Farm-technology Information Acceptance by Farmers for Sustainable Rice Production in Nigeria

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ABSTRACT
The use of information is an indispensable factor in the practice of farming as information on newly introduced technology is needed for the overall development of agriculture. Consequently, the adoption of innovations and new technologies in Agriculture will not only have a central contribution to the achievement of food security and sustainability of rice production rather it will help to address the second Sustainable Development Goal of Zero hunger. This study, therefore, investigated farm-technology information acceptance by rice farmers in Ekiti State, Nigeria. The survey research design of correlative type was adopted using a multistage sampling procedure, stratification sampling was used to select eight hundred and seventy 870 rice farmers in Ekiti State. A questionnaire was used for data collection. The result shows that the major types of farm technology information accepted by rice farmers are leveller 600 (95.1%), planting machine 590(93.5%) and autopilot tractor 579(91.8%). The level of acceptance of farm technology and farm technology information among rice farmers was moderate ($\bar{x}$ = 2.28), and the level of awareness of farm technology and farm technology information among rice farmers was low ($\bar{x}$ = 2.53). Adequate workshops, training and awareness should be done by the government and other agricultural organizations for rice farmers to be aware of information on farm technology to achieve sustainable rice production.

Keywords: *Farm-technology, Farm Technology Information Acceptance, Rice production, Farmers.*

Introduction

Agriculture is the second largest economic sector in Nigeria after petroleum which contributes immensely to the Gross Domestic Product (GDP) of the nation. Due to its contribution to the GDP of the nation, the government therefore, supports agricultural research and extension aiming at producing and disseminating new technologies to improve the productivity of farmers. In percentage, agriculture contributes more than 24.14% to the GDP (NBS 2020) and remains the most important sector in transforming rural communities (USDA, 2014). Rice a staple crop in agriculture and a constant commodity, is one the world cannot do without; an average household in Nigeria consumes rice between 5-7 days a week. Rice is also the fourth largest crop produced in Nigeria after sorghum, millet and maize (NBS, 2020). Twenty-nine out of the thirty-six states

in Nigeria excluding Abuja cultivate rice while Ekiti states is the fourth highest rice producer in the country (1.5 million Metric Tonnes as of 2022). Despite the increase in rice production in the country and the Nigerian rice sector being special within the West African context, it remains a paradox that rice production has consistently fallen below the national demand. The limited capacity of the Nigerian rice sector to meet the domestic demand has been attributed to several factors such as declining productivity due to low awareness and acceptance of farm-technology information.

Consequently, the government supports agricultural research and extension aiming at producing and disseminating new technologies to improve the productivity of farmers including rice farmers. Rice farmers are among the most vulnerable group of farmers because they rely on rain to meet water needs (Nyamekye, Dewulf, Van Slobbe, Termeer& Pinto, 2018). Low technology adoption and use make it even more difficult for small-scale farmers to maximize productivity on their farms (Akudugu, Guo & Dadzie, 2012; Conley & Udry, 2001 in Nyamekye, et. al, 2018). The impact and type of technologies adopted by farmers depend largely on the awareness and acceptance of such technologies by the farmers. Farmers therefore need the right information to make the right decisions on what technologies to accept and use on their farms. Information has therefore been regarded as the most valuable resource in agricultural and rural development programs. This is because information brings people out of intellectual darkness and exposes them to ideas, thoughts and reasoning that they were previously unaware of (Mchombu&Cadbury, 2006). In addition, the use of information is an indispensable factor in farming because information on newly introduced technology is needed for the overall development of agriculture by farmers (Thomas &Okoro, 2018).

Timely, credible and relevant agricultural information is crucial because it allows farmers to make and execute wise decisions on their farms which consequently brings about improvement in farm output, yield and income. Furthermore, if farmers accepted relevant information to their farm needs, they would be able to tackle problems well, adopt new ideas and introduce social change. Information acceptance by farmers will also help to identify efficiencies that lead to higher productivity and profitability, lower input cost, and optimized fertilizer use. The more a farmer accepts information about a certain technology the higher the interest to make use of the technology. Utilization of information on various farm technologies is indispensable for sustainable production, this is because information and technology are the most important input in Agricultural Development (Dulle 2002). Nigerian farmers are reported not to feel the impact of agricultural innovation mainly because they have no access to such vital information or due to poor dissemination (Oguya, 2007 & Morrow, 2002 in Zarmai, Okwu, Dawang &Nankat, 2014). It has also been observed that the wide use of various farm technologies in Agricultural Development Programs in various regions of the country including Nigeria has been generally acknowledged. However, what may be important may not just be the existence of these technologies but how accessible they are to the farmers. Some of these technologies are tractors, levellers, tillage equipment, planting machines, trans planters, seeders harvesting machines etc.

