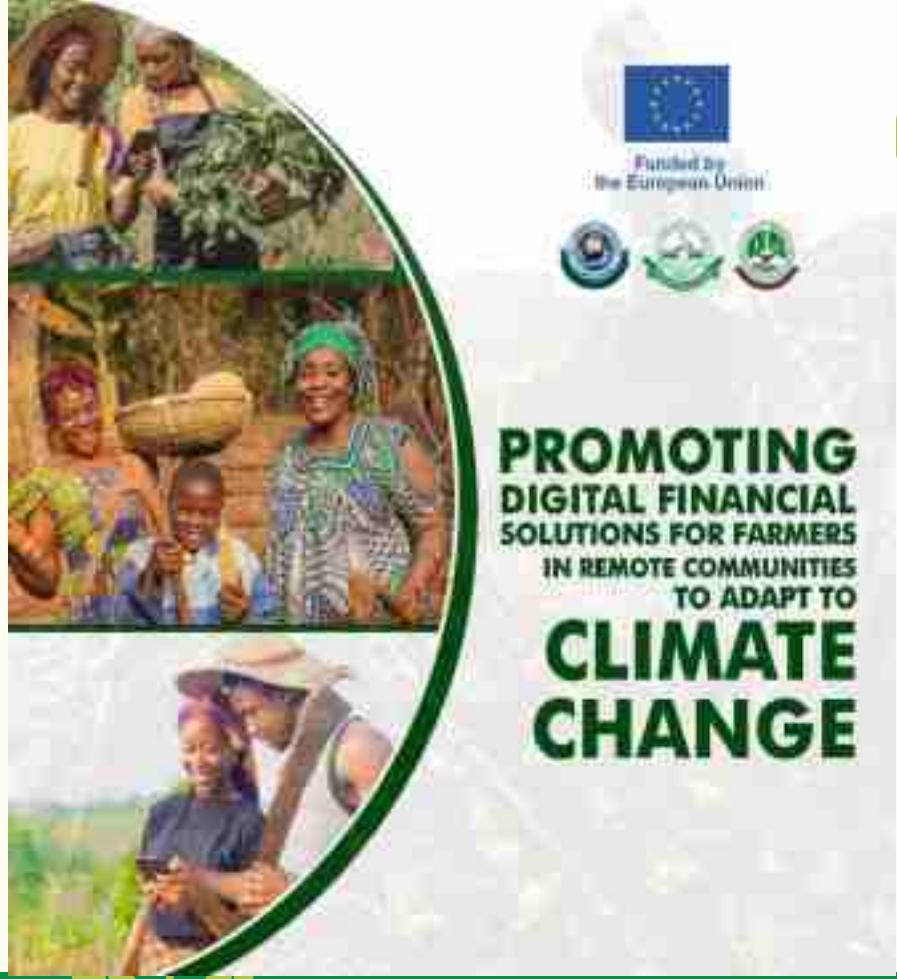
Promoting Digital Solutions for Farmers in Remote Communities to Adapt to Climate Change (DIFISOL)

Findings from Kwara State



Objectives of the study

01

characterise the digital solutions that are available to the farmers in the country that can make them build resilience against climate change in remote communities

02

examine the farmers in remote communities' knowledge of building resilience against climate change through digital solutions

03

analyse the capacities of farmers through digital training to apply climate-smart agricultural practices and promote investments in alternative livelihoods to enhance household incomes.

Objectives of the study cont.

04

examine the capacities of local authorities to facilitate digital solutions to promote investments in small-scale sustainable agriculture and green projects.

05

analyse how national regulatory policies and framework, particularly the Universal Access Right, have helped extend digital solutions to farmers in remote communities and locations, particularly the universal access rights on ICTs.

06

Stimulate policy actions arising from the study towards IT, innovative agriculture curriculum review and innovative financing model.

Research Questions

Data Collection and Research Instruments

To achieve the stated objectives, data will be collected strictly from primary sources. The data will be quantitative and qualitative in nature using structured questionnaire and semi-structured interview. Data collected through research questionnaire will be analysed quantitatively while schematic analysis shall be run on qualitative data.

A survey will be conducted on selected farmers in rural communities using research questionnaire divided into two main sections; socio-demographic information and information directly related to the stated objectives. Interview shall be conducted for local authorities (Local government chairman/counsellors, Traditional rulers, Agricultural services department, opinion leaders, Commuinity Development Association executives, religious leaders) with face-to-face method as well as telephone interviews depending on the availability of the selected respondents.

Sample selection

The study will cover three local government areas as selected in each of the selected 3 States (Moro, Ifelodun and Asa for Kwara State). For quantitative data collection method, a sample of two thousand farmers in rural communities shall be drawn using a stratified sampling technique. The respondents shall be stratified based on local government, gender, age, and physically challenged people. The qualitative data collection method, using indepth interview, shall elicit data from thirty purposively selected local authorities across the three local government. The sampling procedure shall ensure the largest coverage of the various local governments to ensure fair representation.

Reliability and validity of research instrument

The questionnaire and interview items shall be drafted in a specific order for each of the stated objectives. To conduct a construct validity of the instruments, a group discussion and joint review involving the research team shall be done. Further, discriminant validity shall be performed using appropriate STATA 15 and SPSS 23 softwares on responses from a pilot survey. A reliability test shall be conducted after the instrument has been validated while retest reliability shall be conducted on the responses from the same participants but administered at two different occasions.

