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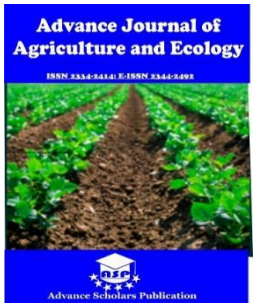

EFFECTIVENESS OF AGRICULTURAL EXTENSION TEACHING METHODS IN DISSEMINATING IMPROVED RICE PRODUCTION TECHNOLOGIES IN EKITI AND OGUN STATES, NIGERIA.

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Abstract: *The Nigerian rice sector has seen some remarkable developments over the last quarter-century as both production and consumption have vastly increased during the aforementioned period. The study therefore determines agricultural extension teaching methods effectiveness in disseminating improved rice production technologies in Southwest, Nigeria. A multistage sampling procedure was employed for the selection 133 rice farmers in Ekiti state and 130 rice farmers in Ogun state for the study. Data were collected using a structured interview schedule. Descriptive statistics such as frequency counts, percentages, means and Weighted Mean Score (WMS) were used to describe the study's stated objectives while Pearson Product Moment Correlation were used to test the study hypothesis. The findings revealed that the mean age of rice farmers was 44 years in Ekiti State and 45years in Ogun State while mean household size was 4 people in Ekiti and 3 people in Ogun State. The mean year of experience in rice farming in Ekiti State was 5.2 years and 6.5 years in Ogun State. The mean size of rice farm cultivated was 2.9ha in Ekiti State and 2.2ha in Ogun State. The highly adopted improved rice production technologies in both States were 25x25 plant spacing and improved variety while small plot adoption techniques, method demonstration and audio-visual aids were the very effective extension teaching methods in both States. The most severe constraints encountered by the rice farmers were poor access road and other infrastructure, lack of transport facilities high cost of farm inputs, inadequate finance and credit facilities and absence of processing facilities. There was significant relationship were found between rice farmers age (r=0.310, p=0.000), household size (r=0.409, p=0.000), number of years of spent schooling (r=0.131, p=0.034), years of experience in rice farming (r=0.505, p=0.000), size of rice farm (r=0.470, p=0.000), (r=0.491, p=0.000) and effectiveness of agricultural extension teaching methods in disseminating improved rice production technologies. The study concluded that the effectiveness of agricultural extension teaching methods plays a crucial role in disseminating information on improved rice production technologies to the famers. The study therefore recommended that agricultural extension services should focus on*

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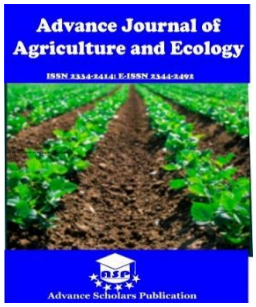

	promoting the most effective and feasible technologies that farmers are likely to adopt based on local conditions and the farmers preferences.

Introduction

The Nigerian rice sector has seen some remarkable developments over the last quarter-Century. Both rice production and consumption in Nigeria have vastly increased during the Aforementioned period. Notwithstanding, the production increase was insufficient to match the consumption increase -with rice imports making up the shortfall. With rice now being a structural component of the Nigerian diet and rice imports making up an important share of Nigerian agricultural imports, there is considerable political interest in increasing local rice production. This has made rice a highly political commodity in Nigeria. However, past policies have not been successful in securing the market share for local rice producers (Udemezue, 2018; USDA Country Summary, 2015). Rice is very important in Nigeria, based on the various ways it can be used. The capability to produce more rice has aided in the development of numerous communities, while its failure has led to the spread of starvation, death and political uncertainty in many countries including Nigeria (Seck et al. 2012; Oludare, 2014). The acceptance of rice as food has witness an upsurge lately by becoming a major crop in many countries in America and Africa (Seck et al. 2012). According to Ochigbo et al. (2013), rice is said to rank sixth in Nigeria in terms of production in relation to crops like sorghum, millet, cassava, and yam. It has emerged as one of the fastest growing

agricultural sub-sectors and has moved from a ceremonial to a staple food in many Nigerian homes within the last two decades, such that some families cannot do without rice in a day. Rice is the second most important staple food in Nigeria accounting for 10.5 percent of the average caloric intake (FAO, 2019) and 6 percent of household expenses (Johnson et al. 2013). Nigeria is the second largest producer of rice in Africa due to a 70 percent growth in production in the last decade (USDA, 2019). Despite the increase in rice production, Nigeria can only meet 49 percent of its own internal demand (Udemezue, 2018). Therefore, to enhance rice production and improve food security, the dissemination of effective agricultural extension teaching methods is essential as agricultural extension services act as a bridge between agricultural researchers and farmers facilitating the transfer of agricultural technologies, knowledge and best practices to improve farm productivity and income. Agricultural extension services play a crucial role in disseminating knowledge and technologies to the farmers facilitating their adoption and implementation on the field. The effectiveness of extension branch is related to communication strategies developed and their applications to bring about social transformation. The term "extension"

