Utilization of Rice Advice Smartphone-Technology in Enhancing Climate Smart Agricultural Practices Among Small-Scale Farmers in Benue State, Nigeria.

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Abstract
Traditionally, farmers have relied solely on their own knowledge and expertise for decisions making. The current transformation in information and communications technologies has made it possible to create decision-support tools that can help farmers increase productivity, minimize risks, and improve their livelihoods. Climate Smart Agriculture (CSA) is aimed at income sustainability, resilience to extreme weather, and the elimination of greenhouse gases. The study examined the utilization of Riceadvice Smartphone-Technology in enhancing climate smart agricultural practices among small-holder farmers in Benue State, Nigeria. Purposive sampling and simple randomization were used in selecting 120 respondents. The socio-economic characteristics, utilization, attitude and perception, knowledge, and constraints were the specific objectives analyzed using descriptive statistical tools. The mean age of the respondents is 36 years. The majority were males (77.5%), married (66.7%), Christians (72.5%) with 0-0.5 hectares of land (77.5%). Mean household size of 7 persons, farming experience of 10 years, monthly income of N32, 500.80k. The source of labor is from family (75.0%) and cooperative movement complaints (90.0%). The main sources of knowledge on Riceadvice technology are Co-farmers/farmers groups (92.5%), Radio programs (77.3%) and family/friends/neighbors (75.0%). They have a positive attitude and perception towards Riceadvice technology ($\overline{xx}$ =0.958-1.998 and $\overline{xx}$=0.992-2.000, Mean Index of $\overline{xx}$=1.499 and 1.576 respectively). Major constraints to utilization of riceadvice technology are inadequate network coverage (92.5%), fewer clienteles with Android phones (88.3%), and poor extension contact (75.8%), amongst others. It was recommended that extension services should be proactive, networks should be made available and accessible, and the provision of lending institutions at the community level as well as other infrastructural development in the study area.
Keywords: Climate, Smart-Agriculture, Riceadvice, Smartphone-Technology, Practices

Introduction:

The growing global population and shifting diets are driving up the demand for food. Production is struggling to keep up as crop yields level off in many parts of the world, a decline in ocean health, and natural resources like water, soils, and biodiversity are all stretched dangerously thin [1]. The task is further strengthened by agriculture's life-threatening susceptibility to climate change. The negative impacts of climate change are already being felt in the areas of weather variability, increasing temperatures, invasive crops and pests, shifting agroecosystem boundaries, and more frequent and dangerous weather events. Climate change on farms is reducing crop yields, lowering livestock productivity and the nutritional quality of major cereals. A considerable increase in adaptation is needed to maintain present output, retain food quality increases, and achieve production to meet demand [2].

The life-threatening consequences of climate change are becoming evident from unswerving interference in the arrangement of some climate variables like temperature, rainfall, etc. It is unequivocally right that hot, extreme weather has become more common and intense across most land regions since the 1950s [3]. Conspicuously, numerous natural dynamics and anthropogenic undertakings are answerable for the course of change in the global climate as scientifically evidenced since the 20th century. Climate change has significantly impacted different natural systems, including human existence. Projections are more serious and severe, threatening the existence of different eco-systems and food security. Human activities have significantly intensified climate change in various ways, causing immeasurable disruptions to agricultural activities. Additionally, agriculture has long been recognized as one of the primary contributors to climate change because of its role in burn practices, tillage operations, deforestation, slashing, unrestricted fertilization use, livestock production (particularly enteric fermentation of ruminants), and methane from rice farms [4]. It is imperative that agricultural practices be made climate smart to stem their contribution to contribution to green gasses emissions.

Climate change poses a gigantic threat to the sustainability of livelihood activities and food production in vulnerable areas like Nigeria because it depends mainly on rain-fed agriculture. Climate change is real, with bold manifestations like intense temperatures and fluctuations in rainfall, which have upsetting consequences on humanity, majorly on agricultural livelihood [3]. The most defenseless areas prone to climate change are developing countries, mostly African countries, characterized by subsistence food production, high levels of poverty, and land degradation [5]. Due to the fact that their economies are heavily dependent on agriculture, there is not enough money to comply with regulations and put adaptation measures in place [6]. In tackling the encounters posed by climate change on agriculture, it must experience the main change to block the various penalties of food insecurity, hunger, poverty, malnutrition, and also environmental degradation [7,1]. Agriculture is said to be climate smart when it realizes three main objectives; building resilience to climate change; reducing greenhouse gas emissions, and a sustainable increase in agricultural production and income [8]. Climate smart agriculture promotes the transformation of agriculture systems and agricultural policies in order to increase food production, enhance food security and ensure that food is affordable, hence reducing poverty while preserving the environment and ensuring resilience to a changing climate [9,10].