Method of data analysis

Data relating to objective one shall be analysed using descriptive statistics. Specifically, a frequency distribution shall be used to categorise the DSs available to farmers in rural communities. Further, mean, variance, skewness, and kurtosis shall be run to understand the structure and normality of the data set.

Data on Objective two will be analysed using descriptive and inferential statistics. The inferential statistics shall involve Analysis of Variance (ANOVA) to test the significance of differences among rural farmers' knowledge categories in building resilience against climate change through DSs.

Data relating to objective three shall also be analysed using both descriptive and inferential statistics. The inferential statistics shall also involve Analysis of Variance (ANOVA) to test the significance of differences among rural farmers' capacities through digital training to apply DSs for climate change resilience.

Method of data analysis cont.

Data relating to objective four shall be analysed using thematic analysis to identify factors that determine the capacities of local authorities to facilitate DSs in promoting investments in smart agricultural practices.

Data relating to objective five shall be analysed using triangulation of evidence across quantitative and qualitative analyses. Document analysis will be carried out on the government's existing policy and regulatory documents on universal access right. More so, the thematic analysis shall be conducted on the interview of local authorities on their accessibility to ICT infrastructure and facilities. The outcome of the qualitative analysis shall then be triangulated against the result of inferential analysis conducted on data sourced from farmers.

Report of Enumerators' Training

Day 1: Empowering Enumerators - Al-Hikmah Research Team Kickstarts Three-Day Training Workshop on EU-Grant Project

The training workshop was inaugurated by Tajudeen Ajala, the Project Manager and director of the day's activities. The first day's focus was to equip the enumerators with a deep understanding of the content and purpose of the instruments they would be using. The training comprised two informative sessions. Session A was facilitated by Dr. Ahmad B. Uthman who provided a thorough explanation of the instruments, while Session B was led by Dr. Saidat O. Onikosi-Alliyu who clarified the meaning of specific vocabulary used in the instruments, utilising the local language for better comprehension.

Day 1

Report of Enumerators' Training

Day 2: Empowering Enumerators with Digital Tools: Exploring the Efficiency of the Kobo Toolbox Application for Seamless Research Instrument Deployment

On Wednesday, June 21, 2023, the second day of the training commenced with Bolaji Ogidan, the Ag. Director, ICT and a member of the Al-Hikmah Research Team, taking the lead. The training session revolved around utilising the Kobo Toolbox Application for deploying the research instruments. A comprehensive explanation was provided, highlighting the efficiency and benefits of the application.

The training actively engaged all five enumerators, who participated effectively throughout the session. They contributed valuable observations and comments and posed relevant questions, showcasing their dedication and enthusiasm for mastering the Kobo Toolbox Application.

Day 2

Report of Enumerators' Training

Day 3: Empowered Enumerators Excelling: Practical Session Validates Instruments Deployment Skills, Paving the Way for a Successful Fieldwork Journey

On Thursday, June 22, 2023, the training program's final day featured a practical session designed to provide valuable feedback. Each enumerator demonstrated their understanding of effective instrument deployment using a role-playing method. The research team assumed the roles of different respondents, such as farmers, Small and Medium Enterprise owners, Local Authorities, NGOs, CSOs, and Co-operative Societies. Through this interactive exercise, the enumerators showcased their knowledge and skills in engaging with respondents and administering the instruments accurately. The feedback received by the research team from the enumerators was highly encouraging, instilling a sense of optimism within the team regarding the successful outcomes to be achieved in the field. Tajudeen Ajala, the Project Manager for the Institution, officially concluded the training Session.

Day 3

Data Analysis

Table 4.1 Local Government Coverage

Local Government	Frequency	Percent	Valid Percent	Cumulative Percent
Moro	65	34.6	34.6	34.6
Ifelodun	58	30.9	30.9	65.4
Asa	65	34.6	34.6	100.0
Total	188	100.0	100.0	