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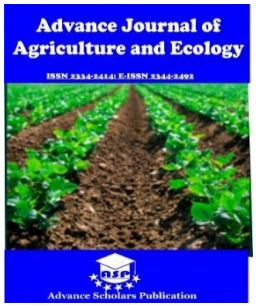

tends to be associated with agriculture and rural development, cooperative extension, advisory services, technology transfer, as well as the transfer and exchange of practical information (Ahmed et al. 2015). The need for extension services became very necessary in order to provide farmers with development information in order to solve widespread agricultural problems. Bonye et al. (2012) argued that extension provides a source of information on new technologies for farming communities which when adopted can improve production, incomes and standards of living. Extension service providers make an innovation known to farm households, act as a catalyst to speed up adoption rate and also control change and attempt to prevent some individuals in the system from discontinuing the diffusion process (Alemu et al., 2016). The success of extension service delivery depends on the expertise and technical know-how of the extension personnel, which could be achieved by providing adequate and relevant information to wide range of farmers who live significantly in the rural areas (Tambari et al., 2014). Extension teaching methods are devices, modes or channels used to create situations in which new information can pass freely from the source (extension worker or research institutes) to the farming communities (Ayanda, 2019). Agricultural extension is basically aimed at providing farmers with essential knowledge and skills that would assist them in taking vital decisions which would ultimately lead to increased production (Ephraim and Gloria, 2013). Extension agents therefore, will need to carefully adapt communication strategies and channels to effectively pass on the required message in each local situation. Effective communication between change agents and researchers is essential for increasing agricultural production through the use of improved technologies. The effectiveness of extension teaching methods in disseminating improved rice production technologies is paramount for enhancing agricultural productivity and food security particularly in developing nations where rice is a staple food. Extension teaching methods crucial for developing strategies that will enhance the uptake of these technologies. The diffusion of innovation theory suggests several stages of adoption: awareness, interest, evaluation, trial and adoption (Rogers, 2003). Each stage requires targeted extension teaching methods that not only deliver information but also facilitate understanding, skill acquisition and ultimately behavioural change (Bandura, 1977). Recent literatures indicate that traditional extension approaches often fail to engage farmers effectively particularly at the initial stages of adoption. Moreover, the complexity of rice production systems and variability in socioeconomic conditions among the farmers necessitate a more advanced approach to extension services. Despite these findings, there remains a gap in understanding how different extension teaching methods impact each stage of adoption for various rice production technologies especially in the face of changing climatic conditions and socioeconomic

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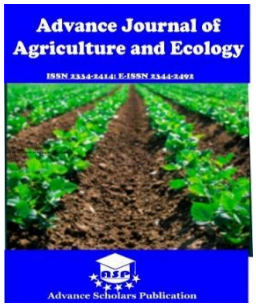

challenges. The effectiveness of extension teaching methods in disseminating improved rice production technologies is critical not only for the modernization of agricultural practices but also for ensuring food security and improving the livelihoods of millions of Nigeria who are dependent on rice farming. Based on the above, this study therefore examines the effectiveness of agricultural extension teaching methods in disseminating improved rice production technologies in Ekiti and Ogun States, Nigeria. Specifically, the study described the socio-economic characteristics of the rice farmers, types of improved rice production technologies adopted, level of effectiveness of extension teaching methods in disseminating improved rice production technologies and constraints associated with the effective utilization of improved rice production technologies. It was hypothesized that there is no significant relationship between the socioeconomic characteristics of the rice farmers and effectiveness of agricultural extension teaching methods in disseminating improved rice production technologies.

Methodology

`The study was carried out in Ekiti and Ogun States and were purposively selected being the major rice producing States in the Southwestern region. Ekiti State is a state in Southwestern Nigeria and is bounded to the north by Kwara State, to the northeast by Kogi State, to the south and southeast by Ondo State, and to the west by Osun State. The Yoruba's make up the majority of the state's population. Ekiti State was formed from a part of old Ondo State in 1996 and has its capital as the city of Ado-Ekiti. Ekiti State is partially based around agriculture, mainly of yams, rice, cocoa, and cassava crops. The State is mainly an upland zone, rising over 250 meters above sea level. It lies on an area underlain by metamorphic rock. It is generally an undulating part of the country with a characteristic landscape that consists of old plains broken by step-sided out-crops that may occur singularly or in groups or ridges. The State enjoys tropical climate with two distinct seasons. These are the rainy season (April–October) and the dry season (November– March). Temperature ranges between 21° and 28 °C with high humidity. The south westerly wind and the northeast trade winds blow in the rainy and dry (Harmattan) seasons respectively. Tropical forest exists in the south, while savannah occupies the northern peripheries. Ogun State is a state in southwestern Nigeria, bounded by Lagos State to the south, Oyo State and Osun State to the north, Ondo State, and the Republic of Benin to the west. Abeokuta is both Ogun State's capital and most populous city; other important cities in the state include Ijebu-Ode, the royal capital of the Ijebu Kingdom, and Sagamu, Nigeria's leading kola nut grower. Ogun state is covered predominantly by rain forest and has wooden savanna in the northwest. Ogun State had a total population of 6,379,500 residents as of 2022 (National Population Commission web, and National Bureau of Statistics web) and a land area of 16,762 kilometre square and predominantly Yoruba's, with the Yoruba