To enhance sustainable rice production in the Nigerian agricultural sector, one option would be to make available adequate farm-technology information to farmers; and encourage the use of

information among rice farmers. These efforts if carefully utilized will help to make rice production not only in Ekiti state increase; it will also help to fill the consumption difference needed to obtain optimal production. Technology adoption by farmers is an essential pre-requisite for economic prosperity in developing countries. In many developing nations, a huge amount of resources has been devoted to extension services to educate farmers on new agricultural practices. In Nigeria, such initiatives have been undertaken through the Agricultural extension project (Chekene & Chancellor, 2015 Donye, Ja'afar-Furo & Obinne 2013). The efficiency of these programmes depends on the acceptability and usage of this farm-technology information by farmers hence the need for this study.

Statement of the Problem

Ekiti state being the fourth highest producer of rice in Nigeria is confronted with the major challenge of increasing production to feed a growing and increasing population in the face of insecurity and other threats. The importance of information is seen as a straw that stirs the drink in development activity especially when available and documented. Farm-technology information acceptance should lead to a significant yield of technology use which will boost rice production and enhance sustainable rice production. However, despite the effort of the government through Agricultural Development Programs and Agriculture extension agents in each local government of Ekiti State to make the information on farm technology available to all rice farmers, observations still indicate that rice farmers in most cases find it difficult to accept such information on farm technologies. Some of the farmers that are aware of the farm technology information are not willing to accept them, this could be due to high level of illiteracy, inadequate access to loans, politicising grant opportunities, credibility of the source of information, timeliness of the information and poor socioeconomic background of the farmers. It is against this background this study tends to look at farm-technology information acceptance by rice farmers for sustainable rice production in Ekiti state, Nigeria.

Research Questions

The following research questions guided this study:

1. What is the level of awareness of Farm Technologies and Farm Technology Information by rice farmers in Ekiti State?
2. What is the type of farm technology and farm technology information accepted by rice farmers in Ekiti State?
3. What is the type of farm technology and farm technology information accepted by rice farmers in Ekiti State?

Literature Review

Agricultural technology or agro-technology is the use of technology in agriculture, horticulture, and aquaculture to improve yield, efficiency, and profitability. Agricultural technology can be products, services or applications derived from agriculture that improve various input/output processes (National Institute of Food and Agriculture, 2020). To address the liquidity and supply constraints faced by poor farmers with regard to technology acceptance, several African countries have implemented various forms of 'smart subsidies' that target specific farmers (Minde, Jayne & Crawford, 2008). Based on extensive studies in Ethiopia, it has been shown

that life cycle effects are important drivers of agricultural technology acceptance (Asfaw, & Admassie, 2004). Agricultural technologies play an immense role in increasing food productivity. Agricultural technologies are said to include all kinds of improved techniques and practices which affect the growth of agricultural output (Jain, Arora, & Raju, 2009).

Increasing agricultural productivity is critical to meeting the continuously rising demand for food. According to Loevinsohn, Sumberg, Diagne, and Whitfield (2013), the most common areas of technology development and promotion for crops include new varieties and management regimes; soil as well as soil fertility management; weed and pest management; irrigation and water management. According to Challa (2013) an improvement in input and output relationships, new technology tends to raise output and reduce the average cost of production which in turn results in substantial gains in farms.

According to (Doss, 2003), the first thing to consider is whether acceptance is a discrete state with binary response variables or not. That means the definition depends on the fact that the farmer is an adopter of the technologies or a non-adopter taking values zero and one or the response is a continuous variable (Challa, 2013). Again Kiptot et al (2007) in Sousa, Nicolay and Home (2016) reported several factors that influence the uptake of innovations, including financial incentives and practical issues, but also information transfer. Technology information acceptance is often the result of informal learning processes, in which social networks play an important role, with farm managers learning by creating networks of colleagues and advisers (Gielen, Hoever, Nieuwenhuis 2003 in Sousa, Nicolay, Home 2016). Early adopters tend to be those with better information networks, which suggests that information flow between different growers and other actors should be encouraged if Technology information is to be accepted (Aguilar-Gallegos 2015). Collence (2012) believed that information is an integral component of a value chain network because it connects all components, activities and operations. Information is critical in agricultural development because it is a tool for communication and coordination between stakeholders.

According to Ali (2014), the information needs of farmers change from time to time due to changes in agricultural technologies, environmental changes, agricultural policies, and the emergence of agricultural innovations. Despite the recognized importance of acceptance, there is no clear definition of what acceptance is and how to measure it. Only a little work regarding acceptance theory has been carried out within the Farmer-supported area. Many studies have claimed to measure acceptance although few of them have defined what it is. As Regan et al (2002) put it “While everyone seems to know what acceptability is, and all agree that acceptability is important, there is no consistency across studies as to what ‘acceptability’ is and how to measure it”. Although there is no prevailing definition of acceptance, there is some work done.