Source: Authors' Field work 2023

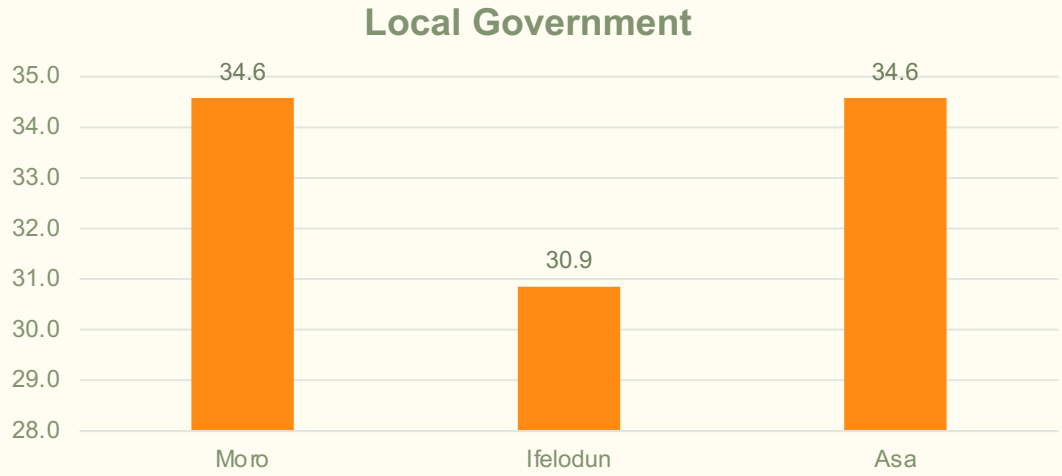


Figure 4.1: Local Government Coverage

Source: Field Work, 2023

Table 4.2 Gender Distribution of Respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Female	44	23.4	23.4	23.4
Male	144	76.6	76.6	100.0
Total	188	100.0	100.0	
	188	100.0		

Source: Authors' Field work 2023

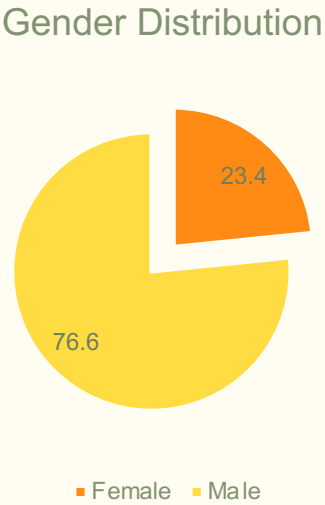


Figure 4.2 : Gender Distribution of Respondents

Source: Authors' Field Work 2023

Table 4.3: Age Distribution of the Respondents

Age	Frequency	Percent	Valid Percent	Cumulative Percent
Below 18	1	.5	.5	.5
18 - 40	100	53.2	53.5	54.0
40 - 60	69	36.7	36.9	90.9
Above 60	17	9.0	9.1	100.0
Total	187	99.5	100.0	
Missing System	1	.5		
	188	100.0		

Source: Authors' Field work 2023

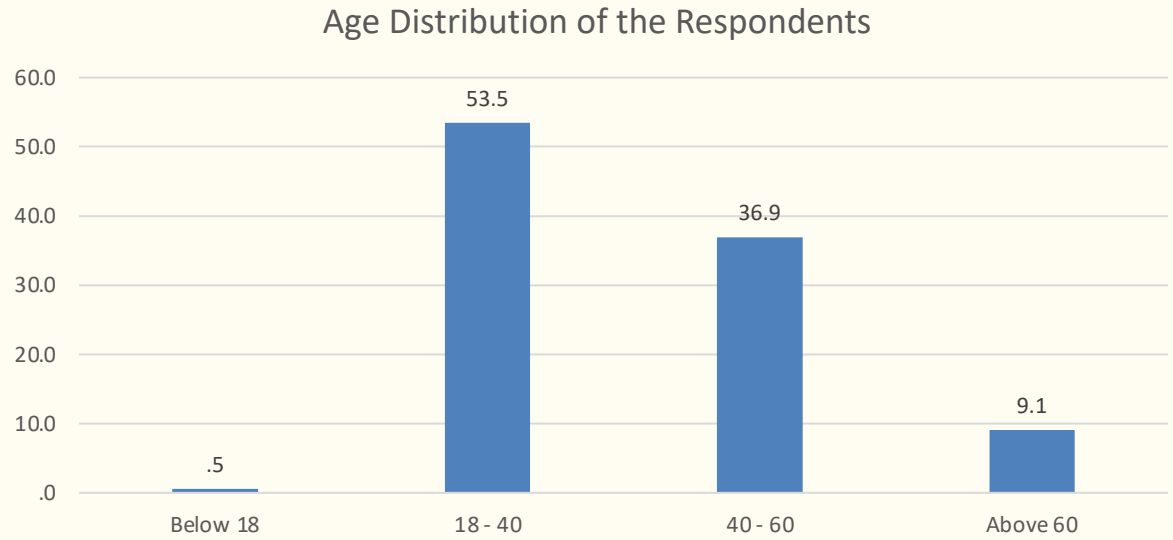


Figure 4.3 : Age Distribution of the Respondents

Source: Field work, 2023

Table 4.4: Level of Education

Level of Education	Frequency	Percent	Valid Percent	Cumulative Percent
No Formal Education	48	25.5	25.5	25.5
Primary Education	35	18.6	18.6	44.1
Secondary Education	51	27.1	27.1	71.3
Tertiary Education	54	28.7	28.7	100.0
Total	188	100.0	100.0	