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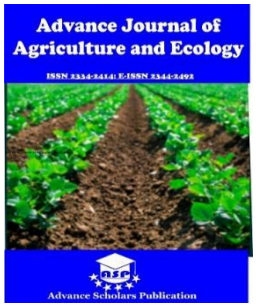

language serving as the lingua franca of the state. The dominant religions in the State are Islam and Christianity although a certain level of traditional religion is still practiced. Ogun State is noted for being the almost exclusive site of Ofada rice production. The population of the study consists of all registered rice farmers including both male and female in Ekiti and Ogun States. A multistage sampling procedure was employed for the selection of rice farmers for this study in the study areas. The first stage involved purposive selection of two States out of the six States in Southwest, Nigeria, based on the concentration of rice farmers. The selected States are Ekiti and Ogun States. In the second stage, four (25 percent) of the 16 Local Government Areas in Ekiti State were purposively selected, and these are: Efon Alaye, Irepodun/Ifelodun, Oye Ekiti and Ikole Ekiti. The third stage involved purposive selection of 2 rice producing communities, making 8 rice producing communities namely; Erio, Igbemo, Ode, Ijan, Efon Alaye, Ikere, Oye and Ikole. The last stage involved random selection of 10% of all the registered rice farmers in the selected communities. Ogun state has 20 LGAs of which eight (8) LGAs were renowned for rice production, includes: Abeokuta-north, Ewekoro, Yewa-South, Ifo and Ijebu-north, Yewa-north, Ogun waterside and Obafemi-Owodeare. Firstly, 4 rice producing Local government areas were randomly selected namely; Ikenne, Ewekoro, Ijebu-north, and Obafemi-Owode. Secondly, 2 (two) rice producing communities were randomly selected making 8 rice producing communities namely; Iro, Oba, Kobape and Mokoloki, Simawa, Someke, Isoyin and Ibiade. A total of 263 rice farmers constituted the sample size for this study. Data obtained were subjected to both descriptive and inferential statistical tools. Descriptive statistical tools employed in the course of this study include; frequency counts, percentage means and weighted mean score (WMS) while t-test was used for testing the stated hypothesis.

Results and Discussion

Respondents' socioeconomic characteristics

Respondents' age

Results presented in Tables 1 revealed that in Ekiti State, 41.4% the rice farmers were between the age range of 40-49 years while 18.7% were between the age range of 50-59 years and 13.5% of them were between 30-39 years. Also, 19.6% were below 30 years of age and 6.8% were 60 years of age and above with a mean age of 44 years. Similarly, in Ogun State, 58.5% of the rice farmers were between the ages of 40-49 years, 18.5% were between 50-59 years while 8.4% falls within the age range of 30-39 years and 60 years and above respectively and 6.2% of them were less than 30 years of age with a mean age of 45 years. This indicates that majority of the respondents in Ekiti State (74.5%) and Ogun State (73.1%) were less than 50 years of age hence considered as productive, economically active, able-bodied and agile young men and women who possessed the physical strength to sustain rigorous and arduous tasks required in rice farming. The study finding is in line with the

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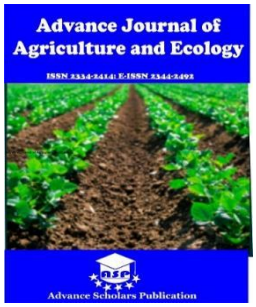

reports of Nwofoke et al. (2024) and Konja et al. (2019) that the mean age of the rice farmers was 44 and 45 years respectively but disagrees with the finding of Amusa et al. (2020) who reported that the mean age of the rice farmers was 48 years.

Respondents' household size

Result presented in Table1 further revealed that 63.2% of the rice farmers in Ekiti State had household size of less than 5 people while 23.3% of them had household size of between 5-6 people, 13.5% of them had household size of 7-8 people and none had household size of 9 people and above with the mean household size of 4 people. In Ogun State, 73.9% of the respondents had household size of less than 5 people, 4.6% of them had household size of between 5-6 people while 14.6% had household size of 7-8 people and 6.9% had household size of 9 people and above with the mean household size of 3 people. This implies that the respondents in the study areas had small household size which indicates there that there would be unavailability of family labour to carryout farming activities. This finding is in tandem with the report of Ruedas and Guico (2021) that the rice farmers had small-scale household size but in disagreement with the findings of Michael et al. (2024) and Oluwatusin and Sekumade (2016) that the mean household size was 7 and 9 persons per household.

