



ANALYSIS OF UTILIZATION OF THE SYSTEM OF RICE INTENSIFICATION
INNOVATION SMART PRACTICES AMONG SMALLHOLDER FARMERS IN
NORTH-WEST, NIGERIA

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ABSTRACT

The study examined the utilization of SRI innovation practices among smallholder farmers in North-west, Nigeria. A 3-stage sampling procedure was used in selecting 315 respondents for the study, using structured questionnaire and interview schedule. Data were analyzed using descriptive and inferential statistical tools. The result shows that majority are males (91.7%), married (75.0%), with secondary education (66.7%). Average age of 32 years, farming experience of 11 years, monthly income of ₦30, 637.51k, farm size of 7.0 hectares and household-size of 5 persons. No presence of extension-services (91.7%). Main sources of information on SRI practices are fellow-farmers (45.3%), field-demonstration (16.2%) and contact-farmers (11.7%). The respondents used all the examined SRI innovation smart components (\bar{x} =1.527-1.743). extent of utilization indicated that majority (79.4%) agreed that they very much used the SRI innovation components. Respondents perceived severe to very severe constraints to utilization of SRI smart practices (\bar{x} =3.19-3.45) with constraint index of \bar{x} =3.21. It was recommended that other sources of information on SRI smart practices be instituted, employed and used to improve the information and knowledge sources on SRI smart practices. With the increased information sources, extent of utilization can be more enhanced for food security. Most severe constraints to SRI utilization be examined and mitigated by development partners, stakeholders in rice production, extension agents and solving matter specialists with periodic capacity-building training on climate-change variability and mitigation measures.

Keywords: Analysis, Intensification, Rice, Smallholder and Utilization.

INTRODUCTION

Nigeria is the major producer and customer of rice in Africa. In 2021, 5 million metric tons of rice was produced against a demand of 6.8 million metric tons per annum. Around 90% of the rice is grown on paddies by resource-constrained smallholder farmers (Abdulkadir, *et al.*, 2022). Rice paddies contribute almost 20% of total worldwide anthropological methane emissions, and overall rice farming accounts for around 2.5% of all global human-induced greenhouse gas (GHG) emissions. (LINKS, 2021). In a bid to increasing food production and alleviate poverty in Sub-Sahara Africa (SSA), given the limited possibility for expansion of cultivable area and increase in population, there is need for a Green Revolution (GR). GR enhances crop yield per unit of land by using high-yielding varieties, irrigation and agrochemicals such as fertilizers, pesticides and herbicides. The speed and scale with which it solved the food problem was remarkable and unprecedented, and it contributed to a substantial reduction in poverty and the launching of broader economic growth in many Asian countries. Improved cereal varieties, fertilizers, irrigation, and modern pest control methods lay at the heart of the GR (Yakubu *et al.*, 2021).



With a view to increasing rice productivity, the System of Rice Intensification (SRI) practices was developed and introduced to improve GR. The absence of technology, limited access to and inappropriate is among the factors causing food deficiency in most parts of developing world (Adepoju, 2018). The technology emphasizes sustainability principles in management of soil, water, local plants, nutrients and its' incorporation into farmers' current practices (where they deem compatible). The core philosophies of the SRI are; younger seedling, one seedling planted at one clump, wide square planting (more than 0.2m × 0.2m), and intermittent irrigation (Garba and Kumeri, 2016). The SRI innovation is a fluid package that needs to be adjusted according to local nuances (Esiobu *et al.*, 2020). Emphasis is still given to compliance with the usage of organic fertilizer to reduce synthetic fertilizers and improve the soil quality and structure (Abdulkadir *et al.*, 2022). It is differentiated also with diverse types of biological control from the orthodox weed and pest management. Using this philosophy, rice is more resistant to pests and pathogens as their leaves are stronger, larger and bolder than those planted using the conventional systems (Doni *et al.*, 2023). Water, seed and chemical inputs are used efficiently when SRI norms are strictly implemented and monitored (Esiobu, *et al.*, 2020). Since the system moderates' external inputs, SRI smart practices have positive influences on resource and environmental conservation. Hence, SRI pave way to realizing the goals of sustainable agriculture. Essentially, still, it gives flexibility and robustness and the practices are applicable to smallholder farmers.