Source: Authors' Field work 2023

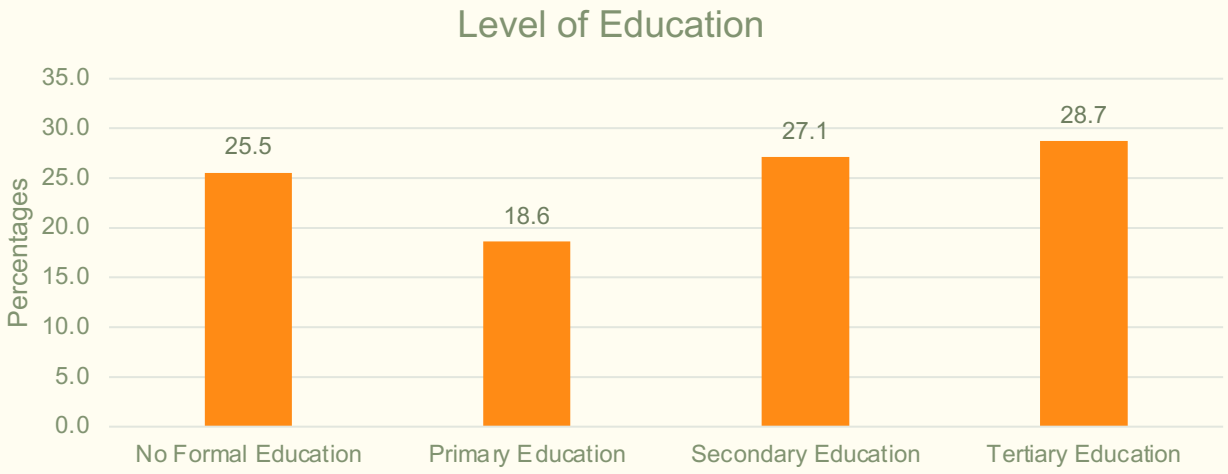


Figure 4.4: Level of Education of Respondents

Source: Field Work, 2023

Table 4.5: Marital Status of the Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Single	16	8.5	8.6	8.6
Married	168	89.4	90.3	98.9
Widow	2	1.1	1.1	100.0
Total	186	98.9	100.0	
System	2	1.1		
	188	100.0		

Source: Field Work, 2023

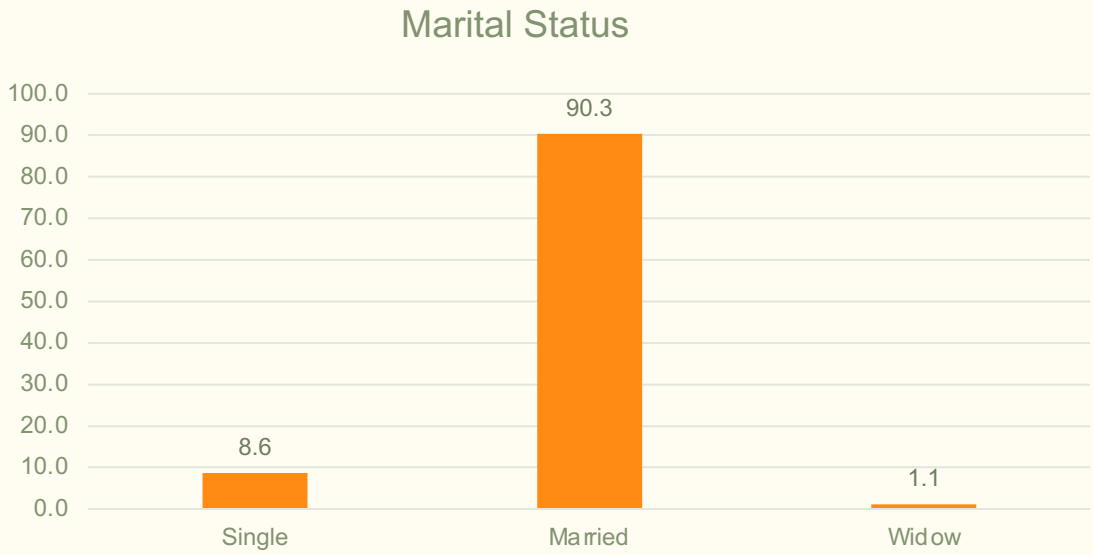


Figure 4.5: Marital Status of the Respondents

Source: Field Work, 2023

Table 4.6: Religion of the Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Islam	165	87.8	88.2	88.2
Christianity	22	11.7	11.8	100.0
Total	187	99.5	100.0	
System	1	.5		
	188	100.0		

Source: Authors' Field Work, 2023

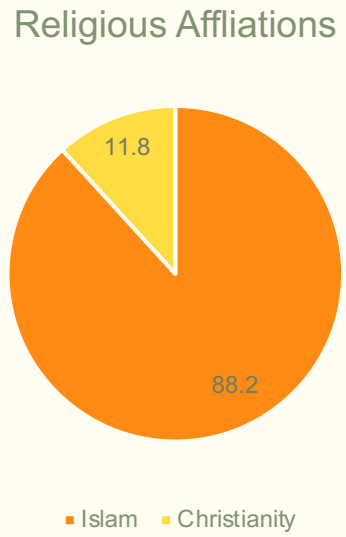


Figure 4.6: Religion of the Respondents

Source: Field Work, 2023

Table 4.7: Length of Farming

Length of Farming	Frequency	Percent	Valid Percent	Cumulative Percent
Zero - Ten Years	37	19.7	19.7	19.7
Eleven - Twenty Years	49	26.1	26.1	45.7
Twenty One - Thirty Years	37	19.7	19.7	65.4
Above Thirty Years	65	34.6	34.6	100.0
Total	188	100.0	100.0	