In particular, younger as well as much older household heads are risk averse and are less likely to adopt new technologies. On the other hand, the availability of adult family members within households may facilitate the process of technology because most farming households cannot easily acquire hired labour due to liquidity constraints (Carletto, Kirk & Winters 2007).In a study

on Farmer's acceptance towards sustainable farming technology, the study found out that farmers are willing to accept sustainable farming technology when they can make gains and reduce task uncertainty in their farming activities. They will also accept it when the technology can increase their work performance (Sa'ari, Jabar, Tahir and Mahpoth 2017).

However, Ali (2014) found out that the information needs of farmers change from time to time due to changes in agricultural technologies, environmental changes, agricultural policies, and the emergence of agricultural innovations. Some of the challenges that rice farmers encounter include the lack of an effective way to collect farm produce data, record farm input expenses, as well as expenditure on farm chemicals and receive information from other stakeholders (Oluoch & Osida, 2015).

The use of ICTs in Malaysia (Hassan, Shaffril, AbuSamah, Abu Hassan & Ismail, 2009 in Nzonzo& Mogambi 2016) and India (Syiem& Raj, 2015) among irrigated rice producers have shown that there is a positive effect of ICTs use on access to markets, sharing knowledge on emerging technologies for production, sharing of value addition activities in irrigated rice production and availability on weather information. Literature shows that information that is often sought by rice farmers in most countries in sub-Saharan Africa, Nigeria inclusive, included pest and disease management, pesticide and fertilizer application, the best time to plant, planting method, storage and seed treatment (Orde and Mary, 2008)

Methodology

The study adopted the descriptive survey research design. A multi-stage sampling technique was adopted for this study, using a combination of random, proportionate and stratified techniques to select respondents for this study; In the first stage, five (5) Local Government Areas (LGAs) namely; Gbonyin LGA, Irepodun/ Ifelodun LGA, Ijero LGA, Ido-Osi LGA, Oye LGA in Ekiti State were purposely selected based on the annual production survey of Ekiti State Ministry of Agriculture (2021), which indicates that,- this LGAs produces rice in good quantity and quality. Secondly, three (3) communities from each LGA were randomly selected. Thirdly, the selection of 10% of rice farmers in each of the selected LGAs is shown in Table 1. Thus, fifteen (15) communities were selected for the study. The questionnaire was the main research instrument used in gathering information for the study. The questionnaire was divided into two sections, sections A and B. Section 'A' solicits demographic data of the respondent, and section 'B' focuses on the research questions aimed at extracting facts for the study.

Table 1: Population of the Study

SN	LOCAL GOVERNMENT AREA	Total number of hectares	No of Farmers
1	Gbonyin	3500	1700
2	Irepodun/Ifelodun	3800	2000
3	Ijero	2800	1800
4	Ekiti West	2000	800
5	Ekiti West, Efon	3200	1140
6	Ido/Osi	1600	1600
7	Oye	2100	1600
8	Ado	1550	700
9	Emure, Ise	2000	1240
10	Ikole, Ekiti East	3500	1250
11	Ekiti South West	1250	600

Table 2: Distribution of the sample of the Study

LGA	Town/ Community	Total Number of Rice Farmers	10% sample size
Gboyin	Ijero Ijan Aisegba	1700	170
Irepodun/Ifelodun	Igbemo Awo Eyio	2000	200
Ijero	Ijero Ikoro Epe Ijero	1800	180
Ido-Osi	Esure Orin	1600	160
Oye	Ayetoro Ire Omu Ijelu	1600	160
	Total =	**8700**	**870**

Results

Table 3: Demographic information of respondents

Gender	Frequency	Percentage (%)
Male	392	62.1
Female	239	37.9
Age		
Below 30	73	11.6
31-40	124	19.7
41-50	230	36.5
51-60	162	25.7
61 above	42	6.7
Years of work experience		
0-4 years	114	18.1
5-10 years	192	30.4
11 years and Above	325	51.5
Level of Education		
No formal Education	-	-
Primary school	21	3.3
Secondary education	47	7.4
OND/ NCE	154	24.4
HND/BSC	312	49.5
Postgraduate	97	15.4
Farm size		
Less than 1 Hectare	52	8.2
1-2 Hectares	136	21.6
2-3 Hectares	251	39.8
4 Hectares and Above	192	30.4
Total	**631**	**100**

Results in Table 3 revealed that 392(62.1%) of the respondents were male while 239(37.9%) were female. This implies that more males participated than females. Results in Table 3 further revealed that the majority of the farmers were between ages 41-50 years and had been farming between 5yrs-10yrs. A good number of the farmers had either a higher national diploma or a bachelor's degree. The farm size depicts that the majority of the farmers also had between 2-3 hectares of farm size.

