GRANT SPONSOR:

Nigerian Communication Commission

CLIENT:

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PROJECT TERMS:

Stage 1: Submission of an Inception Reception

Stage 2: Interim report on analysis and design of the Agricultural Information and Communication center

Stage 3: Draft report on hardware and software deployment

Stage 4: Final report

STUDY ON IMPACT OF NATIONAL FARMERS' HELP LINE CENTERS BY FARMERS IN NORTH-EAST NIGERIA

1.0   INTRODUCTION

1.1   Background of the Study

Agriculture is a vital sector for many developing countries, since majority of the rural population depends upon it for livelihood. Improved technologies are very essential drivers in the agricultural sector in developing countries, especially in Nigeria, in view of the daunting challenge of increasing crop, livestock and fisheries owing to rapid population growth and dwindling natural resources (Ajani and Agwu, 2012). However, the success of agriculture largely depends on the nature and extent of use of mass media in mobilizing farmers for the needed development. In spite of the long existence of extension institutions and technology transfer programmes, the extent of coverage is still limited and the quality of potentially beneficial transferred new technologies is low and often underutilized.

1.2   Justification

Knowledge and information are essential in addressing the social, economic and technological agricultural challenges, but must be effectively communicated to farmers in order to elicit changes in improving agricultural productivity, food security and rural livelihood. Communication is a vital issue in agriculture, conveying improved and recommended agricultural practices through extension workers to clients in order to improve on their agricultural productivity across value chain (Williams, 1989). Digital communication is the current agricultural extension trend towards emphasizing the message and the social dynamics of its transmission. However, in developing countries this advanced technologies in communication, important as it may be, is receiving commensurately less attention, and many farmers still rely more on traditional channels of agricultural information transfer (Kuta, 2003, Howell and Hebron, 2004; Vergot et al., 2005; Boz and Ozca, 2010). Thus, integration of appropriate multi-channel communication strategies into extension programmes could substantially impact on the existing agricultural information delivery system (Kuta, 2003).

1.3   Objectives of the Study

The present study assessed the impact of National Farmers' Helpline Centers on agriculture by farmers in north eastern Nigeria using their mobile phones, specifically:

a) extent of awareness on the national farmers' helpline in the North-East,

b) effectiveness of the national farmers' helpline as a source of information,

c) determine the types of agricultural information available from the national farmers' helpline,

d) promote the national farmers' helpline as the best medium of the interacting with farmers, focusing on mobile technologies, and

e) upgrade the centre to Agricultural Information and Communication Centre.

1.4   Scope of the Study

The study is limited to North East geo-political states of Adamawa, Bauchi, Borno, Gombe, and Yobe States in Nigeria. A total of five Local Government Areas per state with 100 farmers per LGA was targeted, and the study zeroed on the effectiveness and impact of National Farmers' Helpline Centre on productivity of farmers in the North East. The study would assess awareness, availability and quality of agricultural information services to farmers in North East Nigeria, citing classical case studies of improvement in their businesses.

2.0   METHODOLOGY

2.1   Research Design

The research employed the survey research method as described by Thomas and Nelson (1990) in order to seek the opinion of a specified population on the status or practice of one or more variables. This method is appropriate in study "The Impact of National Farmers' Helpline Centers by Farmers in North East Nigeria".

2.2   Population and Sample

All the National Farmers' Helpline Centres in Nigeria formed the population of the study, with sample size of 33% of the total Helpline Centres in Nigeria. There are six zonal Helpline Centres in Nigeria out of which three are functional thus one was assessed. Therefore, the study was undertaken in North East zone, which comprised Adamawa, Bauchi, Borno, Gombe and Yobe States of Nigeria. Five Local Government Areas were covered per state with 100 farmers per LGA, and 10 respondents from 10 villages each, thus the total sample size was 3,000 farmers. The farmers were purposively chosen for the obvious reasons of their direct access to radio, television, print media, ADPs and handsets, followed by sub-sampling of respondents with history of patronage of the National Farmers Helpline Centres for analysis.

Table 1. Distribution of respondents according to states

Name of state	LGAs	Villages	No. of respondents		
			Questionnaires	Responsive	%
Adamawa	5	10	500	51	14.2
Bauchi	5	10	500	100	27.9
Borno	5	10	500	26	7.2
Gombe	5	10	500	99	27.6
Yobe	5	10	500	83	23.1
Total	25	50	2,500	359	100

2.3   Research Instrument

An eight-item self-developed questionnaire was used known as "Assessment of the Impact of National Farmers' Helpline Centers by Farmers in North East Nigeria", intended to elicit response on mobile technologies for effective agricultural information service delivery about:

a) major medium employed for agricultural information service delivery,
b) information source, level of awareness and patronage of the National Farmers' Helpline Centre,
c) sectors of agriculture and the types of agricultural information sought by farmers, and
d) the quality, effectiveness and impact of the National Farmers' Helpline Centres as a source of information,
e) the need for upgrading the entre to Agricultural Information and Communication Centre.

The instrument consisted of three sections A, B and C, in which Section A elicited information on demographic characteristics of the farmer-respondents, while Sections B and C sought information on major sources of agricultural information and the National Farmers' Helpline Centre services from farmers, using structured and checklist questionnaires, respectively (Appendix 1). The checklist questionnaire rated the services of the National Farmers' Helpline Centre on a four-point Likert type scale: strongly agree – 4, agree – 3, disagree – 2 and strongly disagree – 1. The validity and reliability of the instrument was tested using Crombach's product alpha and sample adequacy by Barlett-Kaiser-Meyer-Olkin (KMO) test.

2.4   Procedure for Data Collection

Permission was obtained from civic authorities before administering the questionnaires, by an Introductory Letter will be issued by Lake Chad Research Institute to Local Government Chairmen and village heads, seeking for permission to conduct research in their areas. Questionnaires were personally administered by the investigator, assisted by trained enumerators to the respondents in the various areas selected for the study. The farmers were interviewed on the spot and then be thoroughly guided by the researcher to fill the questionnaires.

2.5   Method of Data Analysis

Descriptive statistics, association tests using chi-square and correlation, and regression analyses were used in computing the data collected, in order to classify respondents and detect differences in the responses on the impact of the helpline centre on farmers' productivity. A statistical level of significance of 5% was used for the acceptance or rejection of the null hypothesis. Thus, the following statistical analyses were carried out:

i.   Frequencies and percentages to classify compare responses among farmers,

ii.   Chi-square to detect differences in responses among farmers,

iii. Cronbach alpha reliability test ($\alpha>0.70$) to measure the internal consistency of the multiple Likert-type scale questionnaire,

iv.   Bartlett's test/Kaiser-Meyer-Olkin (KMO > 0.6) to determine sampling adequacy of data that are to be used for factor analysis in order to confirm validity,

v.   One-way ANOVA and Kruskal-Wallis mean ranks to in order to rank and detect differences among variables

vi.   Factor analysis among multiple outcomes data using correlations (factor loading) for reduction (shrinking) for removing surrogate variables (factors) in regression models.

vii. Regression analysis to quantify impact of the National Farmers' Helpline Centre services on the productivity of farmers.