Trials with the System of Rice Intensification were first undertaken at the Sabon Gari station of Ahmadu Bello University in 2006-07, and farmer trainings and trials were done in Ondo State in 2007, but the results were not well-documented (Ewepu, 2022). In 2010, the Nigerian NGO Green Sahel-RDI began promoting SRI in Jigawa State after sending participants to an SRI event sponsored the USAID-funded IICEM/E-ATP Expanded Agribusiness Trade Promotion project in Mali in 2010. In 2011, Green Sahel Agricultural and Rural Development Institute (GSARDI) conducted a training program on SRI and organic methods with support from E-ATP project in Jigawa State (Hiawatha, 2021). Farmers trained by the E-ATP SRI events in Nigeria have gotten yields up to 10 tons/ha due to the utilization of SRI practices. The Commercial Agriculture Development Project (CADP) in Kano State reports usage of SRI among rice farmers in project areas where SRI is being extended resulted in an average yield increase from 2.7 to 3.6 metric ton per hectare (Yakubu, *et al.*, 2021). Nigeria is included in the project Improving and Scaling up the System of Rice Intensification in West Africa (SRI-WAAPP) (Rahman *et al.*, 2021).

SRI initiative under the WAAPP-assisted Rice Value Chain Innovation Platform was launched in Abakaliki, Ebonyi state in 2014. Institute for Agricultural Research of the Ahmadu Bello University Zaria embarked on a project by training 1,000 Bakolori farmers in System of Rice Intensification methods in 2018 (Onuoha *et al.*, 2020; Hiawatha, 2021). During 2021, the LINKS program (Catalysing Economic Growth for Northern Nigeria) began using the SRI in Jigawa and Kano States to increase farmer incomes through increased yields while reducing GHG emissions, seed utilization, and water consumption in a commercially and environmentally sustainable manner (Esiobu *et al.*, 2020). Till date the extent of utilization of the SRI smart technology remains low especially in Nigeria where rice farmers abound and also rice is one of the most consumed cereals amongst others (Ewepu, 2022; Siéwé, *et al.*, 2023). The main objective of the study is to examine the extent of utilization of the System of Rice Intensification innovation smart practices among smallholder farmers in North-west, Nigeria. The specific objectives are to;

- i. describe the socio-economic characteristics of the respondents in the study area;
- ii. examine the respondents' source(s) of knowledge on the SRI innovation;



- iii. determine the extent of utilization of the SRI innovation practices;
- iv. identify the constraints of the respondents to utilization of the SRI innovation practices;

Hypothesis:

H₀₁: There is no significant relationship between the utilization of SRI innovation smart practices and some selected socio-economic characteristics of the respondents.

MATERIALS AND METHODS

The Study Area

The study was conducted in Jigawa and Kano states in North-West Nigeria where the pilot SRI project was conducted. The study area is located between Latitude $11^{\circ} 00' 00''$ N and $13^{\circ} 00' 00''$ N with Longitude $8^{\circ} 00' 00''$ E and $10^{\circ} 15' 00''$ E. The area occupies a land mass of 216,065 Sq Km. According to National Population Census (2006), the study area has a population of 26,231,987 with a growth rate of 2.83% and 2.94% in Jigawa and Kano states respective. Jigawa State has a total of 27 Local Government Areas (LGAs) divided into Agricultural zones, which include Headquarters at Birnin-Kudu, Gumel, Hadeja and Kazaure. Agricultural activities predominant with food crops grown are millet, cowpea, sorghum, maize, and rice. Fishing and livestock production are key economic activities as well. The topography is characterized by high land areas which are almost 750metres above sea level. Soil tends to be fertile ranging from sandy-loamy with many pockets of Fadama and alluvial plains suitable for the cultivation of rice.