Respondents' years spent in education institution

Table 1 reveals that in Ekiti State, 46.6% of the rice farmers spent less or exactly 5 years in primary school while 53.4% of them spent 6 years in Primary school with 4.9 years as the mean number of years spent in Primary school. Also, 80.5% of them spent less or exactly 5 years in Secondary school while 19.6% of them spent 6 years in Secondary school with 4.5 years as the mean number of years spent in Secondary school. Less than half (30.8%) of the rice farmers spent less or exactly 2 years in the Polytechnic while 44.4% of them spent 3 years in the Polytechnic and 24.8% spent 4 years in the Polytechnic with 3 years as the mean number of years spent in the Polytechnic. Similarly, 37.6% of the respondents spent less or exactly 4 years in the University while 31.6% spent 5 years and 30.8% of them spent 6 years in the University with 4 years as the mean number of years spent in the University. The grand mean number of years spent in formal school by the rice farmers in Ekiti State was 4.1 years. In Ogun State, 54.6% of the rice farmers spent 5 years in Primary school while 26.2% of them spent 6 years in Primary school with 4 years as the mean number of years spent in primary school. More than half (65.4%) of the rice farmers spent 5 years in Secondary school while 23.1% spent 6 years in Secondary school with 5 years as the mean number of years spent in Secondary school. Also, 7.6% of the respondents spent 2 years in the

lytechnic with 0.2 year as the mean number of years spent in the Polytechnic while 0.8% of them spent 3 years in College with 0.02 year as the mean number of years spent in the College. Ten percent (10%) of the rice farmers spent 5 years in the University while 54.6% of them spent

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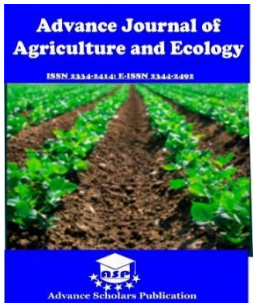

6 years in the University with 6 years as the mean number of years spent in the University. The grand mean number of years spent in formal school by the rice farmers in Ogun State was 3 years. The grand mean number of years spent in formal by the rice farmers in both States was 3.2 years. The above finding implies that the rice farmers the two study areas have relatively low level of formal education which could affect the communication and comprehension of technical agricultural information. This finding is in tandem with the report of Apuyor et al. (2023) that the rice farmers had low level of formal education which could be a barrier to the adoption of innovation that could have improved their production and productivity level.

Respondents' years of experience in rice farming

Table 1 shows that in Ekiti State, 7.5% of the rice farmers had less than 5 years of experience in rice farming, 65.4% had between 5-6 years of experience in rice farming while 9% of them had between 7-8 years of experience in rice farming and18.1% of them had 9 years and above in rice farming experience with 5.2 years as the mean year of experience in rice farming. In Ogun State, 50% of the rice farmers had less than 5 years of experience in rice farming while 18.5% had between 5-6 years of experience in rice farming and 31.5% had 9 years and above in rice farming experience with 7.7 years as the mean year of experience in rice farming. This indicates that all the sampled rice farmers the study areas had less than 10 years of experience in rice farming which implies that they may have limited knowledge and understanding of rice production technologies thus making it more challenging for them for them to grasp and effectively implement information provided through agricultural extension teaching methods and at the same time may be more resistant to change and less inclined to adopt new and improved technologies. Also, these farmers may lack practical experience in the implementation of new rice production technologies. The above finding is in line with the report of Michael et al. (2024) that most of the respondents had experience of less than 10 years with 4.4 years as the mean years of experience in the study area.

Respondents' size of rice farm

Result presented in Table 1 further shows that in Ekiti State, 51.1% of the rice farmers cultivated less than 3 ha of rice farm while 31.6% of them cultivated between 3-4 ha of rice farm and 17.3% cultivated 5 ha of rice farm and above with 2.9 ha as the mean size of rice farm cultivated by the respondents. Likewise, In Ogun State, more than half (70%) of the respondents cultivated less than 3 ha of rice farm while 12.3% cultivated between 3-4 ha of rice farm and 17.7% of them cultivated 5 ha of rice farm and above with 2.2 ha as the mean size of rice farm cultivated by the respondents. This indicates that the rice farmers in the study areas cultivated less than 3 ha of rice farm thus operating on a small-scale which may be as a result of the respondents having limited financial resources thus making it more challenging for them to invest in new technologies. This finding corroborates the

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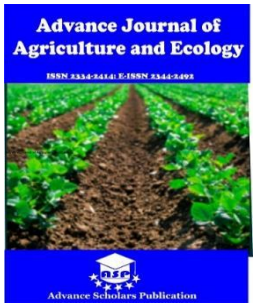

report of Alabi et al. (2023) that majority of the rice farmers in the study area were small holders.