3.0   RESULTS AND DISCUSSION

3.1   Demographic Characteristics of the Farmers

Table 2 gives the demographic characteristics of the interviewed farmers across the five states in the North-East. Descriptive frequency statistic revealed that a total of 2,500 farmers were interviewed for the study, out of which 359 (14.36%) farmers were responsive. Thus, only 14.36% of the respondents have used the National Farmers Helpline Centre before, with 51 (14.2%) in Adamawa, 100 (27.9%) in Bauchi, 26 (7.2%) in Borno, 99 (27.6%) in Gombe and 83 (23.1%) in Yobe, out of which 327 (91.1%) were males and 32 (8.9%) females, while 194 (54.0) were small scale and 165 (46.0) large scale farmers. These show that the respondents were predominantly males and small scale farmers. The interview covered a wide cross-section of educational levels, with 0.3 - 24.2% of the respondents in the non-formal to doctoral (Ph.D.) educational categories, which suggests that most (78.0%) of the farmers had experienced formal western education as against the few (22.0%) in the non-formal education category.

In terms of age and family size, mean values were adopted as measures of central tendency and standard deviation (SD) values as measures of dispersion to estimate variability in the data set, coupled with the observed ranges. Consequently, the age of farmers was highly dispersed between 25 to 67 years from the mean of 44.0 ± 11.21 years. Family size of the farmers was equally diverse between 0 to 50 members around mean value of 12.2 ± 8.84 years.

3.2   Sources of Accessing Agricultural Information

The study assessed the five common sources of accessing agricultural information by farmers and the relative rankings in the five states of the North-East are provided in Table 3. Results showed that the ranking of information sources varied significantly (χ^2=1114.73, P<0.0000) across states, in which radio, television, print media, neighbours and ADPs received the first ranking from 18.0-94.0%, 0-8.4%, 0-3.8%, 0-42.3% and 2.0-81.0% of the farmers' approvals from Gombe, Yobe, Borno, Borno and Bauchi, respectively. Table 4 indicated significant differences in the ranking on sources of information, in which radio and ADPs were ranked as first by 174 (48.5%) and 133 (37.0%) and second by 146 (40.7%) and 52 (14.5%) of the farmers, respectively. Conversely, neighbours was ranked as third by 139 (38.7%), closely followed by television by 117 (32.6%), while print media was ranked as

Table 2. Demographic characteristics of the interviewed farmers across the five states in the North-East

Item	Frequency (%)
1. No. interviewed (Freq/%)	
Adamawa	51 (14.2)
Bauchi	100 (27.9)
Borno	26 (7.2)
Gombe	99 (27.6)
Yobe	83 (23.1)
Total	359 (100.0)
2. Gender (Freq/%)	
Male	327 (91.1)
Female	32 (8.9)
3. Category of farmer (Freq/%)	
Small-scale	194 (54.0)
Large-scale	165 (46.0)
4. Age (years)	
Mean $\pm$ SD	44.0 ± 11.21
Range	25 – 67
4. Family size	
Mean $\pm$ SD	12.2 ± 8.84
Range	0 – 50
5. Educational level (Freq/%)	
No formal education	46 (12.8)
Quaranic	33 (9.2)
Primary	87 (24.2)
JSS	11 (3.1)
SSS	65 (18.1)
Ordinary National Diploma	28 (7.8)
Higher National Diploma	37 (10.3)
First Degree	46 (12.8)
Masters	5 (1.4)
Ph.D.	1 (0.3)

Table 3. Ranking of the five sources of agricultural information across states

Rank	Adamawa Freq	%	Bauchi Freq	%	Borno Freq	%	Gombe Freq	%	Yobe Freq	%	Total Freq	%
A:							Radio					
1st	26	51.0	18	18.0	14	53.8	94	94.0	22	26.5	174	48.5
2nd	8	15.7	78	78.0	9	34.6	4	4.0	47	56.6	146	40.7
3rd	14	27.5	3	3.0	2	7.7	1	1.0	11	13.3	31	8.6
4th	2	3.9	1	1.0	1	3.8	0	0	3	3.6	7	1.9
5th	1	2.0	0	0	0	0	0	0	0	0	1	0.3
Total	51	100	100	100	26	100	99	100	83	100	359	100
B:							Television					
1st	3	5.9	0	0	0	0.0	1	1.0	7	8.4	11	3.1
2nd	18	35.3	1	1.0	4	15.4	85	85.9	9	10.8	117	32.6
3rd	11	21.6	54	54.0	11	42.3	13	13.1	28	33.7	117	32.6
4th	17	33.3	32	32.0	10	38.5	0	0	17	20.5	76	21.2
5th	2	3.9	13	13.0	1	3.8	0	0	22	26.5	38	10.6
Total	51	100	100	100	26	100	99	100	83	100	359	100
C:							Print media					
1st	0	0	0	0.0	1	3.8	1	1.0	2	2.4	4	1.1
2nd	2	3.9	1	1.0	1	3.8	1	1.0	3	3.6	8	2.2
3rd	2	3.9	11	11.0	0	0	4	4.0	14	16.9	31	8.6
4th	5	9.8	48	48.0	15	57.7	85	85.0	47	56.6	200	55.7
5th	41	82.4	40	40.0	9	34.6	8	8.0	17	20.5	116	32.3
Total	51	100	100	100	26	100	100	100	83	100	359	100
D:							Neighbors					
1st	21	41.2	1	1.0	11	42.3	0	0	0	0	33	9.2
2nd	10	19.6	8	8.0	9	34.6	7	7.1	8	9.6	42	11.7
3rd	11	21.6	25	25.0	5	19.2	76	76.8	22	26.5	139	38.7
4th	9	17.6	19	19.0	0	0	9	9.1	19	22.9	56	15.6
5th	0	0.0	47	47.0	1	3.8	7	7.1	34	41.0	89	24.8
Total	51	100	100	100	26	100	99	100	83	100	359	100
E:							Agricultural Development Programmes					
1st	1	2.0	81	81.0	1	3.8	3	3.0	47	56.6	133	37.0
2nd	12	23.5	12	12.0	3	11.5	2	2.0	23	27.7	52	14.5
3rd	13	25.5	7	7.0	7	26.9	5	5.1	9	10.8	41	11.4
4th	19	37.3	0	0	0	0	5	5.1	3	3.6	27	7.5
5th	6	11.8	0	0	15	57.7	84	84.8	1	1.2	106	29.5
Total	51	100	100	100	26	100	99	100	83	100	359	100

fourth and fifth by 200 (55.7%) and 116 (32.3%), respectively. Overall, radio was ranked first by 48.5% of the farmers, followed by Agricultural Development Programmes (37.0%), Neighbours (9.2%), Television (3.1%) and then Print-media (1.1%) in that order of patronage (Tables 3 and 4). Thus, relative ranking for the five assessed sources of information was Radio>ADPs>Television>Neighbours>Print media (Table 5). The foregoing results depicted that Radio and ADPs are predominant agricultural information source to farmers in the North-east.

3.3 Ownership of some Key Sources of Information

Tables 6 and 7 depict the response of farmers in terms of ownership of the three key sources of agricultural information (radio, television and print media) across the five states. Results showed that farmers' responses varied significantly (χ^2=543.78, P<0.0000) across states, in which 6.1-100% of the farmers own radio, 7.0-76.8% own television, while only 2.0-7.7% subscribe to print media, making the later two predominant information sources (Table 6). These results indicate that most farmers own radio, except in Yobe State, while most farmers in Adamawa and Gombe States also own television, but subscription of print media was generally very low. Consequently, overall results revealed that most 329 (91.6%) of the farmers own radio, while 148 (41.2%) own television and only few 19 (5.3%) subscribe or buy print media (Tables 6 and 7).