Research Question 1: **What is the level of awareness of Farm Technologies and Farm Technology Information by rice farmers in Ekiti State?**

Results in Table 4 revealed that the level of awareness of farm technology and farm technology information of the respondents is generally low. This is depicted by the average of the means score of ($\bar{x}$= 2.53). The analysis of data shows that the Rice farmers are above average in the usage of mobile technology and cameras ($\bar{x}$= 3.46), documentation of field via GPS ($\bar{x}$= 3.38), and monitoring, and controlling crop irrigation systems via smartphone ($\bar{x}$= 3.37) and information on planting machine ($\bar{x}$= 3.53), traction and power ($\bar{x}$= 3.53), autopilot tractor ($\bar{x}$= 3.49), threshers to increase the rice production ($\bar{x}$= 3.49), leveller ($\bar{x}$= 3.47), pest control ($\bar{x}$= 3.47), chemical fertilizers ($\bar{x}$= 3.46), tube wells for irrigation ($\bar{x}$= 3.38), usage of mobile technology and camera ($\bar{x}$= 3.37), tillage equipment ($\bar{x}$= 3.35), soil cultivation ($\bar{x}$= 3.35), how to apply pesticides ($\bar{x}$= 3.35), intelligent water application systems ($\bar{x}$= 3.13), transplanting machine ($\bar{x}$= 3.04), pesticide residue elimination and emission of agro-chemical ($\bar{x}$= 3.04) and power sprayer ($\bar{x}$= 3.00). It could be concluded that the level of awareness of farm technology and farm technology information among rice farmers in Ekiti State was low.

Table 4: Level of awareness of Farm Technology Information by rice farmers

S/N	Farm technology Information	Extremely aware 5	Moderately aware 4	Somewhat aware 3	Slightly aware 2	Not at all 1	$\bar{x}$	SD
	Farm Technologies							
1	Usage of mobile technology and camera	239(37.9%)	105(16.6%)	101(16.0%)	79(12.5%)	107(17.0%)	3.46	1.51
2	Documentation of field via GPS	239(37.9%)	113(17.9%)	68(10.8%)	72(11.4%)	139(22.0%)	3.38	1.60
3	Monitoring and controlling crop irrigation systems via smartphone	269(42.6%)	86(13.6%)	66(10.5%)	29(4.6%)	181(28.7%)	3.37	1.70
4	Barcodes, QR codes, RFID	-	289(45.8%)	111(17.6%)	39(6.2%)	192(30.4%)	2.79	1.30
5	Real time recording systems	-	218(34.5%)	169(26.8%)	46(7.3%)	198(31.4%)	2.65	1.24
6	Smart logistics system	-	117(18.5%)	158(25.0%)	102(16.2%)	254(40.3%)	2.22	1.16
7	Smart traceability system	-	94(14.9%)	187(29.6%)	87(13.8%)	263(41.7%)	2.18	1.13

8	Seeder	-	90(14.3%)	172(27.3%)	85(13.5%)	284(45.0%)	2.11	1.13
9	VRA spraying system	-	160(25.4%)	87(13.8%)	22(3.5%)	362(57.4%)	2.07	1.31
10	Crop sensor	-	148(23.5%)	95(15.1%)	26(4.1%)	362(57.4%)	2.05	1.29
11	VRT and Swath Control Technology	-	78(12.4%)	86(13.6%)	134(21.2%)	333(52.8%)	1.86	1.07
12	Herbicide application	-	33(5.2%)	155(24.6%)	49(7.8%)	394(62.4%)	1.73	1.00
13	Autopilot tractor	-	79(12.5%)	71(11.3%)	73(11.6%)	408(64.7%)	1.72	1.09
14	Weeding machine	-	77(12.2%)	81(12.8%)	52(8.2%)	421(66.7%)	1.71	1.09
15	Harvesting machine	-	37(5.9%)	125(19.8%)	80(12.7%)	389(61.6%)	1.70	0.98
16	Milling equipment	-	59(9.4%)	103(16.3%)	38(6.0%)	431(68.3%)	1.67	1.05
17	Intelligent water application systems	-	69(10.9%)	89(14.1%)	36(5.7%)	437(69.3%)	1.67	1.08
18	Transplanting machine	-	39(6.2%)	105(16.6%)	85(13.5%)	402(63.7%)	1.65	.97
19	Power sprayer	-	65(10.3%)	82(13.0%)	40(6.3%)	444(70.4%)	1.63	1.05
20	Leveler	-	65(10.3%)	56(8.9%)	77(12.2%)	433(68.6%)	1.61	1.02
21	Planting machine	-	64(10.1%)	47(7.4%)	99(15.7%)	421(66.7%)	1.61	1.00
22	Power tiller	-	38(6.0%)	98(15.5%)	64(10.1%)	431(68.3%)	1.59	0.97
23	Tillage equipment	-	29(4.6%)	67(10.6%)	131(20.8%)	404(64.0%)	1.56	0.86
							2.09	**1.17**
	Farm Technology Information							
24	Information on planting machine	239(37.9%)	98(15.5%)	126(20.0%)	93(14.7%)	75(11.9%)	3.53	1.42
25	Information on traction and power	239(37.9%)	98(15.5%)	126(20.0%)	93(14.7%)	75((11.9%)	3.53	1.42