Kano State has a total of 44 Local Government Areas (LGAs) about 13,076,900 people with an annual growth rate of 2.94%. Based on this growth rate projected present population of the state to about 19,296,109 (NPC, 2006). It lies between latitude $11^{\circ} 33'$ North and $12^{\circ} 37'$ North of the equator and Longitude $8^{\circ} 34'$ East and $9^{\circ} 29'$ East and covers a land area of about 20760km² square. The state is bordered to the West and Northwest by Katsina State, to the East and Northeast by Jigawa State, to the South by Bauchi State, and to the Southwest by Kaduna State. The annual rainfall is between 420mm-1000mm and the temperature is averagely warm throughout the year. Most of the people of Kano State depend on agriculture for their livelihood. Major crops grown in the state includes rice, millet, groundnut, pepper, sorghum, and maize which are grown throughout the year because of the availability of irrigation facility made possible by the establishment of artificial water bodies like earth dams across the state. The state is administratively divided into three agricultural zones by Kano State agricultural rural development authority.

Sampling Procedure and Sample Size

A multi-stage sampling procedure was used in selecting respondents for the study. The first stage was a purposive selection of Jigawa and Kano states being the states where the pilot phase of the SRI innovation project was first conducted in Northwest, Nigeria. The second stage was a judgmental selection of three Local Government Areas from each state where rice is mostly produced and where SRI farmers probably abound to obtained a total of six (6) local government areas. In the third stage, Taro Yamane's formula was used at 5% probability level to obtain a sample size of 315 respondents for the study. This implies that a total of 97 respondents were used in Jigawa State and 218 respondents were used in Kano State to give a total of 315 respondents for the study.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Rice Farmers



The distribution of the respondents based on their socio-economic characteristics is shown in Table 1. Majority of the respondents were males (91.7%) which implies that the activities of rice production is dominated by the males. This may be due to the rigorous activities involved in the rice production activities which the females may not be able to cope with. Significant proportion (74.9%) were married with secondary educational qualification (66.7%). The marital status was corroborated by Ehien *et al.* (2017), who agreed that marriage confers responsibility.

Table 1: Distribution of the respondents based on their socio-economic characteristics

Variables	Frequency	Percentage	$\bar{x} \pm \delta$
Age (Yrs.)			
0-20	3	0.9	33.4±1.94
21-30	97	30.8	
31-40	210	66.7	
≥ 41	5	1.6	
Sex			
Male	289	91.7	
Female	26	8.3	
Marital Status			
Single	70	22.2	
Married	236	74.9	
Widowed	5	1.6	
Divorced	4	1.3	
Farming Experience (Yrs.)			
1-5	8	2.5	10.89±2.37
6-10	139	44.1	
11-15	149	47.4	
16-20	16	5.1	
≥ 21	3	0.9	
Educational Qualifications			
No Formal Education	3	0.9	
Primary Education	53	16.8	
Secondary Education	210	66.7	
Tertiary Education	15	4.8	
Islamic Education	34	10.8	
Average Monthly Income (N)			
1-10,000	5	1.7	30,637.51±3,689.84
11,000-20,000	3	0.8	
21,000-30,000	157	50.0	
31,000-40,000	126	40.0	
41,000-50,000	21	6.7	
≥ 51,000	3	0.8	
Farm Size (ha)			
1-5	105	33.3	7.2±1.4
6-10	173	54.9	
11-15	31	9.8	
≥ 16	6	2.0	
Household Size (No)			
1-5	235	74.6	4.7±1.6
6-10	70	22.2	
11-15	8	2.5	
≥ 16	2	0.7	
Presence of Extension Services			
Yes	26	8.3	
No	289	91.7	