Respondents' annual income

Table 1 shows that in Ekiti State, 39.1% of the rice farmers earned between #300,000-#499,999 annually and 40.6% earned an annual income of between #500,000-#699,999 while 16.5% earned #900,000 and above annually. Less than four percent (3.8%) earned below #300,000 annually with #595,420 as the mean annual income. Similarly, in Ogun State, 15.4% of the rice farmers earned between #300,000-#499,999 annually while 38.5% of the rice farmers#500,000-#699,999 and 9.2% earned between #700,000-#899,999. Also, 16.2% of the respondents earned below #300,000 annually and 20.7% of them earned #900,000 and above annually with #654,961 as the mean annual income. The above finding indicates that rice farming in the study areas profitable. Higher mean annual income may indicate that the farmers have greater financial resources to invest in improved rice production technologies. This finding corroborates the report of Abdullahi et al. (2022) that rice production is highly profitable in the study area.

Table 1: Distribution of respondents by socio-economic characteristics

Respondents socioeconomic characteristics	Ekiti State (n=133)	Ogun State (n=130)
Age(years)		
<30	26(19.6)	8(6.2)
30-39	18(13.5)	11(8.4)
40-49	55(41.4)	76(58.5)
50-59	25(18.7)	24(18.5)
60>	9(6.8)	11(8.4)
Mean	**44years**	**45years**
Household size		
<5	84(63.2)	96(73.9)
5-6	31(23.3)	6(4.6)
7-8	18(13.5)	19(14.6)
9>	0(0)	9(6.9)
Mean	**4people**	**3people**
No of years spent in education institutions		
Primary school		
<5years	62(46.6)	71(54.6)
6years	71(53.4)	34(26.2)
No Response		25(19.2)
Mean	**4.9years**	**4years**
Secondary School		
<5years	107(80.5)	85(65.4)

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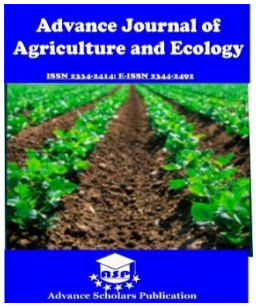

6years	26(19.5)	30(23.1)
No Response	0(0)	15(11.5)
Mean	**4.5years**	**5years**
Polytechnic		
<2years	41(30.8)	10(7.6)
3years	0(0)	59(44.4)
4years	0(0)	33(24.8)
No Response	0(0)	120(92.4)
Mean	**3years**	**0.2year**
College		
3years	0(0)	1(0.8)
No Response	0(0)	129(99.2)
Mean	**0.0**	**0.02year**
University		
4years	50(37.6%)	13(10)
5years	42(31.6)	71(54.6)
6years	41(30.8)	46(35.4)
Mean	**4years**	**6years**
Years of experience in rice farming		
<5	10(7.5)	65(50)
5-6	87(65.4)	24(18.5)
7-8	12(9)	0(0.0)
9>	24(18.1)	41(31.5)
Mean	**5.2years**	**7.7years**
Respondents' size of rice farm		
<3	68(51.1)	91(70)
3-4	42(31.6)	16(12.3)
5>	23(17.7)	23(17.7)
Mean	**2.9ha**	**2.2ha**
Respondents' annual income		
<#300,000	5(3.8)	21(16.2)
#300,000-#499,999	52(39.1)	20(15.4)
#500,000-#699,999	54(40.6)	50(38.5)
#700,000-#899,999	-	12(9.2)
#900,000>	22(16.5)	27(20.7)
Mean	**#595,420**	**#654,961**

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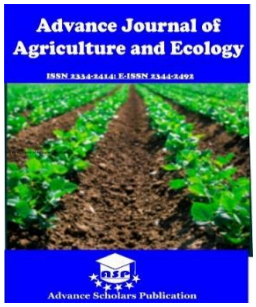