Climate-smart agriculture (CSA) interventions are those that increase productivity, adjust farming systems with respect to perceived or future projected climate change impacts, and reduce or remove (where possible) GHG emissions. It is sustainably increasing agricultural productivity, and incomes, adapting and building resilience to climate change and reducing greenhouse gas emissions [11,12]. It is not a new set of practices, but rather an integrated approach to the implementation of agricultural development programme policies [13,7,14,1]. Climate-smart agriculture is an integrated approach to managing landscapes—cropland, livestock, forests, and fisheries—that address the interlinked challenges of food security and accelerating climate change. Climate smart agricultural strategies usually integrate innovative indigenous practices, technologies, and services that are relevant to a specific location. This implies that CSA is context-specific [15]. However, uptake of CSA practices, technologies, and services can increase crop production and productivity, enhance resource-use efficiency, increase profitability and net income, enhance resilience, ensure food security, and reduce or sequester below and above ground carbon. Uptake of CSA practices and technologies, inter alia, depends on the policy and institutional frameworks of the country. Therefore, responding fully to climate change needs systematic adaptation, mitigation, and food security strategies [16,17]. The World Bank Group (WBG) is currently scaling up climate-smart agriculture. In its first Climate Change Action Plan (2016-2020), as well as the forthcoming update covering 2021-2025, the World Bank committed to working with countries to deliver climate-

smart agriculture that achieves the triple win of increased productivity, enhanced resilience, and reduced emissions [1].

Agriculture, as a mainstay of the Nigerian economy, employs 72 % of the people, regardless of its declining role in providing foreign exchange income to the government. The main players in Nigerian agriculture are the rural dwellers, who are faced with a lot of challenges, such as low productivity, inadequate access to capital, transportation, storage, and processing facilities, and are more vulnerable to the negative impact of climate change [7,14,1]. Evidence shows that Nigeria is already overwhelmed with various ecological problems which have been directly connected to the ongoing climate change. The southern ecological zone of Nigeria, mostly known for high rainfall, is currently confronted by an abnormality in the rainfall pattern and also the Guinea Savannah, which is under slowly increasing temperature, while the northern zone faces the menace of desert encroachment at a very wanton rate per year induced by a fast reduction in the volume of surface water, vegetation and wildlife resources. Most of these farmers are challenged with the going concern about climatic variability. Concerned amongst the targeted clienteles in Nigeria today against food insecurity are the rice farmers. Because rice is one of the most consumed foods in Nigeria today, its contribution to climate change cannot be overemphasized. It is therefore pertinent to assess the utilization of Riceadvice smartphone technology in enhancing climate-smart agricultural practices among small-scale rice farmers in Benue State, Nigeria. The specific objectives are to:

1. describe the socioeconomic characteristics of the respondents in the study area;
2. examine the source(s) of knowledge of the respondents on riceadvice CSA technology;
3. examine the attitude and perception of the respondents on riceadvice CSA technology;
4. determine the constraints of the respondents to the utilization of the riceadvice CSA technology.

Methodology:

Study Area:

The study was carried out in Benue State, Nigeria. Benue State is in north-central Nigeria between longitude 60 35'E to 10^0E and latitude 6030' to 8^0N. Benue state was created in 1976 and it has a population of 4,218,244 with 50.2% male and 49.8% female. National Population Commission [18]. According to the National Bureau of Statistics-NBS (2016), Benue state is projected to have a population of 5,620,940 at a 3.0% annual growth rate in 2016. The state has a total landmass of 33,955 km2. It is surrounded by five states, namely, Nassarawa to the north, Taraba to the northeast, Cross River to the south, Enugu to the southwest, and Kogi to the west. It has an international boundary with the Republic of Cameroon along its southeast border. Benue state has a tropical climate in nature, which is manifest in two distinct seasons. The state is situated in the Guinea Savannah agro-ecological zone of Nigeria. The rainy season is from April to October, and the dry season is from November to March. The annual rainfall average varies from 1750 mm in the south to 1250 mm in the north of the state. Agriculture is the major occupation where 70% of the population depends on it. Benue state has a major river which is the source of water for agricultural purposes; the state is endowed with fertile land and abundant human resources and raw materials. Small-scale farmers are involved in the production of cassava, yam, rice, beans, maize, sorghum, millet and livestock such as pigs, poultry, sheep, cattle and goats. Benue State is divided into 3 ADP zones according to Benue State Agricultural and Rural Development Authority (BNARDA) into Zone A (Eastern zone), Zone B (Northern zone) and Zone C (Central Zone) respectively [18].