Source: Field Survey, 2023. $\bar{X} \pm \delta$ = Mean \pm Standard Deviation

Extension services saddled with goal of bringing innovation, technologies and improved practices as well as problem solving are not seen in the study area (91.7%). Hence, awareness of the SRI practices may not be felt by the rice farmers and still usage maybe hampered. The average age of the clientele is 33 years, which implies that the respondents are youth who are energetic and agile to carry out all the rigorous activities that may be involved in implementing the SRI technology. This is in line with the submission of Nasiru *et al.* (2017), who agreed that the mean ages of youth in utilization of rice production and processing technologies in Jigawa state is 34 years. Average rice farming experience is 11 years, monthly income of ₦30, 637.51k, household size of 5 persons and farm size of 7.0 hectares. This is in line with the work of Orifa and Fadairo (2015), who found that average household size of cassava youth farmers was within 5-6 persons. The farming experience is an indication that the respondents are experienced rice farmers. Household size implies that more hands would be available for labor to implement the SRI usage.

Source(s) of Information of the Clienteles on SRI Innovation Smart Practices

The sources of information of the respondents on SRI innovation smart practices is worthwhile, in order to know the main sources through which the respondents (Users) became aware of these practices among the array of the sources available. According to the table 2, the main sources of information among the array is fellow farmers (45.3%). This is in line with the submission of Okoro *et al.* (2023) who agreed that the main sources of information of rice farmers in Enugu State, Nigeria is fellow farmers. This was followed directly by field demonstration (16.2%). This is probably because field demonstration in form of SPAT (Small Plot Adaptive Training) can be used to arouse the interest of the clientele and allow them to use the SRI innovation practices. Fidelugwuowo (2021) posited that one of the main sources of information of farmers on improved innovation is through the use of demonstration plots. Contact farmers (11.7%) took the third position, because they are the first point of contact on innovation dissemination, utilization and adoption. Farmers' association (6.0%) is another mean through which respondents got information about the SRI innovation practices. This is so because farmers are known to pass information on improved farming practices to themselves via individual contact procedure and this had proven to be very effective. This is in congruent with the work of Adio *et al.* (2016) who agreed that farmers' association is one of the main sources of information of farmers on innovation utilization.

Table 2: Distribution of the respondents based to their source(s) of information on SRI Innovation Smart Practices

S/NO	Variables	Frequency	Percentage
1	Extension Contact	10	3.2
2	Contact Farmers	37	11.8
3	Fellow Farmers	146	46.4
4	Research Institute	2	0.6
5	Leaflet Postal	1	0.3
6	Field Demonstration	51	16.2
7	NGO Activities	1	0.3
8	Farmers' Meeting	17	5.4
9	Exhibition	4	1.3
10	Newspaper	1	0.3
11	Campaign	1	0.3
12	Workshop	2	0.6
13	Television	2	0.6
14	Radio	8	2.5
15	Farmers' Association	19	6.0
16	Agric Show	10	3.2

Source: Field Survey, 2023

Farmers' meetings (5.4%) was another important source of information of the respondents. This implies there are various meetings done by the farmers in which information are mostly shared on innovation, best practices, inputs and advisory services. Extension services saddled with the responsibility of bringing information on innovation, knowledge and improved technological practices to farmers are not proactive in the study area (3.2%). This is in tandem with the work of Adetimehin *et al.* (2018), who agreed that extension services are inadequate in most rural areas to spread innovation.

Utilization of the SRI Innovation Components

The utilization of the components of the SRI innovation practices on rice production is shown in Table 3. the utilization of these SRI innovation smart components was measured on a 3-point likert type scale of Very Much Used (VMU)=2, Moderately Used (MU)=0 and Not Used (NU)=1 respectively. Weighted Index Score (WMS) was used to draw inference from the result. Average class mean was 1.00 hence, mean value of 0-1.44 was classified as not used variables while means of 1.50-2.00 are classified as very much used variables. The result shows that the respondents used all the selected components of SRI innovation practices with mean value range of \bar{x} =1.527-1.743. This implies that the respondents utilize and put into practice all the main components of SRI innovation smart practices. Since if they used it, it will significantly impact on their livelihood in many folds by sustainably increasing their income and reduced input usage. This is in congruent with the submission of (Isah, 2019) on the utilization and adoption of rice technologies in Kura Local Government Area of Kano State, Nigeria.