26	Information on autopilot tractor	224(35.5%)	122(19.3%)	121(19.2%)	67(10.6%)	97(15.4%)	3.49	1.45
27	Information on threshers to increase the rice production	224(35.5%)	122(19.3%)	121(19.2%)	67(10.6%)	97(15.4%)	3.49	1.45
28	Information on leveller	227(36.0%)	102(16.2%)	134(21.2%)	79(12.5%)	89(14.1%)	3.47	1.44
29	Information on pest control	227(36.0%)	102((16.2%)	134(21.2%)	79(2.5%)	89(14.1%)	3.47	1.44
30	Information on chemical fertilizers	239(37.9%)	105(16.6%)	101(16.0%)	79(12.5%)	107(17.0%)	3.46	1.51
31	Information on tube wells for irrigation	239(37.9%)	113(17.9%)	68(10.8%)	72(11.4%)	139(22.0%)	3.38	1.60
32	Information on the usage of mobile technology and camera	269(42.6%)	86(13.6%)	66(10.5%)	29(4.6%)	181(28.7%)	3.37	1.70
33	Information on tillage equipment	197(31.2%)	94(14.9%)	167(26.5%)	81(12.8%)	92(14.6%)	3.35	1.41
34	Information on soil cultivation	197(31.2%)	94(14.9%)	167(26.5%)	81(12.8%)	92(14.6%)	3.35	1.41
35	Information on how to apply pesticide	197(31.2%)	94(14.9%)	167(26.5%)	81(12.8%)	92(14.6%)	3.35	1.41
36	Information on intelligent water application systems	129(20.4%)	94(14.9%)	210(33.3%)	123(19.5%)	75(11.9%)	3.13	1.27
37	Information on transplanting machine	114(18.1%)	70(11.1%)	259(41.0%)	102(16.2%)	86(13.6%)	3.04	1.24
38	Information on pesticide residue elimination and emission of agro-chemical	114(18.1%)	70(11.1%)	259(41.0%)	102(16.2%)	86(13.6%)	3.04	1.24
39	Information on power sprayer	108(17.1%)	90(14.3%)	215(34.1%)	125(19.8%)	93(14.7%)	3.00	1.27

40	Information on seeder	112(17.7%)	77(12.2%)	223(35.3%)	125(19.8%)	94(14.9%)	2.98	1.28
41	Information on milling equipment	79(12.5%)	82(13.0%)	262(41.5%)	148(23.5%)	60(9.5%)	2.96	1.12
42	Information on VRA spraying system	92(14.6%)	104(16.5%)	217(34.4%)	121(19.2%)	97(15.4%)	2.96	1.25
43	Information on weeding machine	73(11.6%)	103(16.3%)	247(39.1%)	136(21.6%)	72(11.4%)	2.95	1.14
44	Information on harvesting machine	84(13.3%)	84(13.3%)	231(36.6%)	158(25.0%)	74(11.7%)	2.91	1.17
45	Information on herbicide application	96(15.2%)	74(11.7%)	230(36.5%)	133(21.1%)	98(15.5%)	2.90	1.25
46	Information on power tiller	73(11.6%)	92(14.6%)	240(38.0%)	154(24.4%)	72(11.4%)	2.90	1.14
47	Information on crop sensor	83(13.2%)	81(12.8%)	246(39.0%)	111(17.6%)	110(17.4%)	2.87	1.23
48	Information on barcodes, QR codes, RFID	69(10.9%)	81(12.8%)	253(40.1%)	110(17.4%)	118(18.7%)	2.80	1.20
49	Information on soil management	-	289(45.8%)	111(17.6%)	39(6.2%)	192(30.4%)	2.79	1.30
50	Information on smart traceability system	-	289(45.8%)	111(17.6%)	39(6.2%)	192(30.4%)	2.78	1.30
51	Information on smart logistics system	-	218(34.5%)	169(26.8%)	46(7.3%)	198(31.4%)	2.65	1.24
52	Information on monitoring and controlling crop irrigation systems via smartphone	-	117(18.5%)	158(25.0%)	102(16.2%)	254(40.3%)	2.22	1.16
53	Information on VRT and Swath Control Technology	-	94(14.9%)	187(29.6%)	87(13.8%)	263(41.7%)	2.18	1.13
54	Information on real time recording	-	148(23.5%)	95(15.1%)	26(4.1%)	362(57.4%)	2.05	1.29

	systems						
55	Information on - documentation of field via GPS	78(12.4%)	86(13.6%)	134(21.2%)	333(52.8%)	1.86	1.07
56	Information on - Government regulations	77(12.2%)	81(12.8%)	52(8.2%)	421(66.7%)	1.71	1.09
		Average				**2.97**	**1.30**
		Average of the Means = 2.53					

Research Question 2: What are the types of farm technology and farm technology information accepted by rice farmers in Ekiti State

Table 5 shows that the type of farm technology accepted by rice farmers in Ekiti State are leveller 600(95.1%), planting machine 590(93.5%), autopilot tractor 579(91.8%), seeder 577(91.4%), herbicide application 556(88.1%), transplanting machine 550(87.2%), tillage equipment 540(85.6%), harvesting machine 404(64.0%), milling equipment 376(59.6%), power tiller 344(54.5%) and weeding machine 339(53.7%).