Zone A: Contains Konshisha, Vandeikya, Kwande, Ushongo, Katsina-Ala, Ukum and Logo
Zone B: Contains Buruku, Gboko, Tarka, Guma, Makurdi, Gwer-West and Gwer

Zone C: Contains Apa, Ado, Agatu, Otukpo, Ohimini, Okpokwu, Ogbadibo, Obi and Oju.

Sampling Procedure and Sample size:

The population of the study comprises all rice farmers in Benue State, Nigeria. The list of registered rice farmers in the state was obtained from the Benue State Agricultural and Rural Development Authority (BNARDA) Makurdi. A multi-stage (3-stage) sampling procedure was employed in selecting respondents for the study. The first stage was a purposive selection of the three agricultural zones (ADP) that made up the Benue State Agricultural Zone due to the fact that rice farmers were spread all over the local government areas of the state. In the second stage, a simple random sampling procedure was used in the selection of two (2) LGAs from each of the three (3) ADP zones in the state, making a total of six (6) LGAs. These are as follows: Zone A (Vandeikya and Katsina-Ala), Zone B (Gboko and Makurdi), and Zone C (Agatu and Otukpo) respectively. In the third stage, a simple randomization technique was used in the selection of twenty (20) rice farmers that used Riceadvice Smartphone-Technology from each of the six (6) LGAs to make a total of 120 respondents for the study. The dataset for the study were collected using a structured questionnaire and interview schedule with the aid of trained enumerators. The data were analyzed using descriptive statistical tools like; frequency, counts, percentages, means score, Tabulations and standard deviation.

Results and Discussion

The Socioeconomic Characteristics of the Rice Farmers

Table 1 discussed the outcome of the socioeconomic characteristics of the rice farmers in the study area. It shows that the majority of the respondents were within the average age of 36 years (95.0%). This suggests that respondents were very much in their active and productive age range, where energy is very high for rice production activities. This is in line with the work of [19], who pointed out that the active age is regarded as agile age with more energy to dissipate and concentrate on rice productive activities. Similarly, the majority of the clienteles were males (77.5%), Christians (72.5%), and married (66.7%). The average farming experience is 10 years (91.7%), which implies that they are experienced rice farmers. Marriage confers responsibility according to [20,21], and they are highly experienced rice farmers judging from the years of rice farming activities. The rice farming experience corroborates the submission of [22], who stated that the higher the farming experience, the more the rice farmers would have gained more knowledge and technological ideas on how to tackle issues relating to rice production activities and the higher would be their output and income. The mean farm size is 4 hectares (77.5%) and the household size is 7 persons (74.2%). A significant proportion of the clienteles had secondary education (66.7%). Next to this is primary education (16.7%) and Christ Theological education (10.8%) with an average monthly income of N32,500.80k (90.0%). [23] posited that, literate respondents stand a chance of understanding the general information on rice production and that this assists their information-seeking habits. This implies that the clienteles in the study area are not really educated.

Table 1: Distribution of the Respondents based on Socioeconomic Characteristics

Variables	Frequency	Percentage	$\bar{x}\bar{x}\pm\delta$
Age (Years)			
0-20	0	0.0	36 ±5.98
21-30	0	0.0	
31-40	114	95.0	
≥ 41	6	5.0	
Sex			

Male	93	77.5	
Female	27	22.5	
Religion			
Islam	5	4.2	
Christianity	87	72.5	
Traditional	28	23.3	
Marital Status			
Single	35	29.2	
Married	80	66.7	
Widowed	4	3.3	
Divorced	1	0.8	
Farming Experience (Years.)			
0-5	5	4.2	10.33±2.71
6-10	60	50.0	
11-15	50	41.7	
16-20	4	3.3	
≥ 21	1	0.8	
Educational Qualifications			
No Formal Education	1	0.8	
Primary Education	20	16.7	
Secondary Education	80	66.7	
Tertiary Education	6	5.0	
Christ Theological Education	13	10.8	
Average Monthly Income (N)			
1-10,000	2	1.7	32,500.80
11,000-20,000	1	0.8	
21,000-30,000	48	50.0	
31,000-40,000	60	40.0	
41,000-50,000	8	6.7	
≥ 51,000	1	0.8	
Farm Size (ha)			
0-5	93	77.5	4.3±1.6
6-10	25	20.8	
11-15	1	0.8	
≥ 16	1	0.8	
Household Size (No)			
0-5	27	22.5	7.1±2.1
6-10	89	74.2	
11-15	3	2.5	
≥ 16	1	0.8	
Source of Labor			
family,	90	75.0	
Hired	9	7.5	
Both	21	17.5	
Source of Funds			
Cooperative Movement	108	90.0	
Family/friends/neighbors	8	6.7	
Community Bank	1	0.8	
Private Money Lenders	3	2.5	