Percentage (Figures in parenthesis)
Source: Field Survey, 2024

Types of improved rice production technologies adopted

Result presented in Table 2, shows that in Ekiti State, 25/25 planting method ranked 1st with a weighted mean score of 2.90, bird scarier ranked 2nd with a weighted mean score of 2.71 and improved variety ranked 3rd with a weighted mean score of 2.69 were the highly adopted improved rice production technologies in the study area. This implies that 25/25 planting method, bird scarier and improved variety were unrestrictedly available to the rice farmers. The 25/25 planting method and improved rice varieties can lead to higher yields and better quality rice thus the extension agents can demonstrate the effectiveness of these technologies to the farmers through hands-on training, field demonstration and participatory learning as this engagement can assist the farmers in understanding the practical applications of these methods resulting in higher adoption rate and eco-friendly practices through the utilization of bird scarier can be crucial fo sustainability. This finding is in tandem with the report of Rilwanu et al. (2024) that the improved rice production technologies that were highly accessible to the farmers include the use of recommended improved variety, planting seed at recommended seed rate, timely planting, planting spacing of 25/25, and recommended method of fertilizer application. In Ogun State, knapsack sprayer and improved variety ranked 1st with a weighted mean of 2.72 respectively and 25/25 planting method ranked 3rd with a weighted mean score of 2.60 were the highly adopted improved rice production technologies in the study area. This implies that knapsack sprayer, improved variety and 25/25 planting method were moderately available to the respondents. Access to tool like the knapsack sprayer can be a key component of effective extension programme thus providing training in the proper use and maintenance of this tool in conjunction with the agronomic practices can promote holistic approach to rice production. These technologies can significantly streamline and enhance the effectiveness of extension teaching by making the information more accessible, relatable and implementable for the farmers. This finding is in line with the report of Ajayi et al. (2023) that improved rice production

132 hnologies highly accessible to the farmers ınclude improved rice varieties, use of herbicides, rice milling machine and use of fertilizer.

Table 2: Distribution of respondents by types of improved rice production technologies adopted

	Ekiti State (n-133)		Ogun State (n-130)	
Types of improved rice production technologies adopted	**WMS**	**Rank**	**WMS**	**Rank**
Tube well	1.64	21st	2.12	13th

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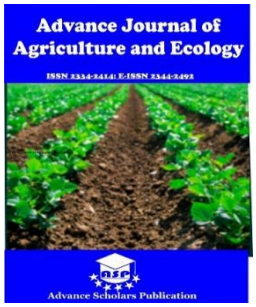

Bird-scarier	2.71	2nd	2.48	4th
Knapsack sprayer	2.65	4th	2.72	1st
Rice farming inputs	2.56	5th	2.43	6th
Improved variety	2.69	3rd	2.72	1st
Timeliness of fertilizer application	2.35	7th	2.35	9th
Herbicide	2.35	7th	2.36	8th
Pesticide	2.02	14th	2.09	14th
Rodenticide	1.42	23rd	1.93	17th
25/25 planting method	2.90	1st	2.60	3rd
Ploughing	1.96	16th	1.91	19th
Harrowing	1.76	20th	1.64	20th
Rain fed irrigated lowland management	1.86	18th	1.48	22nd
Rain fed irrigated upland management	1.55	22nd	1.40	23rd
Long-grain seed selection	2.00	15th	2.02	15th
Short-grain seed selection	1.93	17th	1.64	20th
Seed selection	2.45	6th	2.45	5th
Seed testing	2.30	10th	2.32	11th
Processing	2.33	9th	2.34	10th
Reaper	1.77	19th	1.93	17th
Per boiler	2.25	11th	2.40	7th
Dryer	2.20	12th	2.28	12th
Packaging equipment	2.16	13th	1.94	16th

WMS: Weighted Mean Score
Source: Field Survey, 2024

Level of effectiveness of extension teaching methods in disseminating improved rice production technologies

Table 3 shows the rice farmers' level of effectiveness of extension teaching methods and it could be seen in the table that 57.1% of the rice farmers in Ekiti State indicated that the level of effectiveness of extension methods in disseminating improved rice production technologies is high while 34.2% of them indicated moderate level of effectiveness of extension methods in disseminating improved rice production technologies and 10.5% indicated low level of effectiveness of extension methods in disseminating improved rice production technologies. In Ogun State, 50% of the respondents indicated high level of effectiveness of extension methods in disseminating improved rice production technologies while 27.7% of the rice farmers indicated moderate level of effectiveness of extension methods in disseminating improved

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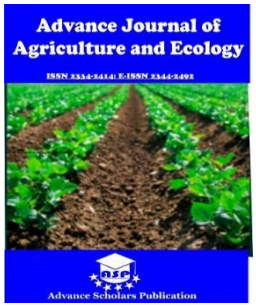

rice production technologies and 22.3% of the rice farmers indicated low level of effectiveness of extension methods in disseminating improved rice production technologies. This indicates that in both study areas the level of effectiveness of extension methods in disseminating improved rice production technologies is high. This finding is in tandem with the report of Abubakar et al. (2018)

Table 3: Categorization of respondents by level of effectiveness of extension teaching methods in disseminating improved rice production technologies

Category	Score's range	Ekiti State (n=133)	Ogun State (n=130)
High	48-70	76(57.1)	65(50)
Moderate	24-47	43(32.4)	36(27.7)
Low	0-23	14 (10.5)	29(22.3)
Mean		33.95	31.74
Standard Deviation		3.132	3.518

Percentage (Figures in parenthesis)
Source: Field Survey, 2024

Constraints associated with the effective utilization of improved rice production technologies