Source: Authors' Field Work, 2023

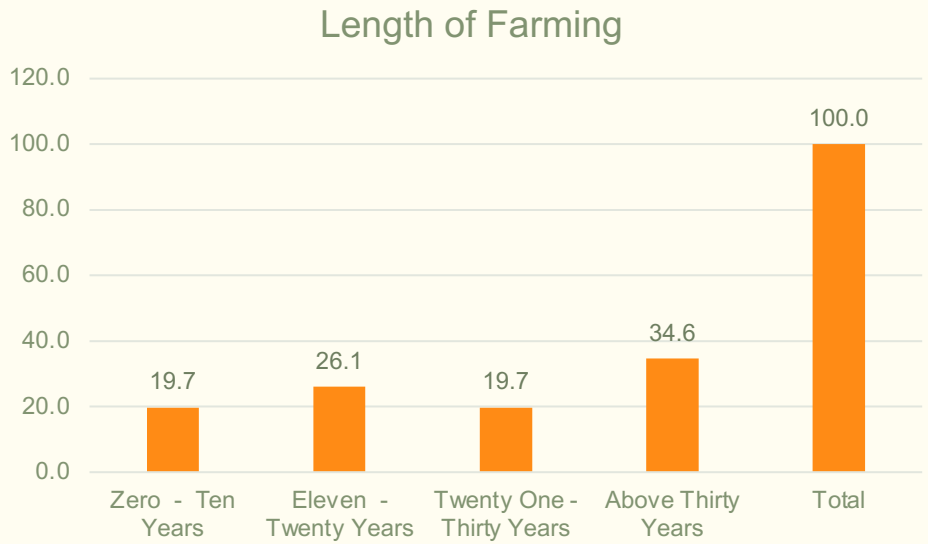


Figure 4.7: Length of Farming

Source: Author's Field Work, 2023

Table 4.8: Nature of Farming

Nature of farming	Frequency	Percent	Valid Percent	Cumulative Percent
Crop Farming	149	79.3	79.3	79.3
Animal Husbandry	12	6.4	6.4	85.6
Others	27	14.4	14.4	100.0
Total	188	100.0	100.0	

Source: Authors' Field Work, 2023

Table 4.9: Number of Harvest Per Annum

Number of Harvest	Frequency	Percent	Valid Percent	Cumulative Percent
.00	1	.5	.5	.5
1.00	88	46.8	47.8	48.4
2.00	32	17.0	17.4	65.8
3.00	37	19.7	20.1	85.9
4.00	9	4.8	4.9	90.8
5.00	8	4.3	4.3	95.1
6.00	4	2.1	2.2	97.3
7.00	2	1.1	1.1	98.4
8.00	3	1.6	1.6	100.0
Total	184	97.9	100.0	
System	4	2.1		
	188	100.0		

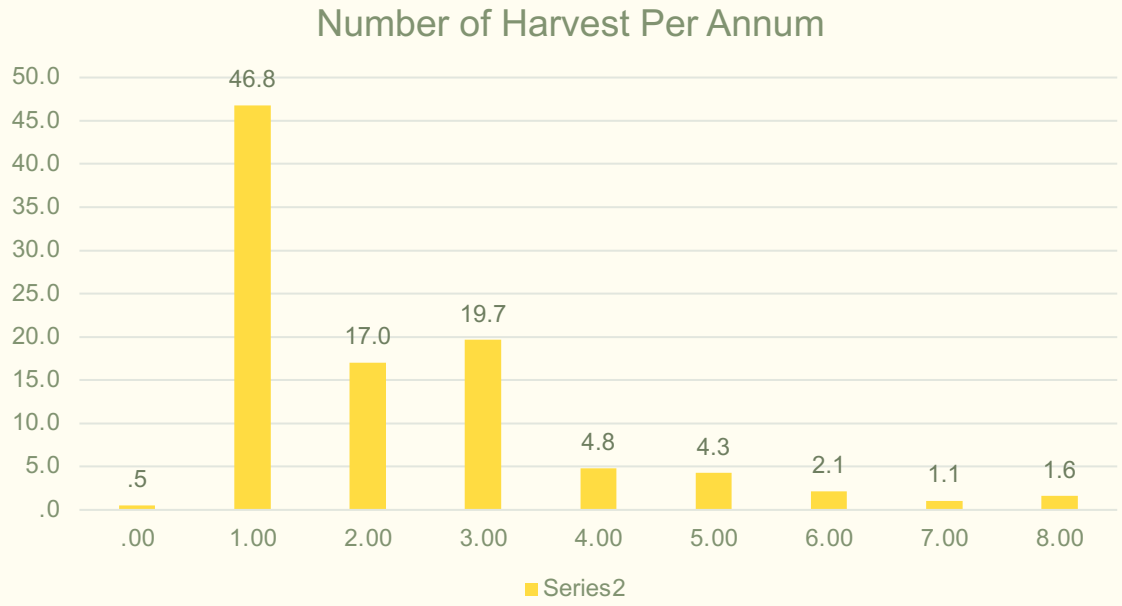


Figure 4.9: Number of Harvest Per Annum

Objective 1: To characterise the digital solutions that are available to the farmers in the country that can make them build resilience against climate change in remote communities