3.4 Usage and Sharing of some Key Sources of Information

Tables 8 and 9 represent farmers' response with respect to usage and sharing of the three key sources of agricultural information (radio, television and print media) in the five states. Results revealed that usage of the sources of information significantly (χ^2=31.87, P<0.0000) differed across states, with 12.0 - 89.9% of the farmers using their sources of information alone, while 9.1 - 80.8% share with family members and 3.8 - 67.5% shared with fellow farmers (Table 8). These results revealed higher proportion of farmers that use their information sources alone in Adamawa, with family members in Borno, and with fellow farmers Yobe. Overall, 197 (54.9%) of the farmers share their information source, while 162 (45.1%) use it alone (Tables 8 and 9). Furthermore, 91 (25.3%) share with family members, while 117 (32.6%) share with fellow farmers. Therefore, most farmers shared their information source, but sharing with fellow farmers outscored families.

Table 4. Overall chi-square cross-tabulation of agricultural information sources by rank

Information source	Relative rank				
	1st	2nd	3rd	4th	5th
Radio					
Observed	174	146	31	7	1
Row %	48.5	40.7	8.6	1.9	0.3
Column %	49.0	40.0	8.6	1.9	0.3
Expected	71.00	73.00	71.80	73.20	70.00
Cell χ^2	149.42	73.00	23.18	59.87	68.01
Television					
Observed	11	117	117	76	38
Row %	3.1	32.6	32.6	21.2	10.6
Column %	3.1	32.1	32.6	20.8	10.9
Expected	71.00	73.00	71.80	73.20	70.00
Cell χ^2	50.70	26.52	28.45	0.11	14.63
Print media					
Observed	4	8	31	200	116
Row %	1.1	2.2	8.6	55.7	32.3
Column %	1.1	2.2	8.6	54.6	33.1
Expected	71.00	73.00	71.80	73.20	70.00
Cell χ^2	63.23	57.88	23.18	219.65	30.23
Neighbours					
Observed	33	42	139	56	89
Row %	9.2	11.7	38.7	15.6	24.8
Column %	9.3	11.5	38.7	15.3	25.4
Expected	71.00	73.00	71.80	73.20	70.00
Cell χ^2	20.34	13.16	62.89	4.04	5.16
ADPs					
Observed	133	52	41	27	106
Row %	37.0	14.5	11.4	7.5	29.5
Column %	37.5	14.2	11.4	7.4	30.3
Expected	71.00	73.00	71.80	73.20	70.00
Cell χ^2	54.14	6.04	13.21	29.16	18.51
Overall χ^2	1114.73				
P-value	0.0000				
DF	16				
N	25				

Table 5. Relative ranking for the five assessed sources of information

Information source	Mean rank		Position
	F-test	**Kruskal-Wallis**	
Radio	1.6490e	411.9	1st
Television	3.0362c	912.9	3rd
Print media	4.1588a	1318.6	5th
Neighbors	3.3510b	1026.4	4th
ADPs	2.7799d	820.1	2nd
Grand Mean	2.9950	898.0	
SE$\pm$	0.0605		
LSD$_{0.05}$	0.1678		
Overall χ^2	347***	606.942***	
P-value	0.0000	0.0000	
CV (%)	38.27		

Table 6. Ownership of the three key sources of agricultural information by farmers in the North-East

Response	Adamawa		Bauchi		Borno		Gombe		Yobe		Total	
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
A:						Own radio						
Yes	50	98.0	86	86.0	26	100.0	6	6.1	72	86.7	329	91.6
No	1	2.0	14	14.0	0	0.0	93	93.9	11	13.3	30	8.4
Total	51	100	100	100	26	100	99	100	83	100	359	100
B:						Own television						
Yes	37	72.5	7	7.0	12	46.2	76	76.8	16	19.3	148	41.2
No	14	27.5	93	93.0	14	53.8	23	23.2	67	80.7	211	58.8
Total	51	100	100	100	26	100	99	100	83	100	359	100
C:						Subscribe (buy) print media						
Yes	1	2.0	5	5.0	2	7.7	6	6.1	5	6.0	19	5.3
No	50	98.0	95	95.0	24	92.3	93	93.9	78	94.0	340	94.7
Total	51	100	100	100	26	100	99	100	83	100	359	100

Table 7. Overall farmers' response on ownership of the three key sources of agricultural information by farmers in the North-East

Source of information	Response	
	Yes	**No**
Radio		
Observed	329	30
Row %	91.6	8.4
Column %	66.3	5.2
Expected	165.33	193.67
Cell χ^2	162.02	138.31
Television		
Observed	148	211
Row %	41.2	58.8
Column %	29.8	36.3
Expected	165.33	193.67
Cell χ^2	1.82	1.55
Print media		
Observed	19	340
Row %	5.3	94.7
Column %	3.8	58.5
Expected	165.33	193.67
Cell χ^2	129.52	110.57
Overall χ^2	543.78	
P-value	0.0000	
DF	2	
N	6	

Table 8. Sharing of the source of agricultural information with others in the North-East

	Adamawa		Bauchi		Borno		Gombe		Yobe		Total	
Response	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
A:	*Use alone*											
Yes	14	27.5	45	45.0	4	15.4	89	89.9	10	12.0	162	45.1
No	37	72.5	55	55.0	22	84.6	10	10.1	73	88.0	197	54.9
Total	51	100	100	100	26	100	99	100	83	100	359	100
B:	*Share with family members*											
Yes	21	41.2	22	22.0	21	80.8	9	9.1	18	21.7	91	25.3
No	30	58.8	78	78.0	5	19.2	90	90.9	65	78.3	268	74.7
Total	51	100	100	100	26	100	99	100	83	100	359	100
C:	*Share with fellow farmers*											
Yes	19	37.3	31	31.0	1	3.8	10	10.1	56	67.5	117	32.6
No	32	62.7	69	69.0	25	96.2	89	89.9	27	32.5	242	67.4
Total	51	100	100	100	26	100	99	100	83	100	359	100

Table 9. Overall response for sharing of the source of agricultural information with others in the North-East

Usage of information source	Response	
	Yes	No
Alone		
Observed	162	197
Row %	45.1	54.9
Column %	27.9	27.9
Expected	123.33	235.67
Cell χ^2	12.12	6.34
Family members		
Observed	91	268
Row %	25.3	74.7
Column %	24.6	37.9
Expected	123.33	235.67
Cell χ^2	8.48	4.44
Fellow farmers		
Observed	117	242
Row %	32.6	67.4
Column %	31.6	34.2
Expected	123.33	235.67
Cell χ^2	0.33	0.17
Overall χ^2	31.87	
P-value	0.0000	
DF	2	
N	6	

3.5 Types of Agricultural Information Sourced by Farmers

Table 10 gives the state-wise ranking of the sectors of agriculture from which farmers sourced information in north eastern Nigeria. Result shows that the types of agricultural information sourced by farmers differed significantly (χ^2=2207.36, P<0.0000) across state, in which crops, agro-forestry, livestock, fisheries, marketing and weather were ranked first by 66.0-98.0%, 0-3.9%, 0-3.9%, 0-2.0%, 0-6.0% and 0-28.0% of the farmers, respectively. These results further revealed that the highest scores for first position in respect of crops, agro-forestry, livestock, fisheries marketing and weather were recorded Gombe, Adamawa, Borno, Gombe, Yobe and Bauchi, respectively. Overall, 298 (83.0%) of the farmers attested that they sourced crop-related agricultural information, as against livestock and marketing with 7 (1.9%) responses each, agro-forestry 4 (1.1%) and then fisheries 3 (0.8%) in that decreasing order (Tables 10 and 11). Table 10 further shows that crop was ranked first by 298 (83.0%) of the farmers, while livestock second by 163 (45.4%), marketing third by 131 (36.5%), agro-forestry as fourth by 125 (34.8%) and fifth by 110 (30.6%), fisheries as fourth by 101 (28.1%) and fifth by 132 (36.8%), and weather as sixth by 135 (37.6%). Table 12 gives the relative ranking of the types types of agricultural information sourced as Crop>Livestock>Marketing>Weather>Agro-forestry>Fisheries. Thus, majority of the farmers sourced crop-related agricultural information, followed by livestock, marketing, weather, agro-forestry and fisheries, in that order of relevance.