Table 3: Distribution of the respondents based to their utilization of SRI innovation components (n=315)

Variables	VMU (%)	MU (%)	NU (%)	$\bar{x} \pm \delta$	R
Seed selection techniques	169(53.7)	3(0.95)	143(45.4)	1.527±1.236	VMU
Nursery management methods	190(60.3)	1(0.32)	124(39.4)	1.600±1.265	VMU
Using age of seedling in timing transplanting	236(74.9)	1(0.32)	77(24.4)	1.743±1.320	VMU
Compliance with plant spacing conditions	172(54.6)	1(0.32)	142(45.1)	1.540±1.241	VMU
Givencognizance to number of plants per hills	195(61.9)	0(0.0)	120(38.1)	1.619±1.272	VMU
Water Management techniques	178(56.5)	3(0.95)	134(42.5)	1.559±1.249	VMU
Utilization of weed control methods	227(72.1)	2(0.6)	86(27.3)	1.714±1.31	VMU
Application of compost manure/fertilization	224(71.1)	3(0.95)	86(27.3)	1.695±1.30	VMU

Source: Field Survey, 2023 VMU=Very Much Used, MU=Moderately Used and NU=Not Used

Extent of Utilization of SRI Innovation Components

The extent of utilization of SRI innovation components was depicted in Table 4. The extent of utilization of the SRI was classified into the very much used, moderately used and not used respectively. Greater proportion of the respondents (79.4%) agreed that they very much used the SRI innovation components on their rice production farm. Only an infinitesimal proportion (4.4%) of the respondents moderately used these components of SRI innovation while small fraction (16.2%) doesn't use these SRI components on their rice production farms. This implies that the majority of the respondents complied with the usage of the SRI innovation practices to increase output on rice production with less or reduced inputs usage.

Table 4: Categorization of the Utilization of SRI Innovation Components

Level Utilization	Categorical (\bar{x})	F (%)
Very Much Used	1.45-2.00	250 (79.4%)
Moderately Used	0.00-0.44	14 (4.4%)
Not Used	0.50-1.44	51(16.2%)

Source: Field Survey, 2023

This is in congruent with the submission of Aliyu *et al.* (2020) on the extent of utilization of SRI practices among farmers in Niger State, Nigeria.

Constraints to Utilization of the SRI Innovation Smart Practices among the Respondent

The result of the constraints to utilization of the SRI innovation smart practices among the rice farmers is shown in Table 5. The constraints were measured on a 4-point likert type scale of very severe (4.00), severe (3.00), moderately severe (2.00) and not severe (1.00) against some constraint constructs obtained during the pretesting of the data collection instrument. The average score of 2.50 was obtained which implies that mean score of 0-1.44 are classified as not severe constraints, 1.45-2.44 are considered as moderate constraints, 2.45-3.44 are considered as severe constraints while 3.45-4.00 are considered as very severe constraints respectively.

The rice farmers in the study area perceive several constraints to the utilization of SRI innovation practices. Most of the constraints examined were under the category of severe constraints while; none availability of organic manure for usage ($\bar{x}=3.70\pm1.50$), farm input requirement are expensive ($\bar{x}=3.45\pm1.60$), inadequate funds to practice the SRI method ($\bar{x}=3.56\pm1.58$) and the equipment are not available or too expensive to put SRI innovation into practice ($\bar{x}=3.53\pm1.58$) were under the very severe constraints to utilization of SRI practices. Arifin and Hambali's (2020) discovered that expensive input requirement, limited access to inputs and finance, and adherence to traditional farming practices among others are main barriers to utilization of SRI innovation practices in his study area. Bhattacharyya and Bhattacharyya's (2018) identified lack of access to inputs and finance, and inadequate support from government agencies as key constraints to SRI usage. Barrett, *et al.* (2022) found that low education levels and limited access to finance and information were among the main barriers to SRI usage in his study area.