Table 4.10: Digital Solutions Available

Name of Digital Solutions	Frequency	Percentage
Farm Management Software	2	1.06
Precision Agriculture Technology	2	1.06
Digital Market Places	2	1.06
Mobile Apps and digital platform	14	7.45
Agricultural Robotics and Automation	0	0.00
Mobile Banking Apps	54	28.72
POS	147	78.19
E-Wallets	4	2.13
ATM	53	28.19
USSD	77	40.96
Electronic Banking	0	0.00
E-Insurance	0	0.00
E-Market	1	0.53
E-Loan	1	0.53
E-Farming	0	0.00
E-Remittance	0	0.00
Others specify	1	0.53

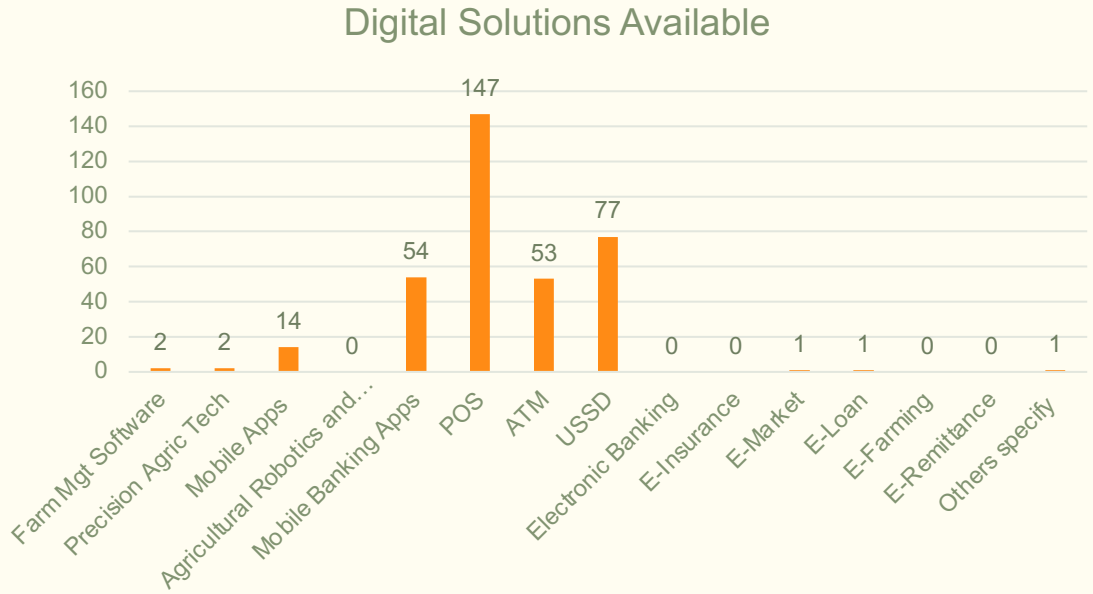


Figure 4.10: Digital Solutions Available

Table 4.11: Idea of Digital Solutions by Farmers

Any idea of Digital Solutions	Frequency	Valid Percent	Cumulative Percent
No	57	31.8	31.8
Yes	122	68.2	100.0
Total	179	100.0	

Source: Authors' Field Work, 2023

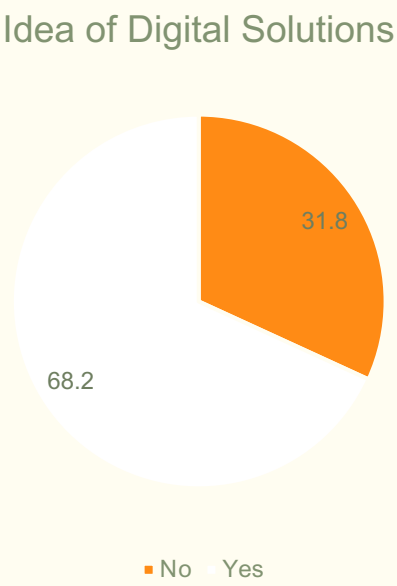


Figure 4.11: Idea of Digital Solutions

Source: Field Work, 2023

Table 4.12: Digital solutions use for farming activities

Any idea of Digital Solutions	Frequency	Valid Percent	Cumulative Percent
No	57	31.8	31.8
Yes	122	68.2	100.0
Total	179	100.0	

Source: Authors' Field Work, 2023

Table 4.13: Digital Solutions Used During Off-Farming Season

	Frequency	Percent	Valid Percent	Cumulative Percent
POS	51	27.1	27.1	27.1
ATM	7	3.7	3.7	30.9
USSD	2	1.1	1.1	31.9
Electronic Banking	1	.5	.5	32.4
Others	6	3.2	3.2	35.6
Multiple	121	64.4	64.4	100.0
Total	188	100.0	100.0	