3.6 Aspects of Agriculture on which Farmers Seek Information

Table 13 shows aspects of agriculture on which farmers source information across states, and agronomy of crop production was ranked first by 290 (80.8%) of the farmers, product development by 23 (6.4%), pest and disease management by 18 (5.0%), soil and water management by 17 (4.7%) and economics and marketing by 14 (3.9%) in that decreasing order. In the overall results, agronomy of crop production was ranked first by 290 (80.8%) of the farmers, product development second by 153 (42.6%), pest and disease management third by 143 (39.8%), soil and water management fourth by 228 (63.5%) and economics and marketing fifth by 133 (37.0%) in that decreasing order (Table 14). Thus, the relative raking of the aspects of agriculture was agronomy of crop production>economics and marketing>product development>pest and disease management>soil and water management (Table 15). Therefore, most of agricultural information sourced by farmers in the north-east was in the area of agronomy of crop production, followed by economics and marketing,

Table 10. Relative ranking of types of agricultural information sourced by farmers in the North-East

Rank	Adamawa Freq	%	Bauchi Freq	%	Borno Freq	%	Gombe Freq	%	Yobe Freq	%	Total Freq	%
A:					**Crop**							
1st	40	78.4	66	66.0	25	96.2	97	98.0	70	84.3	298	83.0
2nd	7	13.7	33	33.0	1	3.8	0	0	6	7.2	47	13.1
3rd	3	5.9	0	0	0	0	0	0	7	8.4	10	2.8
4th	0	0	1	1.0	0	0	0	0	0	0	1	0.3
5th	1	2.0	0	0	0	0	2	2.0	0	0	3	0.8
6th	0	0	0	0	0	0	0	0	0	0	0	0
Total	51	100	100	100	26	100	99	100	83	100	359	100
B:					**Agro forestry**							
1st	2	3.9	2	2.0	0	0	0	0	0	0	4	1.1
2nd	5	9.8	6	6.0	2	7.7	1	1.0	7	8.4	21	5.8
3rd	7	13.7	20	20.0	6	23.1	11	11.0	13	15.7	57	15.9
4th	10	19.6	42	42.0	17	65.4	30	30.3	26	31.3	125	34.8
5th	9	17.6	22	22.0	1	3.8	52	52.5	26	31.3	110	30.6
6th	18	35.3	8	8.0	0	0	5	5.1	11	13.3	42	11.7
Total	51	100	100	100	26	100	99	100	83	100	359	100
C:					**Livestock**							
1st	2	3.9	1	1.0	1	3.8	0	0	3	3.6	7	1.9
2nd	21	41.2	15	15.0	17	65.4	85	85.9	25	30.1	163	45.4
3rd	16	31.4	57	57.0	7	26.9	10	10.1	21	25.3	111	30.9
4th	9	17.6	18	18.0	1	3.8	3	3.0	21	25.3	52	14.5
5th	0	0	8	8.0	0	0	0	0	13	15.7	21	5.8
6th	3	5.9	1	1.0	0	0	1	1.0	0	0	5	1.4
Total	51	100	100	100	26	100	99	100	83	100	359	100
D:					**Fisheries**							
1st	0	0	1	1.0	0	0	2	2.0	0	0	3	0.8
2nd	0	0	1	1.0	0	0	2	2.0	5	6.0	8	2.2
3rd	10	19.6	1`	1.0	2	7.7	6	6.1	9	10.8	28	7.8
4th	14	27.5	21	21.0	7	26.9	54	54.5	5	6.0	101	28.1
5th	18	35.3	42	42.0	15	57.7	34	34.3	23	27.7	132	36.8
6th	9	17.6	34	34.0	2	7.7	1	1.0	41	49.4	87	24.2
Total	51	100	100	100	26	100	99	100	83	100	359	100
E:					**Marketing**							
1st	0	0	2	2.0	0	0	0	0	5	6.0	7	1.9
2nd	3	5.9	30	30.0	7	26.9	10	10.1	10	12.0	60	16.7
3rd	8	15.7	13	13.0	10	38.5	70	70.7	30	36.1	131	36.5
4th	12	23.5	9	9.0	0	0	9	9.1	28	33.7	58	16.2
5th	15	29.4	17	17.0	9	34.6	9	9.1	7	8.4	57	15.9
6th	13	25.5	29	29.0	0	0	1	1.0	3	3.6	46	12.8
Total	51	100	100	100	26	100	99	100	83	100	359	100
F:					**Weather**							
1st	5	9.8	28	28.0	0	0	2	2.0	4	4.8	39	10.9
2nd	14	27.5	16	16.0	0	0	1	1.0	29	34.9	60	16.7
3rd	7	13.7	12	12.0	0	0	1	1.0	17	20.5	39	10.9
4th	10	19.6	11	11.0	1	3.8	2	2.0	10	12.0	34	9.5
5th	8	15.7	12	12.0	1	3.8	22	22.2	10	12.0	52	14.5
6th	7	13.7	21	21.0	24	92.3	71	71.7	13	15.7	135	37.6
Total	51	100	100	100	26	100	99	100	83	100	359	100

Table 11. Cross tabulation of information types types of agricultural information sourced by rank

Type of information	Relative rank					
	1st	2nd	3rd	4th	5th	6th
Crop						
Observed	298	47	10	1	3	0
Row %	83.0	13.1	2.8	0.3	0.8	0.0
Column %	83.2	13.1	2.7	0.3	0.8	0.0
Expected	59.67	59.83	62.67	61.83	62.50	52.50
Cell χ^2	952.00	2.75	44.26	59.85	56.64	52.50
Agro-forestry						
Observed	4	21	57	125	110	42
Row %	1.1	5.8	15.9	34.8	30.6	11.7
Column %	1.1	5.8	15.2	33.7	29.3	13.3
Expected	59.67	59.83	62.67	61.83	62.50	52.50
Cell χ^2	51.93	25.20	0.51	64.53	36.10	2.10
Livestock						
Observed	7	163	111	52	21	5
Row %	1.9	45.4	30.9	14.5	5.8	1.4
Column %	2.0	45.4	29.5	14.0	5.6	1.6
Expected	59.67	59.83	62.67	61.83	62.50	52.50
Cell χ^2	46.49	177.88	37.28	1.56	27.56	42.98
Fisheries						
Observed	3	8	28	101	132	87
Row %	0.8	2.2	7.8	28.1	36.8	24.2
Column %	0.8	2.2	7.4	27.2	35.2	27.6
Expected	59.67	59.83	62.67	61.83	62.50	52.50
Cell χ^2	53.82	44.90	19.18	24.81	77.28	22.67
Marketing						
Observed	7	60	131	58	57	46
Row %	1.9	16.7	36.5	16.2	15.9	12.8
Column %	2.0	16.7	34.8	15.6	15.2	14.6
Expected	59.67	59.83	62.67	61.83	62.50	52.50
Cell χ^2	46.49	0.00	74.51	0.24	0.48	0.80
Weather						
Observed	39	60	39	34	52	135
Row %	10.9	16.7	10.9	9.5	14.5	37.6
Column %	10.9	16.7	10.4	9.2	13.9	42.9
Expected	59.67	59.83	62.67	61.83	62.50	52.50
Cell χ^2	7.16	0.00	8.94	12.53	1.76	129.64
Overall χ^2	2207.36					
P-value	0.0000					
DF	25					
N	36					