Table 5: Distribution of the respondents based on constraints to utilization of SRI smart innovation practices

Variables	Mean (\bar{x})	SD (δ)	R
Problem of weed control	3.19	1.45	Severe
Transplanting difficulties	3.19	1.45	Severe
SRI requires skill labor for management	3.21	1.45	Severe
SRI transplanting demands more labor	3.44	1.45	Severe
SRI needs more concerted effort	3.21	1.53	Severe
None availability of organic manure for usage	3.70	1.50	Very Severe
Transplanting organic matter is a problem	3.44	1.37	Severe
There is rodents attack due to unclean bunds	3.19	1.32	Severe
SRI practices require well drained soils	2.69	1.35	Severe
SRI practices do not work on flooded fields	2.89	1.41	Severe
SRI management activities are difficult	2.96	1.43	Severe
SRI nursery management is difficult to handle	2.77	1.54	Severe
SRI seed selection is again another difficulty	2.71	1.55	Severe
SRI awareness and its benefits against the traditional methods	2.79	1.57	Severe
The Farm inputs requirements are expensive	3.45	1.60	Very Severe
Inadequate funds to practice the SRI method	3.56	1.58	Very Severe
Farmers are not aware of the SRI innovation	3.30	1.43	Severe
Inadequate education to comprehend the innovation	3.44	1.52	Severe
Equipment are not available/expensive to practice SRI innovation into practice	3.53	1.58	Very Severe
No government support to practice SRI technology	3.43	1.34	Severe
Mean Index Value of Constraints	3.21	1.47	Severe

Source: Field Survey, 2023

Ouma *et al.* (2024) found that SRI practices led to higher yields, income, and profitability compared to traditional methods, highlighting the potential benefits of SRI usage among smallholder farmers. Kujinga *et al.* (2016) also found that SRI practices contributed to increased food security, income, and environmental sustainability, and recommended the need for increased extension services and access to inputs and finance to promote wider usage of SRI. The mean index value of the constraints shows that SRI innovation practices have severe constraints ($\bar{x}=3.21\pm1.47$) militating against its usage among the rice farmers in the study area. This is in tandem with the view of Aliyu *et al.* (2020) on the constraints to utilization of SRI practices in Niger State, Nigeria.

Relationship between the utilization of SRI innovation smart practices and some selected socio-economic characteristics of the respondents

The result in Table 6 shows that only age of farmer (X_1) has a positive correlation with utilization of SRI (Y) practices ($r=0.166$, $p<0.1$) and Household size (X_2) has a moderate positive correlation with utilization of SRI (Y) ($r=0.221$, $p<0.01$). Farming experience (X_4) has a positive correlation with utilization of SRI (Y) ($r=0.107$, $p<0.05$). So also Farm size (X_6) has a positive correlation with utilization of SRI (Y) ($r=0.094$, $p>0.05$). This implies that the higher the age, household size farming experience and farm size, the higher the utilization of the SRI innovation practices since more labor will be available for its implementation and also the older the age the more the understanding of the need to increase income and cater for family needs. This agrees with the findings of Khanal *et al.* (2016).

Access to credit (X_5) has no significant correlation with utilization of SRI (Y) ($r=0.039$, $p>0.05$) and educational level of farmer (X_3) has no significant correlation with utilization of SRI (Y) ($r=0.000$, $p>0.05$). This implies that whether educated or not the primary aim is to sustainably increase the income of rice farmers through less input usage for increased output. Whether or not they have access to credits for rice farming doesn't affect their utilization of the SRI practices because there is less input usage. Overall, the results suggest that household size and farming experience are moderately positively associated with the utilization of SRI practices, while age of farmer, formal educational level of farmer, access to credit, and farm size have weak significant correlations with SRI utilization. Therefore, positive correlation implies that the higher the variables in questions the higher the utilization of the SRI innovation practices and vice versa. Zero correlation indicates that there is no change in status of the relationship between the variables under investigation and the utilization of SRI practices.