Source: Authors' Field Work, 2023

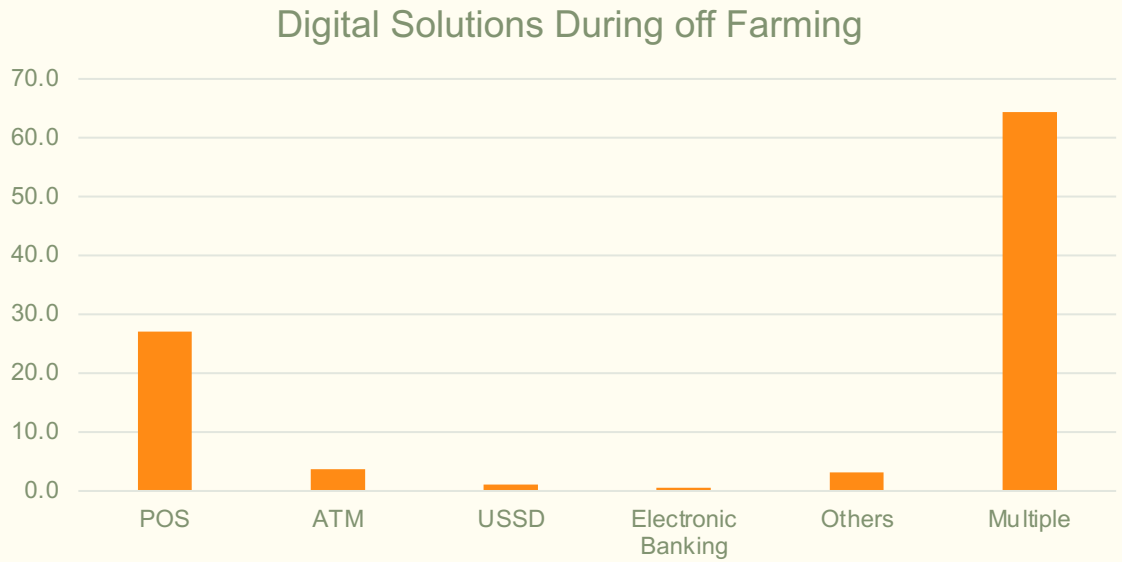


Figure 4.13: Digital Solutions Used During Off-Farming Season

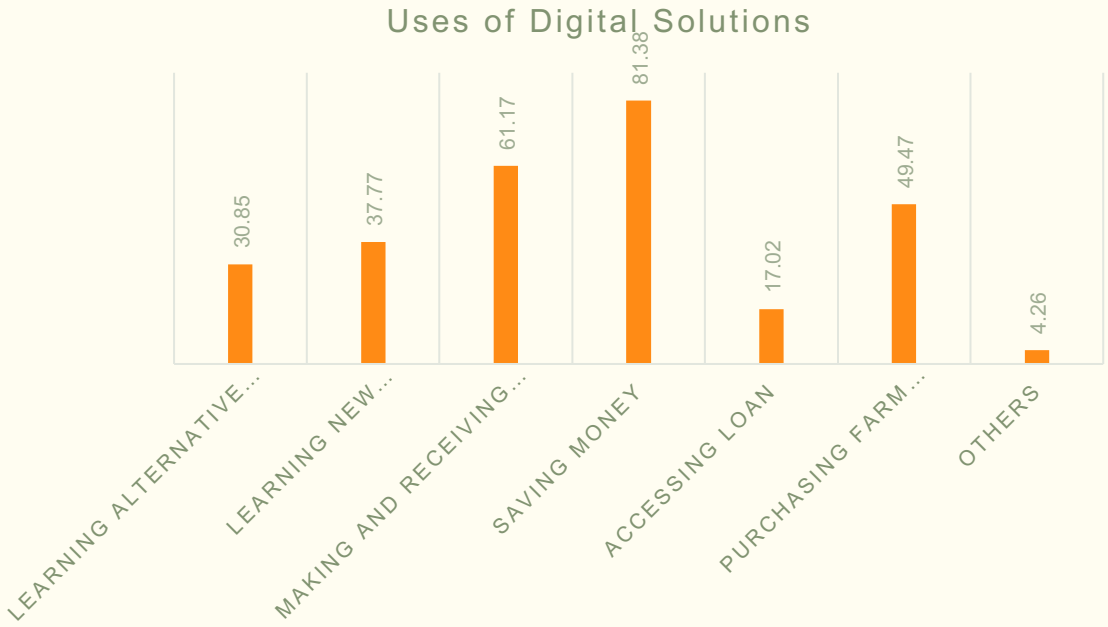


Figure 4.14: Use of Digital Solutions by farmers in rural communities

Objective 2: Examine the farmers in remote communities' knowledge of building resilience against climate change through digital solutions