Table 4 shows that in Ekiti State, the most severe constraints encountered by the rice farmers were poor access road and other infrastructure ranked 1st with a weighted mean score of 3.65, lack of transport facilities ranked 2nd with a weighted mean score of 3.57 and high cost of farm inputs ranked 3rd with a weighted mean score of 3.56 and excessive weed, pest and disease infestation ranked 4th with a weighted mean score of 3.53. This implies that the rice farmers in Ekiti State considered poor access road, lack of transport facilities, high cost of farm inputs and excessive weed, pest and disease infestation were the most strenuous and tough constraints encountered in rice farming. This implies that poor access roads and transportation facilities can hinder extension workers from reaching out to the rice farmers which invariably will result in limited dissemination of information to the rice farmers on improved production technologies. Also, without proper infrastructure and facilities, it will be difficult for the extension workers to provide practical demonstration of improved production techniques to the rice farmers which can limit the effectiveness of extension teaching methods in conveying complex information and encouraging the adoption of new practices. This finding is in line with the report of Kshash and Oda (2022) that the major constraints faced by the rice farmers include high cost of inputs (fertilizer, pesticides), unavailability of improved varieties, lake of capital, High cost of improved varieties, unfavorable government marketing system, poor marketing information while in Ogun State, the most severe constraints faced by the rice farmers were inadequate finance and credit facilities ranked 1st with a weighted mean

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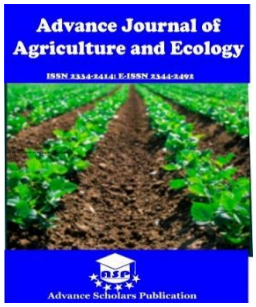

score of 3.71 while high cost of farm inputs and absence of processing facilities ranked 2nd with a weighted mean score of 3.59 respectively and excessive weed, pest and disease infestation ranked 4th with a weighted mean score of 3.55. This indicates that the rice farmers in Ogun State considered inadequate finance and credit facilities, high cost of farm inputs, and absence of processing facilities and excessive weed, pest and disease infestation were the most gruelling constraints encountered in rice farming. This implies that high costs of farm inputs can discourage the rice farmers from adopting new technologies even when they are aware of the technologies through extension teaching methods thereby resulting in low impact of extension efforts on increasing productivity and profitability of the rice farmers. Also, without access to finance and credit facilities, the rice farmers may struggle to scale up their operations and adopt new technologies on a larger scale. This finding corroborates the report of Yusuf and Barnabas (2019) that the major constraints faced by the respondents were high cost of inputs, inadequate finance, poor transportation system and inadequate information.

Table 4: Distribution of respondents by constraints associated with the effective utilization of improved rice production technologies

	Ekiti State (n-133)		Ogun State (n=130)	
Constraints	**WMS**	**Rank**	**WMS**	**Rank**
Inadequate finance and credit facilities	3.43	6th	3.71	1st
Poor soil fertility	2.58	12th	2.53	12th
Inadequate size of farmland	2.89	10th	2.90	10th
Lack of adequate and timely information	3.09	8th	2.14	13th
Excessive weed, pest and disease infestation	3.53	4th	3.55	4th
Soil erosion problem and flood	2.74	11th	2.77	11th
High cost of farm inputs	3.56	3rd	3.59	2nd
Inadequate/lack of seed testing laboratories	3.07	9th	3.17	9th
Poor access road and other infrastructure	3.65	1st	3.39	7th
Absence of processing facilities	3.51	5th	3.59	2nd
Inadequate supply of farm inputs	1.91	13th	3.53	5th
Lack of transport facilities	3.57	2nd	3.47	6th
Non availability of market for rice produce	3.23	7th	3.38	8th

WMS: Weighted Mean Score
Source: Field Survey, 2024

Hypothesis testing

Ho1: There is no significant relationship between the socioeconomic characteristics of the rice farmers and effectiveness of agricultural extension

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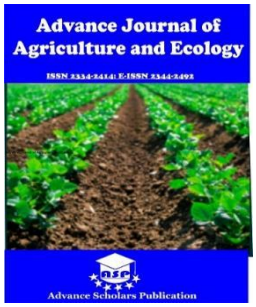

teaching methods in disseminating improved rice production technologies

Relationship between the socioeconomic characteristics of the rice farmers and effectiveness of agricultural extension teaching methods in disseminating improved rice production technologies