The table also shows that the type of farm technology information accepted by rice farmers in Ekiti State are: information on leveller 574(91.0%), information on planting machine 573(90.8%), information on harvesting machine 572(90.6%), information on intelligent water application systems 566(89.7%), information on the usage of mobile technology and camera 529(83.8%), information on weeding machine 525(83.2%), information on milling equipment 505(80.0%).

It could be concluded that the major types of farm technology accepted by rice farmers in Ekiti State are levellers, planting machines and autopilot tractors while the major types of farm technology information accepted by rice farmers in Ekiti State are: information on levellers, information on planting machines and information on harvesting machine.

Table 5: Farm Technology/ Farm Technology Information Acceptance

S/N	Farm technology/ Farm technology Information Accepted	Frequency	Percentage(%)
	Farm technologies		
1	Leveler	600	95.1
2	Planting machine	590	93.5
3	Autopilot tractor	579	91.8
4	Seeder	577	91.4
5	Herbicide applicators	556	88.1
6	Transplanting machine	550	87.2
7	Tillage equipment	540	85.6
8	Harvesting machine	404	64.0
9	Milling equipment	376	59.6
10	Power tiller	344	54.5
11	Weeding machine	339	53.7
12	Real time recording systems	263	41.7
13	Usage of mobile technology and camera	209	33.1
14	Power sprayer	166	26.3
15	Intelligent water application systems	156	24.7
16	Documentation of field via GPS	137	21.7
17	Barcodes, QR codes, RFID	112	17.7
18	Smart traceability system	105	16.6
19	Monitoring and controlling crop irrigation systems via smartphone	104	16.5
20	VRT and Swath Control Technology	103	16.3
21	VRA spraying system	101	16.0
22	Crop sensor	85	13.5
23	Smart logistics system	80	12.7
	Farm technology information		
24	Information on leveller	574	91.0
25	Information on planting machine	573	90.8
26	Information on harvesting machine	572	90.6
27	Information on intelligent water application systems	566	89.7
28	Information on the usage of mobile technology and camera	529	83.8
29	Information on weeding machine	525	83.2
30	Information on milling equipment	505	80.0
31	Information on transplanting machine	498	78.9
32	Information on power tiller	485	76.9
33	Information on tillage equipment	479	75.9
34	Information on threshers to increase rice production	423	67.0

35	Information on monitoring and controlling crop irrigation systems via smartphone	421	66.7
36	Information on pest control	382	60.5
37	Information on documentation of field via GPS	354	56.1
38	Information on real-time recording systems	352	55.8
39	Information on seeder	348	55.2
40	Information on soil management	321	50.9
41	Information on herbicide application	310	49.1
42	Information on traction and power	291	46.1
43	Information on chemical fertilizers	285	45.2
44	Information on a crop sensor	279	44.2
45	Information on barcodes, QR codes, RFID	261	41.4
46	Information on how to apply pesticide	255	40.4
47	Information on soil cultivation	253	40.1
48	Information on VRT and Swath Control Technology	216	34.2
49	Information on tube wells for irrigation	183	29.0
50	Information on power sprayer	158	25.0
51	Information on smart traceability system	153	24.2
52	Information on smart logistics system	135	21.4
53	Information on the VRA spraying system	80	12.7
54	Information on autopilot tractor	59	9.4
55	Information on Government regulations	40	6.3
56	Information on pesticide residue elimination and emission of agro-chemical	38	6.0

Research Question 3: What is the level of acceptance of farm technology information among rice farmers in Ekiti State?

Table 6 shows that the level of acceptance of farm technology among rice farmers in Ekiti State was moderate generally. This is depicted by the average of the means score of ($\bar{x}$= 2.28). The table also revealed that the partially accepted farm technology is the autopilot tractor ($\bar{x}$= 2.51), usage of mobile technology and camera ($\bar{x}$= 2.50), leveller($\bar{x}$= 2.40), planting machine ($\bar{x}$= 2.39), power sprayer ($\bar{x}$= 2.38), smart traceability system ($\bar{x}$= 2.37), weeding machine ($\bar{x}$= 2.35) and power tiller ($\bar{x}$= 2.35). The table also revealed that partially accepted farm technology information on planting machines (2.38%), autopilot tractors (2.37%), leveller (2.37%), seeder (2.30%), real-time recording systems (2.30%), how to apply pesticide (2.30%), tillage equipment (2.29%), documentation of field via GPS (2.28%), and power tiller (2.28%). It could be concluded that the level of acceptance of farm technology and farm technology information among rice farmers in Ekiti State was moderate.