Source: Field Survey, 2022. $\bar{x}\pm\delta$=Mean ± Standard Deviation

Respondents' Sources of Knowledge on Rice advice Climate Smart Agricultural Technology

The result depicted in Table 2 shows the respondents' sources of knowledge on Riceadvice climate smart agricultural technology. The main source of knowledge of the respondents on Riceadvice climate smart agricultural technology is Co-farmers/farmers' group (92.5%). This may be unconnected to the fact that it is much easier for messages to spread through individual contact media among the respondents than any other method. This was followed by radio programs (77.5%), probably because radio sets are very cheap and affordable, and as such, most farmers have access to them all the time. Hence, most farmers receive more messages through radio programs. Next in order is family/friend/neighbors (75.0%). Television programs are not left behind either, as a majority of the respondents claimed their usage (57.5%). Extension services that are saddled with the responsibility of disseminating improved practices and innovation to farmers who are not proactive in the study are (32.5%), and finally newspapers (14.2%). This is probably because the respondents were not really literate and as such, may not be too inclined to newspaper reading. This finding is in line with the work of [24], who asserted that the main sources of knowledge for farmers on innovation are co-farmers and radio programs mostly. The same evidence is seen in the work of [17], who agreed that the main sources of information for farmers in southeast Nigeria are Co-farmers and radio program broadcasting.

Table 2: Distribution of the Respondents based on Source of Knowledge on Rice advice Climate Smart Agricultural Technology

Variables	Frequency	%	Rank
Radio Program	93	77.5	2nd
Television Program	69	57.5	4th
Co-farmers/Farmers' Group	111	92.5	1st
Family/Friends/Neighbors	90	75.0	3rd
Extension Service	39	32.5	5th
Newspapers	17	14.2	6th

Source: Field Survey, 2022

Attitude and Perception of the Respondents on Riceadvice Climate Smart Agricultural Technology

The Table 3A and 3B shows the outcome of the attitude and perception of the rice farmers on riceadvice climate smart agricultural technology among respondents in the study area. The respondent's attitudes and perceptions of riceadvice CSA were analyzed using a 3-point Likert type scale of Agreed, Undecided and Disagreed respectively against some attitudinal and perception statements on riceadvice technology obtained in the pretesting of the research data instrument. The results are displayed below.

Table 3A: Distribution of the Respondents based on Perception of Riceadvice Climate Smart Agricultural Technology

Variables (Perception)	A	U	DA	$\bar{x}$	D
Do you perceive the technology good as for your faming system	98	1	21	1.808	A
Is the technology compatible with your cultural believes	101	0	19	1.842	A
Is the technology easier and understandable	111	7	2	1.867	A
Is it going to lead to sustainable increase in income if adopted	111	1	8	1.917	A
It makes communication and timing of activities easier	118	0	2	1.983	A
It does not waste time and requires no space when applied	100	6	14	1.783	A
It is less expensive and not difficult to handle by clienteles	91	0	23	1.708	A

The technology is adaptable in any environment	120	0	0	1.998	A
It is meant for only the educated rice farmers alone	3	0	117	1.025	DA
It is good for educated farmers alone due to the technicalities involved	0	5	115	0.958	DA
The operational procedures and guidelines are very complex	8	0	112	1.000	DA
It can only be functional in the urban arears only	1	0	119	1.017	DA
Perception Index				**1.576**	**A**

Source: Field Survey, 2022. A=Agreed, U=Undecided and DA=Disagreed, D=Decision, Perception Index= $\bar{x}\bar{x}$