Table 12. Mean rank and relative ranking position of the types of agricultural information sourced by farmers in the North-East

Types of information	Mean rank		Position
	F-test	**Kruskal-Wallis**	
Crop	1.2284e	262.0	1st
Agro-forestry	4.2312b	1362.4	5th
Livestock	2.8106d	837.5	2nd
Fisheries	4.7047a	1535.3	6th
Marketing	3.6574c	1148.6	3rd
Weather	4.1281b	1319.2	4th
Grand Mean	3.4601	1077.5	
SE$\pm$	0.0640		
LSD$_{0.05}$	0.1775	136.26	
Overall χ^2	460		
P-value	0.0000		
CV (%)	35.04		

Table 13. Relative ranking of aspects of agriculture that farmers receive agricultural information in the North-East

Rank	Adamawa Freq	%	Bauchi Freq	%	Borno Freq	%	Gombe Freq	%	Yobe Freq	%	Total Freq	%
A:	Agronomy of crop production											
1st	16	31.4	80	80.0	26	100.0	97	98.0	71	85.5	290	80.8
2nd	6	11.8	12	12.0	0	0	2	2.0	11	13.3	31	8.6
3rd	9	17.6	7	7.0	0	0	0	0	0	0	16	4.5
4th	9	17.6	1	1.0	0	0	0	0	1	1.2	11	3.1
5th	11	21.6	0	0	0	0	0	0	0	0	11	3.1
Total	51	100	100	100	26	100	99	100	83	100	359	100
B:	Product development											
1st	17	33.3	4	4.0	0	0	1	1.0	1	1.2	23	6.4
2nd	4	7.8	6	6.0	0	0	0	0	4	4.8	14	3.9
3rd	9	17.6	14	14.0	2	7.7	3	3.0	5	6.0	33	9.2
4th	9	17.6	34	34.0	2	7.7	3	3.0	10	12.0	61	17.0
5th	12	23.5	42	42.0	22	84.6	92	92.9	63	75.9	228	63.5
Total	51	100	100	100	26	100	99	100	83	100	359	100
C:	Economics and marketing											
1st	8	15.7	4	4.0	1	3.8	0	0	1	1.2	14	3.9
2nd	10	19.6	15	15.0	6	23.1	54	54.5	4	4.8	89	24.8
3rd	9	17.6	21	21.0	5	19.2	14	14.1	4	4.8	50	13.9
4th	8	15.7	28	28.0	14	53.8	29	29.3	61	73.5	143	39.8
5th	16	31.4	32	32.0	0	0	2	2.0	13	15.7	63	17.5
Total	51	100	100	100	26	100	99	100	83	100	359	100
D:	Pest and disease management											
1st	3	5.9	11	11.0	0	0	0	0	4	4.8	18	5.0
2nd	14	27.5	44	44.0	12	46.2	26	26.3	37	44.6	133	37.0
3rd	10	19.6	20	20.0	5	19.2	44	44.4	35	42.2	114	31.8
4th	16	31.4	19	19.0	8	30.8	28	28.3	7	8.4	78	21.7
5th	8	15.7	6	6.0	1	3.8	1	1.0	0	0	16	4.5
Total	51	100	100	100	26	100	99	100	83	100	359	100
E:	Soil and water management											
1st	9	17.6	1	1.0	0	0	1	1.0	6	7.2	17	4.7
2nd	16	31.4	22	22.0	7	26.9	15	15.2	27	32.5	87	24.2
3rd	15	29.4	39	39.0	14	53.8	44	44.4	41	49.4	153	42.6
4th	7	13.7	19	19.0	4	15.4	36	36.4	8	9.6	74	20.6
5th	4	7.8	19	19.0	1	3.8	3	3.0	1	1.2	28	7.8
Total	51	100	100	100	26	100	99	100	83	100	359	100

Table 14. Cross tabulation for aspects of agriculture that farmers receive agricultural information by rank

Aspect of agriculture	Relative rank				
	1st	2nd	3rd	4th	5th
Agronomy of crop production					
Observed	290	31	16	11	11
Row %	80.8	8.6	4.5	3.1	3.1
Column %	80.1	8.8	4.4	3.0	3.2
Expected	72.40	70.80	73.20	73.40	69.20
Cell χ^2	654.00	22.37	44.70	53.05	48.95
Product development					
Observed	17	87	153	74	28
Row %	4.7	24.2	42.6	20.6	7.8
Column %	4.7	24.6	41.8	20.2	8.1
Expected	72.40	70.80	73.20	73.40	69.20
Cell χ^2	42.39	3.71	87.00	0.00	24.53
Economics and marketing					
Observed	18	133	114	78	16
Row %	5.0	37.0	31.8	21.7	4.5
Column %	5.0	37.6	31.1	21.3	4.6
Expected	72.40	70.80	73.20	73.40	69.20
Cell χ^2	40.88	54.64	22.74	0.29	40.90
Pest and disease management					
Observed	14	89	50	143	63
Row %	3.9	24.8	13.9	39.8	17.5
Column %	3.9	25.1	13.7	39.0	18.2
Expected	72.40	70.80	73.20	73.40	69.20
Cell χ^2	47.11	4.68	7.35	66.00	0.56
Soil and water management					
Observed	23	14	33	61	228
Row %	6.4	3.9	9.2	17.0	63.5
Column %	6.4	4.0	9.0	16.6	65.9
Expected	72.40	70.80	73.20	73.40	69.20
Cell χ^2	33.71	45.57	22.08	2.09	364.41
Overall χ^2	1733.70				
P-value	0.0000				
DF	16				
N	25				

Table 15. Mean rank and relative ranking position of the aspects of agriculture that farmers receive agricultural information in the North-East

Aspect of agriculture	Mean rank		Position
	F-test	**Kruskal-Wallis**	
Agronomy of crop production	1.3900e	321.8	1st
Product development	3.0251c	910.2	3rd
Economics and marketing	2.8357d	842.0	2nd
Pest and disease management	3.4234b	1055.1	4th
Soil and water management	4.2730a	1360.9	5th
Grand mean	2.9894	898.0	
SE$\pm$	0.0553		
LSD$_{0.05}$	0.1534	108.60	
Overall χ^2	33.2		
P-value	0.0000	0.0000	
CV (%)	35.06		

product development, pest and disease management, and then soil and water management in that order of patronage.

3.7 Ownership of Mobile Phone Use of Phone, Awareness and Sources of Information about the National Farmers' Helpline Centers

Table 16 shows farmers response on mobile phone use, and awareness and sources of information about the national farmers' helpline centers. Results across states indicated that most (94.0-100%) farmers own mobile phone, while 78.3-100% use their phones to access agricultural information. Furthermore, 77.1-100% were aware about the national farmers' helpline centre, and to 0-93.0% their awareness source radio, 0-30.1% television, 0-12.0% print media, 1-96.2% neighbours, 0-21.7% ADPs. Overall, 350 (97.5%) indicated they own mobile phone, while 336 (93.6%) of the farmers attested to using mobile phone to access agricultural information. Furthermore, 326 (90.8%) of the farmers have heard about the national farmers' helpline center, and 123 (34.3%), 23 (6.4%), 12 (3.3%), 176 (49.0%) and 25 (7.0%) became aware through radio, television, print media, neighbours and agricultural development programmes, respectively.