Table 6: Level of acceptance of farm technology information among rice farmers

S/N	Farm technology Information	Total Acceptance	Partial Acceptance	Never Accepted	$\bar{x}$	SD
	Farm technologies					
1	Autopilot tractor	385(61.0%)	183(29.0%)	63(10.0%)	2.51	0.67
2	Usage of mobile technology and camera	378(59.9%)	190(30.1%)	63(10.0%)	2.50	0.67
3	Leveler	323(51.2%)	238(37.7%)	70(11.1%)	2.40	0.68
4	Planting machine	329(52.1%)	218(34.5%)	84(13.3%)	2.39	0.71
5	Power sprayer	315(49.9%)	239(37.9%)	77(12.2%)	2.38	0.69
6	Smart traceability system	317(50.2%)	230(36.5%)	84(13.3%)	2.37	0.71
7	Weeding machine	316(50.1%)	217(34.4%)	98(15.5%)	2.35	0.73
8	Power tiller	302(47.9%)	245(38.8%)	84(13.3%)	2.35	0.70
9	Tillage equipment	301(47.7%)	246(39.0%)	84(13.3%)	2.34	0.70
10	Transplanting machine	288(45.6%)	267(42.3%)	76(12.0%)	2.34	0.68
11	Herbicide application	280(44.4%)	281(44.5%)	70(11.1%)	2.33	0.67
12	Harvesting machine	308(48.8%)	218(34.5%)	105(16.6%)	2.32	0.74
13	Real time recording systems	280(44.4%)	274(43.4%)	77(12.2%)	2.32	0.68
14	Seeder	308(48.8%)	211(33.4%)	112(17.7%)	2.31	0.76
15	VRA spraying system	308(48.8%)	211(33.4%)	112(17.7%)	2.31	0.76
16	VRT and Swath Control Technology	245(38.8%)	337(53.4%)	49(7.8%)	2.31	0.61
17	Crop sensor	273(43.3%)	267(42.3%)	91(14.4%)	2.29	0.70
18	Barcodes, QR codes, RFID	274(43.4%)	245(38.8%)	112(17.7%)	2.26	0.74
19	Documentation of field via GPS	259(41.0%)	295(46.8%)	77(12.2%)	2.26	0.73
20	Milling equipment	259(41.0%)	253(40.1%)	119(18.9%)	2.22	0.74
21	Intelligent water application systems	231(36.6%)	281(44.5%)	119(18.9%)	2.18	0.72
22	Smart logistics system	204(32.3%)	336(53.2%)	91(14.4%)	2.18	0.66
23	Monitoring and controlling crop irrigation systems via smartphone	190(30.1%)	350(55.5%)	91(14.4%)	2.16	0.65
	Average				**2.32**	**0.70**
	Farm technology information					
24	Information on planting machine	329(52.1%)	211(33.4%)	91(14.4%)	2.38	0.72
25	Information on autopilot tractor	315(49.9%)	232(36.8%)	84(13.3%)	2.37	0.71
26	Information on leveller	301(47.7%)	260(41.2%)	70(11.1%)	2.37	0.67
27	Information on seeder	259(41.0%)	302(47.9%)	70(11.1%)	2.30	0.66
28	Information on real-time	294(46.6%)	232(36.8%)	105(16.6%)	2.30	0.74

	recording systems					
29	Information on how to apply pesticide	259(41.0%)	302(47.9%)	70(11.1%)	2.30	0.66
30	Information on tillage equipment	77(12.2%)	77(12.2%)	77(12.2%)	2.29	0.67
31	Information on documentation of field via GPS	280(44.4%)	246(39.0%)	105(16.6%)	2.28	0.73
32	Information on power tiller	287(45.5%)	231(36.6%)	113(17.9%)	2.28	0.75
33	Information on tube wells for irrigation	280(44.4%)	239(37.9%)	112(17.7%)	2.27	0.74
34	Information on milling equipment	266(42.2%)	266(42.2%)	99(15.7%)	2.26	0.71
35	Information on pest control	280(44.4%)	231(36.6%)	120(19.0%)	2.25	0.76
36	Information on transplanting machine	287(45.5%)	210(33.3%)	134(21.2%)	2.24	0.78
37	Information on the usage of mobile technology and camera	266(42.2%)	253(40.1%)	112(17.7%)	2.24	0.74
38	Information on chemical fertilizers	266(42.2%)	253(40.1%)	112(17.7%)	2.24	0.74
39	Information on pesticide residue elimination and emission of agro-chemical	280(44.4%)	225(35.7%)	126(20.0%)	2.24	0.76
40	Information on soil management	217(34.4%)	351(55.6%)	63(10.0%)	2.24	0.62
41	Information on harvesting machine	266(42.2%)	246(39.0%)	119(18.9%)	2.23	0.74
42	Information on intelligent water application systems	287(45.5%)	204(32.3%)	140(22.2%)	2.23	0.79
43	Information on the VRA spraying system	245(38.8%)	288(45.6%)	98(15.5%)	2.23	0.70
44	Information on traction and power	245(38.8%)	288(45.6%)	98(15.5%)	2.23	0.70
45	Information on soil cultivation	266(42.2%)	245(38.8%)	120(19.0%)	2.23	0.75
46	Information on barcodes, QR codes, RFID	238(37.7%)	295(46.8%)	98(15.5%)	2.22	0.70
47	Information on threshers to increase rice production	245(38.8%)	281(44.5%)	105(16.6%)	2.22	0.71
48	Information on herbicide application	266(42.2%)	231(36.6%)	134(21.2%)	2.21	0.77
49	Information on smart logistics system	196(31.1%)	358(56.7%)	77(12.2%)	2.19	0.63