Respondents' Perception on Riceadvice Climate Smart Agricultural Technology

Table 3A depicted the rice farmers' perception on riceadvice climate smart agricultural technologies on climate change in the study area. Perception is one's conscious understanding or opinion about something or activities in a social system. The perception of the respondents was measured on a 3-point Likert type scale of Agreed (A)=2, Undecided (U)=0 and Disagreed (DA)=1. Perception index was obtained based on the values allotted to the variables under investigation and used for judgment. The perception index was obtained from 2+0+1/3=1.000. Therefore, at an interval of 0.5, upper limit is 1.00+0.50=1.500. Hence, mean index of 1.50-2.00= positive perception. Similarly, the lower limit 1.00-0.50=0.500, hence mean index of 0.50-1.00=negative perception. From the Table 3B the respondents have positive perception towards the riceadvice smart phone technologies. They agreed with the fact that riceadvice technology is adaptable in any environment ($\bar{x}\bar{x}$=1.998), it makes communication and timing of activities easier ($\bar{x}\bar{x}$=1.983), it leads to sustainable increase in income of adopters ($\bar{x}\bar{x}$=1.917), it is easy and understandable ($\bar{x}\bar{x}$=1.867). Also, it is compatible with the culture of the farmers ($\bar{x}\bar{x}$=1.842), it is good for their rice farming system ($\bar{x}\bar{x}$=1.808), it does not waste time and space to apply on farm ($\bar{x}\bar{x}$ =1.783) and it is less expensive and not difficult to apply ($\bar{x}\bar{x}$=1.708). Hence, they disagreed with the following; it is meant for educated farmers alone ($\bar{x}\bar{x}$=1.025), it is only functional in the urban areas alone ($\bar{x}\bar{x}$=1.017), the operational procedures and guidelines are very complex ($\bar{x}\bar{x}$=1.000) and that it is good for educated individuals (clienteles) alone ($\bar{x}\bar{x}$=0.958). Therefore, perception index=18.906/12= 1.576. However, it implies that the respondents have positive perception of rice advice smart phone technology. This is in agreement with the work of [25], who agreed that farmers have positive perception towards improve food technologies because of it can sustainably increase their income. This position is also seen in the work done by [17] that shows farmers have very perception of climate smart agricultural practices and technologies in Southeast, Nigeria

Table 3B: Distribution of the Respondents based on Attitude towards Riceadvice Climate Smart Agricultural technology.

Variables (Attitude)	**A**	**U**	**DA**	$\bar{x}$	**D**
The technology does not have any benefit to the beneficiaries	39	1	80	1.317	DA
The technology is very difficult to understand in application	4	5	111	0.992	DA
The implementation is not compatible with the environment	45	0	75	1.375	DA
Only the literate rice farmers can utilize the technology	25	1	95	1.208	DA
Income will be endangered if the technology is adopted	31	0	89	1.258	DA
The technology will lead to environmental degradation of the study area	50	0	70	1.417	DA
The technology has no effect on the cultural belief, norms and value systems	120	0	0	2.000	A
There is no health hazard attached with the use of the technology	120	0	0	2.000	A

It is not easily applicable because it requires some specialized skills	42	0	78	1.350	DA
It is only meant for the educated farmers only	13	1	106	1.099	DA
It led to change in my knowledge, skills and attitude to climate change	118	0	2	1.983	A
The technology is very effective in assisting against climate change impact	119	0	1	1.992	A
Attitudinal Index				**1.499**	**A**

Source: Field Survey, 2022. A=Agreed, U=Undecided and DA=Disagreed, D=Decision, Attitudinal Index=$\bar{x}$ $\bar{x}$

Respondents' Attitude toward Riceadvice on Climate Smart Agricultural Technology

The attitude of the respondents is their disposition or state of mind towards the riceadvice climate smart agricultural technology in the study area. This is shown in Table 4B. This was measured on a 3 point likert type scale of Agreed (A)=2, Undecided (U)=0 and Disagreed (D)=1 against some predetermined attitudinal statements on riceadvice technology. Mean value ($\bar{x}\bar{x}$) was calculated from 2+0+1/3=1.000. Therefore, at an interval of 0.5, upper limit is 1.00+0.50=1.500. Hence, mean index of 1.50-2.00= positive attitude. Similarly, lower limit 1.00-0.50=0.500, hence mean index of 0.50-1.00=negative attitude. According to the attitude index values of all the constructs, the respondents exhibited positive attitude towards riceadvice technology in the study area. They disagreed with the fact that the technology is very difficult to understand in application ($\bar{x}\bar{x}$=0.992), it is only meant for educated farmers alone ($\bar{x}\bar{x}$=1.099), only literate rice farmers can utilize the technology ($\bar{x}\bar{x}$=1.208), income will be endangered if the technology is adopted ($\bar{x}\bar{x}$=1.258), it is difficult to apply because it requires some specialized skills ($\bar{x}\bar{x}$ =1.350), the implementation is not compatible with the environment ($\bar{x}\bar{x}$=1.375) and it can lead to degradation of the environment ($\bar{x}\bar{x}$=1.417). they agreed with the fact that the technology has no effect on the cultural belief, it has no health hazard attached to the use ($\bar{x}\bar{x}$=2.000), it is effective ($\bar{x}\bar{x}$=1.992) and it led to change in knowledge, skill and attitude ($\bar{x}\bar{x}$=1.983). the attitudinal index value of 1.499 was obtained which implies that the respondents have positive attitude towards riceadvice climate smart agricultural technology in the study area. This agreed with the findings of [26,27] that farmers have positive attitude towards improved technologies in agriculture. This is also seen in the work of [14], who posited that farmers have positive attitude to climate change because it is impacting negatively on their livelihoods.