3.8 Reliability and Sampling Adequacy Tests of Farmers' Scores for Benefits and Performance of the National Farmers' Helpline Centre

Table 17 represents the reliability of the psychometric Likert scores, sampling adequacy and homogeneity of variances tests, to permit further statistical tests by one-way ANOVA, correlation and regression. Cronbach's alpha (α) was employed as a tool for quantifying the reliability of scales, in which α = 0.6 - 0.7 indicates an acceptable level of reliability and α ≥ 0.8 signifies very good level. Thus, in the present study Cronbach's alpha scores for both derivable benefits (α = 0.884) and operational performance (α = 0.805) have affirmed high reliability of the data set. Furthermore, Kaiser-Meyer-Olkin (KMO) test was used to gauge sampling adequacy of the data in lieu of factor analysis, where high values (close to 1.0) suitability for factor analysis, and these results presented KMO values of 0.862 and 0.849 for benefits and performance, respectively. Barlett's test of homogeneity of variances also has affirmed equality of variances (P<0.000) between all possible pairs of independent variables as to warrant further analysis. Table 18 in respect to principal component extractions depicts only one component was extracted with eigenvalues greater than one, as also deduced from the scree plots (Figs 1 and 2).

Table 16. Farmers' response on mobile phone use, and awareness and sources of information about the national farmers' helpline centers

Response	Adamawa		Bauchi		Borno		Gombe		Yobe		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
1: Ownership of mobile phone												
Yes	51	100	97	97.0	26	100	98	98.0	78	94.0	350	97.5
No	0	0	3	3.0	0	0	1	1.0	5	6.0	9	2.5
Total	51	100	100	100	26	100	99	100	83	100	359	100
2: Use of phone												
Yes	50	98.0	96	96.0	26	100.0	99	100.0	65	78.3	336	93.6
No	1	2.0	4	4.0	0	0	0	0	18	21.7	23	6.4
Total	51	100	100	100	26	100	99	100	83	100	359	100
3: Awareness about the national farmers' helpline centre												
Yes	51	100	86	86.0	26	100	99	100	64	77.1	326	90.8
No	0	0	14	14.0	0	0.0	0	0.0	19	22.9	33	9.2
Total	100	100	100	100	26	100	99	100	83	100	359	100
4: Information source												
Radio	6	11.8	93	93.0	0	0	7	7.1	12	20.5	123	34.3
Television	0	0	0	0	0	0	0	0	25	30.1	23	6.4
Print media	2	3.9	0	0	0	0	0	0	10	12.0	12	3.3
Neighbours	43	84.3	1	1.0	25	96.2	92	92.9	13	15.7	176	49.0
ADPs	0	0	6	6.0	1	3.8	0	0.0	18	21.7	25	7.0
Total	51	100	100	100	26	100	99	100	83	100	359	100

Table 17. Reliability and sampling adequacy tests of farmers' scores for benefits and performance of the national farmers' helpline centres

Statistics	Derivable benefits scores	Operational performance scores
1: Reliability test		
Cronbach's Alpha	0.884	0.805
Cronbach's Alpha (standardized)	0.883	0.809
No. of items	5	7
2: Sampling adequacy test		
Kaiser-Meyer-Olkin	0.862	0.849
3: Bartlett's test of sphericity		
Approx. Chi-Square	997.566	732.606
Df	10	21
Sig.	0.000	0.000

Table 18. Eigenvalues principal component extractions of farmers' scores for benefits and performance of the national farmers' helpline centres

Component	Initial Eigenvalues			Sums of squared loadings		
	Total	% variance	Cumulative %	Total	% variance	Cumulative %
A: Derivable benefits						
1: Personal guidance	3.433	68.664	68.664	3.433	68.664	68.664
2: Educational guidance	0.628	12.569	81.233			
3: Socio-economic guidance	0.409	8.177	89.410			
4: Farming career	0.305	6.090	95.500			
5: Productivity enhancement	0.225	4.500	100.000			
B: Operational performance						
1: Information quality	3.323	47.472	47.472	3.323	47.472	47.472
2: Richness of information	0.971	13.878	61.350			
3: Timeliness of the information	0.707	10.098	71.448			
4: Clarity of the information	0.646	9.227	80.675			
5: Sufficient operation time	0.527	7.524	88.199			
6: Language conformity	0.498	7.110	95.309			
7: Expertise of operators	0.328	4.691	100.000			
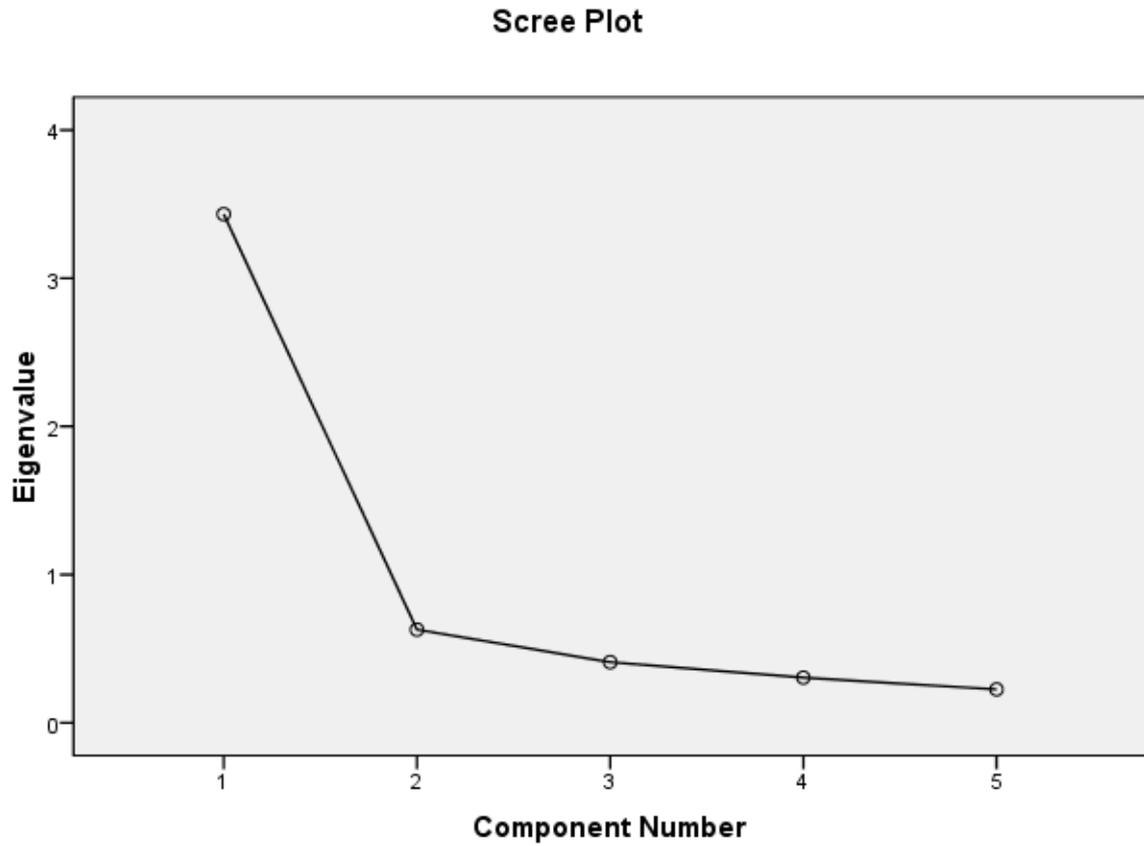
Scree Plot