50	Information on monitoring and controlling crop irrigation systems via smartphone	238(37.7%)	266(42.2%)	127(21.1%)	2.18	0.74
51	Information on crop sensor	238(37.7%)	260(41.2%)	133(21.1%)	2.17	0.75
52	Information on Government regulations	224(35.5%)	273(43.3%)	134(21.2%)	2.14	0.74
53	Information on power sprayer	210(33.3%)	288(45.6%)	133(21.1%)	2.12	0.73
54	Information on smart traceability system	182(28.8%)	344(54.5%)	105(16.6%)	2.12	0.66
55	Information on weeding machine	217(34.4%)	266(42.2%)	148(23.5%)	2.11	0.75
56	Information on VRT and Swath Control Technology	161(25.5%)	358(56.7%)	112(17.7%)	2.08	0.65
	Average				**2.24**	**0.72**

Average of the Means = 2.28

Decision Rule: 1.0-1.99 = low; 2.00-2.99 = moderate; 3.00-4.00 = high.

Discussion of Findings

The demographic information of the respondents depicts that the majority of the farmers are male. This is consistent with the expectation that farming on a large scale is usually done by men probably because it is a tedious task. Interestingly, the majority of the farmers are graduates which implies that because they are literate they should be able to accept farm technology information to improve productivity on their farms. However, the findings from the study revealed that rice farmers' awareness of some of the farm technologies was rather low. The implication is that utilization of farm technology will be low because awareness of farm technology is low among rice farmers. The finding shows that the major types of farm technology accepted by rice farmers are levellers, planting machines, autopilot tractors, seeders, herbicide applicators, transplanting machines and tillage equipment. Additionally, very few farmers accepted monitoring and controlling crop irrigation systems via smartphones, crop sensors and smart logistics systems. Also, the major types of farm technology information accepted by rice farmers are information on levellers, information on planting machines and information on harvesting machines. The reason for this outcome is not far-fetched, this may be arising from the fact that the rice farmers are used to only a few of the farm technologies and are hesitant to try out other technologies on their farms. The finding is in line with the findings of Umar, Yarima, Yusuf, Adetayo and Salihu (2021) who reported that the tractor is one of the major farm tools that enhance mechanization in agriculture. Therefore, incorporating mechanization, notably the tractor is essential because it affects the farmer's livelihoods and living conditions. Cazanescu, Mihai and Mudura (2010) stated that levelling becomes of high importance, in modern and intensive agriculture conditions. Its effects are found in providing optimal and equal conditions to the crops, during yielding and growing. In areas with water

excess, the soil levelling provides an appropriate water runoff, ensuring better water management.

The finding further showed that the level of acceptance of farm technology and farm technology information among rice farmers in Ekiti State was moderate. This implies that the perceived usefulness and relative advantage of the technology influence the positive or negative attitude of the farmers toward the technology. The finding is in line with the finding of Ullah Saqib and Kächele (2022)showed a strong association between the farmers' awareness of a technology (improved wheat varieties) and its adoption.

Conclusion

This study has been able to point out that if farm-technology information is accepted by rice farmers, newly introduced technology and agricultural innovations will be embraced which will lead to a high increase in rice production and reduce the exorbitant cost of rice in our growing nation. There are several reasons why rice farmers in Ekiti state did not accept farm technology information these include, the cost of the said technology, lack of access to credit, the credibility of the source of information, poor socioeconomic background of the farmers, erroneous belief, politicizing grant opportunities, favouritism and so on. It is believed that when these problems are addressed the level at which rice farmers accept farm technology information will increase, which will result in a high rate of utilization of those technologies. This will ensure sustainable rice production in Ekiti state and also reduce hunger and boost food security.

Recommendations

Based on the findings of this study, the following recommendations are imperative;

1. Government should provide easy access to loans and grants and also shun favouritism and politicizing the process, to increase the level of acceptance of any information about new technology or innovation to boost rice production for security and to reduce the importation of rice in Nigeria.
2. Adequate workshops, training and awareness should be done by the government and other private organizations for rice farmers to change their orientations and motives towards accepting farm-technology information.
3. The government should procure the technology needed by the rice farmers at a low cost and ensure they pay back at low interest.
4. Extension officers should further educate the farmers on modern farm technologies that can be adopted by farmers on their farms to increase productivity.
5. Extension officers as information disseminators should monitor the disbursed loan from the government and ensure that the loan is not diverted to other projects.

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