

$H0_1$: some selected socio-economic characteristics of farmers do not affect farmers' training need on improved farm practices in rice production.

Results presented in Table 6 reveals the socio-economic determinants of farmers training need on improved farm practices in rice production. The adjusted R^2 of 0.555 indicated that 55.5% of the variations in the training needs of farmers on improved farm practices was explained by the variables included in the model. The result shows that at $p<0.05$, level of education (β=-4.373), extension contacts (β=-15.792), and membership of farmer-group (β=-7.511) were the determinants of farmers' training needs. The negative coefficient of the level of education implies an inverse relationship with the training needs of farmers on improved farm practices. This means that an increase in the level of education of farmers will cause a decrease in the training needs of farmers on improved farm practices. That is, a higher level of education depicts a lesser training needs of farmers on improved farm practices (Pierre-Andre et al., 2010; Adeogun et al., 2013).

Similarly, the training needs of farmers on improved farm practices decreases with an increase in the frequency of extension contacts and membership of farmer-groups. From this result, it could be inferred that increase in extension contacts to farmers via farmer-groups will reduce the training need of farmers on improved farm practices. Generally, the more farmers are involved in farmer organisations' meetings and activities, the more they will access new information about improved farm practices. Active participation in the social organisation would increase the likelihood of getting adequate information and demonstration of improved farm practices

Table 6. Socio-economic determinants of farmers' training need for improved farm practices

	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	-33.478	10.085	-3.320	.001
Age	.290	.214	1.354	.178
Sex	-4.498	6.368	-.706	.481
Educational level	-4.373	1.826	2.396	.018
Frequency of extension contact	-15.792	3.526	-4.479	.001
Primary occupation	.916	1.712	.535	.594
Household size	.812	.704	1.153	.251
Annual income	-3.275E-6	.000	-.741	.460
Membership of farmer-group	-7.511	4.730	1.588	.015
Access to credit	-2.902	3.635	-.798	.426

Source: Own research results. * Significant at $p\leq0.05$ R^2=0.555 F-value=5.033**

since farmer-groups had been identified as an efficient contact tool of extension agents (Onyeneke, 2017). Extension services serve as an essential source of information on agricultural production. Farmers who have significant extension contacts have better chances to be aware of various management practices that they can use to increase production. This result agrees with Alexander et al. (2018) who opined that it is vital to consider farmers' socio-economic characteristics when making decisions on training needs as it will help to channel training effort rightly for maximum results.

$H0_2$: there is no significant relationship between the use of improved farm practices and training needs of farmers in these practices (Table 7).

Results of correlation analysis between farmers' training need on improved farm practices in rice production and use of the improved practices reveal that there was an inverse relationship between farmers' training need and use of improved farm practices in rice production. The result indicated that poor use of the improved farm practices could be attributed to poor training on the improved farm practices which implies that the more the training need, the less the use. The lower the training need, the more the use. This implies that use can be enhanced by exposing farmers to more training on improved farm practices and this agrees with the submission of Rahman et al. (2018).

Table 7. Relationship between farmers' training need for improved farm practices and the use of the practices

Variable	r-value	p-value
Farmers' Training Need	-0.268***	0.001

***. correlation is significant at the 0.05level (2-tailed)

Conclusion and Recommendations

The study concluded by identifying 10 priority areas of training need as; use of improved harvesting techniques, use of herbicides for weed control, row planting, use of recommended optimum seed rate, flood control measures, land preparation and leveling, use of recommended planting depth, use of recommended fertilizer rate, use of chemicals to control diseases and recommended planting spacing. The study also concluded that farmers' level of education, frequency of extension contacts and membership of farmer-groups inversely influenced the need for training on the use of improved rice farming practices. Finally, the study identified factors related to poor technological know-how and financial constraints as barriers to the effective use of improved rice farming practices. It is therefore recommended that;

- Policymakers, extension as well as other agencies involved in farmers' training in the study area should focus on the identified areas of priority needs in the design and implementation of their training programmes.
- The agricultural extension agency should increase the frequency of extension visits. Educated farmers' who have been identified to have lower training needs can also be used to reached other farmers and complement the efforts of the extension agents.
- A multidimensional approach should be explored to enhancing farmers' income and access to funds to solve farmers' financial constraints. This will include the provision of better markets for farmers' produce and improved access to farm credit.
- Farmers' should be encouraged to improve their membership and participation in farmer-group activities.

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Received: September, 17, 2019; *Accepted:* January, 14, 2020; *Published:* April, 30, 2021