Fig. 1: Eigenvalues principal component extractions scree plot of farmers' scores for benefits derived from the national farmers' helpline centres
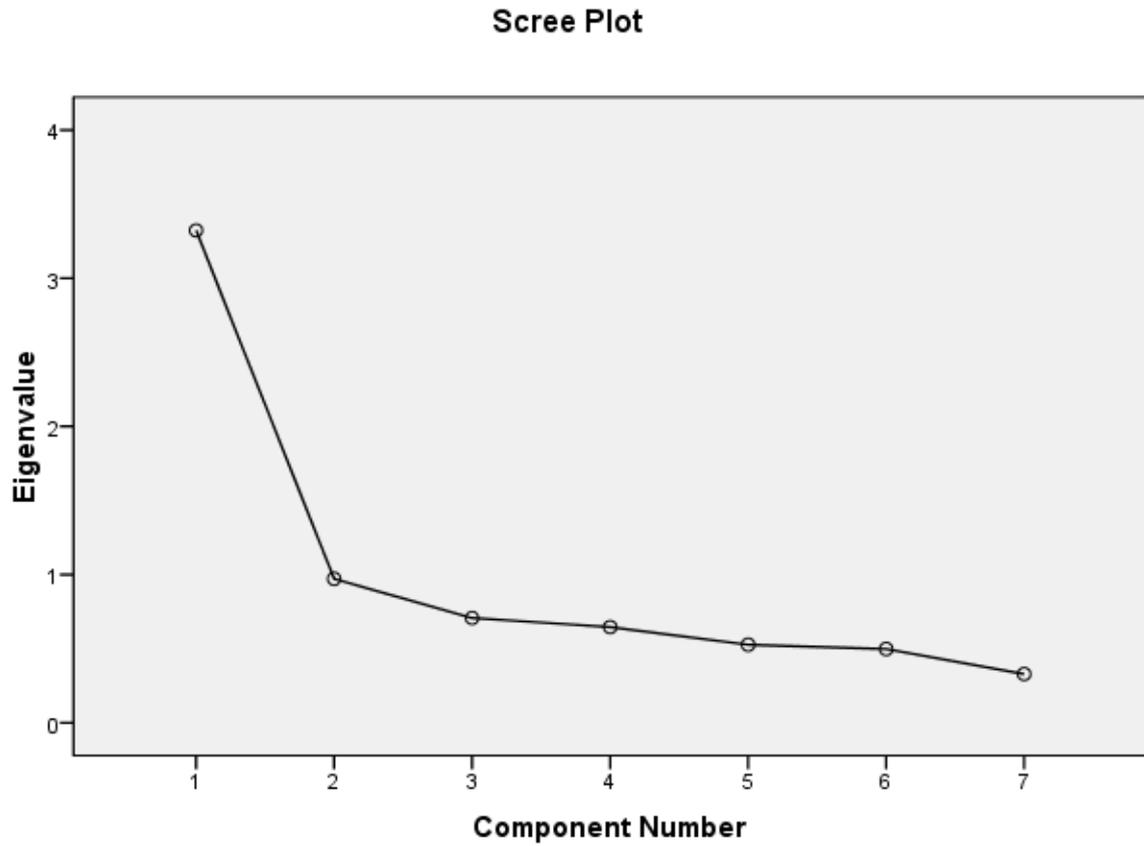
Fig. 2: Eigenvalues principal component extractions scree plot of farmers' scores for operational performance of the national farmers' helpline centres

3.9 Relative Mean Ranks of the Different Indicators of the Benefits and Operational Performance Scores of the Helpline Centre

Most farmers agreed that information obtained from the National Farmers' Helpline Centers has improved their agricultural practice (Table 19). Consequently, those that strongly agreed that National Farmers' Helpline Centers offered personal, educational, socio-economic, farming career, and enhanced their productivity constituted 209 (58.2%), 212 (59.1%), 181 (50.4%), 189 (52.6%) and 224 (62.4%) of the farmers, respectively. Similarly, those that agreed that the centre was beneficial with respect to personal, educational, socio-economic, farming career, and enhanced their productivity were 139 (38.7%), 137 (38.2%), 167 (46.5%), 153 (42.6%) and 126 (35.1%), respectively. Thus, the relative ranking of the types of derived benefits was Socio-economic guidance>Farming career>Personal guidance>Educational guidance>Productivity enhancement. However, while the pattern of response across Likert-scale differed significantly (χ^2=16.45, P<0.0363) among benefit parameters (Table 19), mean ranks of F-test and Kruskal-Wallis test for the benefit parameters were statistically (P>0.0818) at par, depicting all parameters were equally important (Table 20).

Table 21 rates the operational performance and information quality delivery of the national farmers' information helpline centers. Most farmers rated the operational performance and information quality delivery high, in which 234 (65.2%), 211 (58.8%), 188 (52.4%), 203 (56.7%), 144 (40.1%), 237 (66.0%) and 235 (65.5%) strongly agreed to the quality, richness, timeliness, clarity of information, sufficient operation time, language conformity and expertise of operators, respectively. Similarly, 113 (31.5%), 128 (35.7%), 153 (42.6%), 127 (35.5%), 184 (51.3%), 100 (27.9%) and 114 (31.8%) of the farmers as well agreed to the quality, richness, timeliness, clarity of information, sufficient operation time, language conformity and expertise of operators, respectively. The relative ranking of the seven performance indicators was Expertise of operators>Information quality>Language conformity>Richness of information>Clarity of the information>Timeliness of the information>Sufficient operation time (Table 21). The pattern of response across Likert-scale differed significantly (χ^2=106.30, P<0.0000) among performance parameters (Table 21), and both mean ranks of F-test and Kruskal-Wallis test also significant (P>0.0000), depicting differences in the ranking of the seven performance parameters (Table 22).

Table 19. Relative ratings of the benefits derived from the national farmers' helpline centers

Types of benefits	Strongly Disagree	Disagree	Agree	Strongly Agree
1: Personal guidance				
Observed	0	11	139	209
Row %	0	3.1	38.7	58.2
Column %	0	19.0	19.3	20.6
Expected	0	11.6	144.4	203.0
Cell χ^2	0	0.03	0.20	0.18
2: Educational guidance				
Observed	0	10	137	212
Row %	0	2.8	38.2	59.1
Column %	0	17.2	19.0	20.9
Expected	0	11.6	144.4	203.0
Cell χ^2	0	0.22	0.38	0.40
3: Socio-economic guidance				
Observed	0	11	167	181
Row %	0	3.1	46.5	50.4
Column %	0	19.0	23.1	17.8
Expected	0	11.6	144.4	203.0
Cell χ^2	0	0.03	3.54	2.38
4: Farming career				
Observed	0	17	153	189
Row %	0	4.7	42.6	52.6
Column %	0	29.3	21.2	18.6
Expected	0	11.6	144.4	203.0
Cell χ^2	0	2.51	0.51	0.97
5: Productivity enhancement (impact)				
Observed	0	9	126	224
Row %	0	2.5	35.1	62.4
Column %	0	15.5	17.5	22.1
Expected	0	11.6	144.4	203.0
Cell χ^2	0	0.58	2.34	2.17
Overall χ^2	16.45			
P-value	0.0363			
DF	8			
N	20			

Table 20. Relative mean ranks of the different indicators of the benefits of the helpline centre