Table 4: Distribution of the Respondents based on Constraints to Utilization of Riceadvice Climate Smart Agricultural Technology

Variables	Frequency	Percentage	R
Inadequate network coverage of the study area	111	92.5	1st
Poor Extension contacts	91	75.8	3rd
Fewer Clienteles with Android Phones	106	88.3	2nd
High cost of Android Phones	91	75.8	3rd
Inadequate Capital for Data input	88	73.3	4th
Lack of Information from Subject matter specialists	86	71.7	5th
Government Policies on rice production	81	67.5	6th
Poor climatic Information System on rice	86	71.7	5th
Poor Acceptability of the technology due to literacy	61	50.8	7th
Cultural Incompatibility	40	33.3	9th
Over dependence on indigenous knowledge	60	50.0	8th

Source: Field Survey, 2022 R=Rank

Constraints of the Respondents to Utilization of Riceadvice Climate Smart Agricultural Technology

Constraints of the rice farmers to effective utilization of riceadvice climate smart agricultural technology in the study area are shown in Table 4. The constraints were examined under the various constructs obtained from the pretesting of the questionnaire on the field before data was finally collected. The most severe constraint of the respondents on riceadvice climate smart agricultural technology is inadequate network coverage of the study area (92.5%). This was followed by fewer clienteles with android phones (88.3%) and poor extension contact/high cost of Android phones (75.8%) respectively. There is also inadequate capital for Data input (73.3%), lack of information from subject matter specialists/poor climatic information system on rice (71.7%) and various government policies on rice production (67.5%). There is poor acceptability of the technology due to the literacy level of the respondents (50.8%) while cultural incompatibility was not seen as a constraint among the respondents in the study area (33.3%). This is in consonance with the submission of [6] who agreed that one of the main constraints of farmers in the utilization of climate smart practices are network issues, understanding of the technologies and extension contact.

Conclusion and Recommendations:

Based on the research on rice advice climate smart agricultural technology, it can be concluded that;

1. The mean age of the target beneficiaries is 36 years, farming experience of 10 years, monthly income of N32, 500.80k, household size of 7 persons and farm size of 4 hectares. Majority were males (77.5%), married (66.7%), Christians by religion (72.5%), with secondary education (66.7%).
2. Main sources of knowledge on rice advice climate smart agricultural practices are Co-farmers'/farmers' groups (92.5%), Radio programs (77.5%) and family/friends/neighbors (75.0%) respectively.
3. The respondents have positive attitude and perception on the rice advice climate smart agricultural practices in the study area ($\bar{x}\bar{x}$=1.499 & 1.576 respectively)
4. Major constraints were inadequate network coverage (92.5%), fewer clienteles having Android phones (88.3%) as well as poor extension contact/high cost of Android phones (75.8%) amongst others.

The study therefore recommended that:

1. Main sources of awareness should be proactive while others are also instituted in assisting information dissemination in the study area;
2. Enough extension personnel and subject matter specialists both male and female should be employed and trained by the state Agricultural Development Programme office of the state Ministry of Agriculture to be able to get and solve the problems of climate smart agricultural practices for the farmers;
3. The respondents' attitude and perception on climate smart agricultural technology should be enhanced through periodic and constant capacity building training on software usage in the study area;
4. Agro-chemical and other improved cowpea seeds should be made available with adequate enlightenment on the handling and safe use of them with technologies compactable with the socioeconomic background of the people.

5. Government should put in-place financial institutional framework such as the community and Micro-finance banks to help the people at the local levels in having access to smart phone as well as making infrastructures needed for network available to help farmers in the study area.

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