Moreover, Pearson Product Moment Correlation analysis result presented in Table 5 revealed that there was significant relationship between rice farmers age (r=0.310, p=0.000), household size (r=0.409, p=0.000), number of years of spent schooling (r=0.131, p=0.034), years of experience in rice farming (r=0.505, p=0.000), size of rice farm (r=0.470, p=0.000), (r=0.491, p=0.000) and effectiveness of agricultural extension teaching methods in disseminating improved rice production technologies. This implies that younger and less experienced rice farmers may benefit more from specific interventions and hands-on training thus tailoring extension programmes to meet their needs can improve adoption rates of new technologies. Larger households may have different labour dynamics influencing how information is received and implemented thus the extension services could consider household size when designing outreach programmes. The rice farmers with higher education levels might more easily grasp advanced agricultural techniques thus training programmes should be designed to accommodate varying education levels, possibly by offering basic educational support or materials in simpler language for less educated farmers. Rice farmers with larger rice farms and higher yields may have different training needs compared to smaller-scale farmers thus the extension services should focus resources on supporting smallholders who may be more vulnerable and less likely to access information and resources. On the price per each rice bag harvested, understanding the relationship between effective teaching methods and market success can guide initiatives aimed at improving market access for the farmers as this connection can inform strategies that may ensure profitable sales while promoting sustainable practices. Hence, the initial hypothesis which states that there is no significant relationship between the socioeconomic characteristics of respondents and the effectiveness of agricultural extension teaching methods as a tool for disseminating improved rice production technologies information was hereby rejected and the alternative hypothesis which states that there was significant relationship between the socioeconomic characteristics of respondents and the effectiveness of agricultural extension teaching methods as a tool for disseminating improved rice production technologies information was hereby accepted. This is in line with the report of Rilwanu et al. (2024) that household size and age were among the factors influencing the adoption of improved rice production technologies among the respondents.

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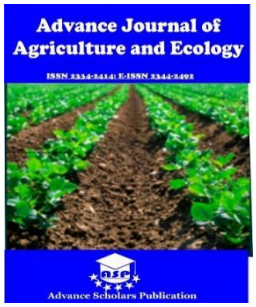

Table 5: Summary of correlation analysis showing the relationship between respondents' socioeconomic characteristics and effectiveness of agricultural extension teaching methods in disseminating improved rice production technologies

Characteristics	r-value	p-value	Decision
Age	0.310	0.000	Significant
Household size	0.409	0.000	Significant
Number of years spent schooling	0.131	0.034	Significant
Years of experience in rice farming	0.505	0.000	Significant
Size of rice farm	0.470	0.000	Significant

Significant at 1% level of significance
Source: Field Survey, 2024

Conclusion and Recommendations

In conclusion, the study highlighted the effectiveness of agricultural extension teaching methods as it plays a crucial role disseminating information on improved rice production to the famers. Also, the effectiveness of extension programmes in promoting the adoption of new farming techniques is influenced by many factors as farmers' participation and engagement in extension activities are key factors in the successful dissemination and adoption of improved rice production technologies. Tailoring extension programmes to the specific needs and constraints of the farmers can enhance their relevance and impact as they are the key to the success of agricultural extension programmes in promoting the adoption of new innovations. The sustainability of information dissemination and technologies adoption can be achieved through capacity building, on-going support and monitoring for continuous improvement. The reach and engagement of extension programmes plays a crucial role in ensuring that the rice farmers receive relevant and practical information that can be integrated into their farming operations. The socioeconomic characteristics of the rice farmers significantly influence their ability to adopt and implement improved rice production technologies as farmers with higher educational levels and more substantial resources tend to adopt new technologies more readily. Various types of improved rice production technologies are generally accessible to and adopted by the farmers through extension services while the accessibility of these technologies varies significantly by region with some areas having more resources and support network than others. The level of utilization of these technologies was moderate thus the gap between knowledge of these technologies and their actual adoption often remain significant. Common constraints include limited access to financial resources, lack of infrastructure. It was recommended that;

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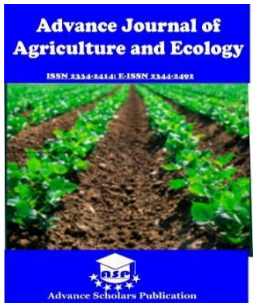

1. Developing diverse training programmes that cater for the different learning styles and preference among the farmers
2. Government agencies and NGOs should facilitate easier access to improved rice technologies by establishing partnership with businesses that supply these technologies especially in the rural areas.
3. Agricultural extension services should focus on promoting the most effective and feasible technologies that the farmers are likely to adopt based on local conditions and the farmers preference
4. Involving the farmers in the selection and adaptation of technologies to ensure that the options provided are relevant and culturally appropriate.

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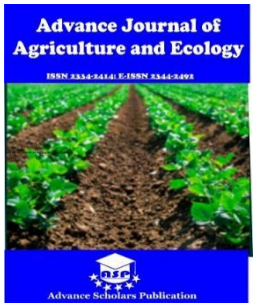

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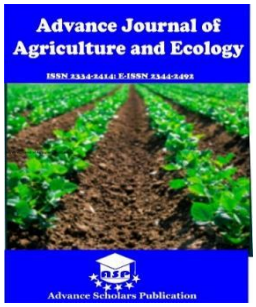

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