The implications of the findings depend on the context and research question at hand. However, based on the results presented in the table, we can draw some general implications: Household size is positively correlated with utilization of SRI practices, which may suggest that larger households have greater labor resources to implement SRI practices. Hence, Policymakers and extension workers could target households with larger family sizes to promote SRI utilization. Age and formal educational level of farmers are weakly or not significantly correlated with SRI utilization, which may suggest that SRI practices are accessible to farmers of different ages and educational backgrounds. Farming experience is positively correlated with SRI utilization, which suggests that farmers with more experience are more likely to use SRI practices than those with less or low experience. Extension workers could target farmers with less experience to provide training and support to increase SRI utilization. Access to credit and farm size are weakly correlated with SRI utilization. This suggests that access to credit and farm size are not significant barriers to SRI utilization.

In general, the results suggest that household size and farming experience may be important factors in promoting SRI utilization, while other factors such as age, formal educational level,

access to credit, and farm size have weaker significant associations with SRI utilization. Khanal *et al.* (2016) identifies the determinants of utilization of System of Rice Intensification (SRI) practices and found that household size was positively associated with SRI utilization, indicating that larger households were more likely to use SRI practices. The authors suggest that this may be due to larger households having more labor resources to implement SRI practices. Dabalén *et al.* (2017) agreed that farming experience was positively associated with utilization of agricultural practices, including SRI. Kizito *et al.* (2018) agreed that household size was positively associated with utilization of conservation agriculture practices. Adhikari *et al.* (2020) opined that farming experience was positively associated with SRI utilization, indicating that farmers with more experience were more likely to adopt SRI practices. Abdulkarim *et al.* (2023) also agreed that household size was positively associated with SRI utilization, indicating that larger households were more likely to adopt SRI practices. These findings could inform policies and interventions aimed at promoting SRI utilization in the agricultural sector and the study area in general.

Table 6: Relationship between Selected Socio-economic Characteristics and the utilization of SRI Practices

Variable	Y	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆
X ₁	0.166**						
X ₂	0.221***	0.596***					
X ₃	0.00029 ^{NS}	-0.091 ^{NS}	-0.157**				
X ₄	0.107*	0.674***	0.550***	-0.220***			
X ₅	0.039 ^{NS}	0.041 ^{NS}	0.118*	-0.114*	-0.103 ^{NS}		
X ₆	0.094 ^{NS}	-0.054 ^{NS}	0.053 ^{NS}	0.062 ^{NS}	-0.028 ^{NS}	-0.010 ^{NS}	-

Source: Field Survey, 2023 Note: NS=Not sig., *=p<0.05 **=p<0.1 ***=p<0.01

Where Y=Utilization of SRI, X₁=Age of Farmer, X₂=Household size, X₃= Formal Educational Level of Farmer, X₄=Farming Experience, X₅=Access to Credit and X₆=Farm Size

CONCLUSION AND RECOMMENDATIONS

The study examined the extent of utilization of the System of Rice Intensification innovation smart practices among smallholder farmers in North-west, Nigeria. The results show that main sources of information of the respondents on SRI practices is fellow farmers (45.3%). The respondents used the SRI smart practices examined (\bar{x} =1.527-1.743). The extent of utilization shows that greater proportion of the respondents (79.4%) agreed that they very much used the SRI innovation components on their rice production farm. Most constraints examined ranges from severe to very severe once (\bar{x} =3.19-3.45) with constraint index of 3.21.

It was recommended that other sources of information on SRI smart practices be employed and strengthened to improve the sources of information and knowledge of the respondents on SRI practices. With the increased information spread on SRI practices extent utilization can increased more since it gives room for less input usage hence less cost of production. Most severe constraints to SRI utilization be examined and solved by development partners, stakeholders in rice production, extension agents and solving matter specialists. There is need for capacity building training to the clientele on the need for SRI Smart practices to assist climate change.

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