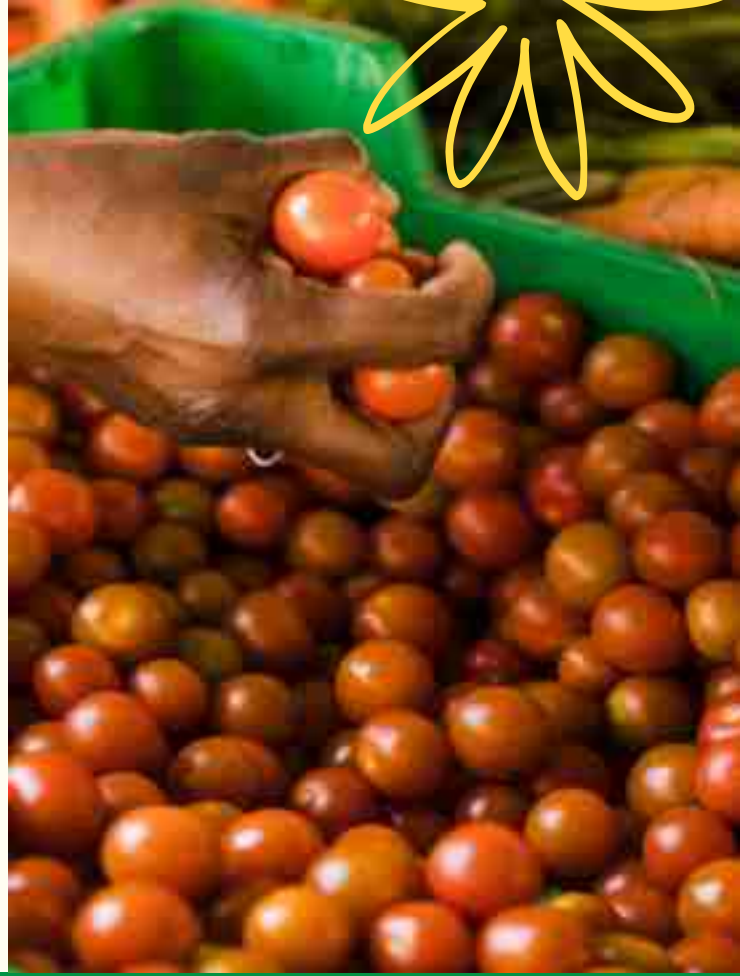


Table 4.14: ANOVA - Climate Change

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.200	1	6.200	27.414	.000
Within Groups	38.221	169	.226		
Total	44.421	170			

Objective 3: To analyse the capacities of farmers through digital training to apply climate-smart agricultural practices and promote investments in alternative livelihoods to enhance household incomes

Table 4.15: Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Intellectual Capacity of Rural Farmers	No Formal Education	47	.9149	.28206	.04114	.8321	.9977	0.00	1.00
	Primary Education	32	.9375	.24593	.04348	.8488	1.0262	0.00	1.00
	Secondary Education	47	1.0000	0.00000	0.00000	1.0000	1.0000	1.00	1.00
	Tertiary Education	51	1.0000	0.00000	0.00000	1.0000	1.0000	1.00	1.00
	Total	177	.9661	.18148	.01364	.9392	.9930	0.00	1.00
Infrastructural Capacity (Electricity)	No Formal Education	48	1.9792	1.50869	.21776	1.5411	2.4172	0.00	6.00
	Primary Education	35	1.2286	1.26225	.21336	.7950	1.6622	0.00	4.00
	Secondary Education	51	1.8431	1.48825	.20840	1.4246	2.2617	0.00	5.00
	Tertiary Education	54	2.0556	1.67576	.22804	1.5982	2.5130	0.00	5.00
	Total	188	1.8245	1.52905	.11152	1.6045	2.0445	0.00	6.00
Technological Capacity (Internet)	No Formal Education	48	1.6250	1.61936	.23374	1.1548	2.0952	0.00	5.00

Table 4.15: ANOVA

ANOVA

		Sum of Squares	df	Mean Square	F
Intellectual Capacity of Rural Farmers	Between Groups	.262	3	.087	2.730
	Within Groups	5.535	173	.032	
	Total	5.797	176		
Infrastructural Capacity (Electricity)	Between Groups	16.478	3	5.493	2.402
	Within Groups	420.729	184	2.287	
	Total	437.207	187		
Technological Capacity (Internet)	Between Groups	62.507	3	20.836	7.964
	Within Groups	481.381	184	2.616	
	Total	543.888	187		

Objective 3 Results

Table 4.15 presented above examined objective three with respect to the intellectual, infrastructural and technological capacities of respondents through digital training to apply climate-smart agricultural practices in order to promote investments in alternative livelihoods to enhance house hold incomes. The analysis was conducted using analysis of variance on level of education of respondents as the factor on which the level of education is predicated.

From the Descriptive Analysis, the study identifies the mean rank of respondents on the basis of each of intellectual, infrastructural and technological capacity. **The study noted that, with respect to intellectual capacity of rural farmers, respondents who have attained tertiary education level demonstrated more intellectual capacity to learn than other categories of respondents while the respondents with no formal education demonstrated the least capacity to learn.** More so, the difference noted among the respondents was significant at 95% confidence interval ($f=2.730$, $p<.005$). **This suggests that the higher the level of education of farmers, the more their intellectual capacity to learn smart-farming skills and improve their earnings therefrom.**

Objective 3 Results cont.

With respect to the infrastructural capacity, it was noted that the respondents are not significantly different on the basis of their level of education as regards their ability to use smart-faming skills. This is possibly due to the fact that infrastructural facilities in the rural area is not individualized as everyone has access to whatever is available in infrastructure for the collective and individual use. **Hence the study submits that there is no significant difference (f=2.402, p>.005)among respondent on the basis of their infrastructural capacity to adapt digital skills for improved individual revenue generation.**

The technological capacity of respondents was based on their ability to use the internet as revealed by their respective levels of education. A significant difference exists based on the ANOVA output (f=7.964, p<.001). **Thus, it is indicated that respondents with at least secondary education have more technological capacity to convert smart-farming skills to improve their earnings.**

Thanks!

Promoting Digital Solutions for Farmers in Remote Communities to Adapt to Climate Change (DIFISOL)