Types of benefits	Mean rank		Position
	F-test	**Kruskal-Wallis**	
1: Personal guidance	3.5515ab	913.2	3rd
2: Educational guidance	3.5627a	921.5	2nd
3: Socio-economic guidance	3.4735b	845.4	5th
4: Farming career	3.4791b	858.3	4th
5: Productivity enhancement	3.5989a	951.6	1st
Grand mean	3.5331	898.0	
SE$\pm$	0.0295		
LSD$_{0.05}$	0.0818	108.60	
Overall χ^2	2.91	0.0067	
P-value			
CV (%)	15.81		

Table 21. Performance of the national farmers' helpline centers in quality information delivery

Operational performance	Strongly Disagree	Disagree	Agree	Strongly Agree
1: Information quality				
Observed	0	12	113	234
Row %	0.0	3.3	31.5	65.2
Column %	0.0	7.2	9.8	12.4
Expected	1.0	19.14	131.29	207.57
Cell χ^2	1.0	2.67	2.55	3.36
2: Richness of information				
Observed	0	20	128	211
Row %	0.0	5.6	35.7	58.8
Column %	0.0	12.0	11.1	11.1
Expected	1.0	19.14	131.29	207.57
Cell χ^2	1.0	0.04	0.08	0.06
3: Timeliness of the information				
Observed	0	18	153	188
Row %	0.0	5.0	42.6	52.4
Column %	0.0	10.8	13.3	9.9
Expected	1.0	19.14	131.29	207.57
Cell χ^2	1.0	0.07	3.59	1.85
4: Clarity of the information				
Observed	5	23	127	204
Row %	1.4	6.4	35.5	56.8
Column %	31.3	13.8	11.0	10.7
Expected	1.0	19.14	131.29	207.57
Cell χ^2	16.0	0.78	0.14	0.06
5: Sufficient Operation time				
Observed	0	31	184	144
Row %	0.0	8.6	51.3	40.1
Column %	0.0	18.6	16.0	7.6
Expected	1.0	19.14	131.29	207.57
Cell χ^2	1.0	7.23	21.17	19.47
6: Language conformity				
Observed	1	21	100	237
Row %	0.3	5.8	27.9	66.0
Column %	6.3	12.6	8.7	12.5
Expected	1.0	19.14	131.29	207.57
Cell χ^2	0	0.18	7.46	4.17
7: Expertise of operators				
Observed	1	9	114	235
Row %	0.3	2.5	31.8	65.5
Column %	6.3	5.4	9.9	12.4
Expected	1.0	19.14	131.29	207.57
Cell χ^2	0	5.37	2.28	3.62
Overall χ^2	106.30			
P-value	0.0000			
DF	18			
N	28			

Table 22. Relative mean ranks of the different indicators of the benefits of the helpline centre

Operational performance	Mean rank		Position
	F-test	Kruskal-Wallis	
1:Information quality	3.6184ab	1356.4ab	2nd
2: Richness of information	3.5320bc	1268.7ab	4th
3: Timeliness of the information	3.4735c	1195.7bc	6th
4: Clarity of the information	3.4763c	1232.9ab	5th
5: Sufficient operation time	3.3148d	1031.3c	7th
6: Language conformity	3.5961ab	1351.5ab	3rd
7: Expertise of operators	3.6240a	1362.5a	1st
Grand mean	3.5193	1257.0	
SE$\pm$	0.0318		
LSD$_{0.05}$	0.0883	164.53	
Overall χ^2	23.7	76.8488	
P-value	0.0000	0.0000	
CV (%)	17.13		

3.12 Correlation matrix among the different indicators of the benefits and operational performance scores of the helpline centre

Factor analysis gives the bi-cameral item-item and reproduced correlations among the assessed benefits variables of the national farmers' helpline centres (Table 23). Results indicated highly significant (P<0.01) positive correlation among all benefits variables with initial inter-item and reproduced correlations in the range of 0.461-0.763 and 0.561-0.766, respectively. These results indicate that the assessed parameters of were all highly related at determinant = 0.060. Furthermore, 7 (70.0%) non-redundant residuals between observed and reproduced correlations had absolute values greater than 0.05, while intra-item reproduced communalities ranged from 0.458-0.777 (Tables 23). Personal, educational, social, career guidance were highly correlated to productivity enhancement with observed r-values of 0.497, 0.461, 0.475, 0.476 and adjusted r-values of 0.596, 0.588, 0.588, 0.561, respectively. Consequently, the derived r^2-values implied that personal, educational, social and career guidance impacted on farmers productivity by 24.7%, 21.3%, 22.6% and 22.7% for observed, and 35.5%, 34.6%, 34.6% and 31.5% for adjusted, respectively.

The item-item and reproduced correlations matrices among assessed performance variables of the national farmers' helpline centres are as shown in Table 24. Results indicated highly significant (P<0.01) positive correlation among initial inter-item and reproduced correlations which ranged from 0.188-0.657 and 0.276-0.624, respectively. These results indicate that the seven performance parameters were highly related at determinant of 0.127. Furthermore, 16 (76.0%) non-redundant residuals between observed and reproduced correlations had absolute values greater than 0.05, while intra-item reproduced communalities ranged from 0.202-0.661 (Tables 24). Results depicts that richness of information, timeliness of the information, clarity of the information, sufficient operation time, language conformity, expertise of operators were highly correlated to overall information quality, with observed r-values of 0.657, 0.401, 0.472, 0.188, 0.303, 0.511 and adjusted r-values of 0.624, 0.511, 0.549, 0.345, 0.471, 0.565, respectively. These correlation coefficients translated to r^2-values implied that richness of information, timeliness of the information, clarity of the information, sufficient operation time, language conformity, expertise of operators impacted on information quality by 43.2%, 16.1%, 22.3%, 3.5%, 9.2% and 26.1% for observed, and 38.9%, 26.1%, 30.1%, 11.9%, 22.2% and 31.9% in consideration of the adjusted, respectively.

Table 23. Correlation matrix among the different benefits variables

Variable	Inter-item correlation[a]				
	Personal	Educational	Socio-economic	Career	Productivity
Personal	1.000	0.763	0.722	0.625	0.497
Educational	0.763	1.000	0.686	0.641	0.461
Socio-economic	0.722	0.686	1.000	0.678	0.475
Career	0.625	0.641	0.678	1.000	0.476
Productivity	0.497	0.461	0.475	0.476	1.000
	Reproduced correlation				
Personal	0.777[b]	0.766	0.766	0.731	0.595
Educational	0.766	0.754[b]	0.755	0.721	0.588
Socio-economic	0.766	0.755	0.756[b]	0.721	0.588
Career	0.731	0.721	0.721	0.688[b]	0.561
Productivity	0.596	0.588	0.588	0.561	0.458[b]
	Residuals[c]				
Personal	Personal	Personal	Personal	-0.106	-0.099
Educational	-0.003		-0.069	-0.079	-0.126
Socio-economic	-0.044	-0.069		-0.044	-0.113
Career	-0.106	-0.079	-0.044		-0.086
Productivity	-0.099	-0.126	-0.113	-0.086	

a. Determinant=0.060; b. Reproduced communalities, c. Residuals between observed and reproduced correlations with 7(70.0%) non-redundant residuals with absolute values greater than 0.05.

Table 24. Correlation matrix among the different operational performance variables

	Inter-item correlation[a]						
	Quality	Richness	Timeliness	Clarity	Call time	Language	Expertise
Quality	1.000	0.657	0.401	0.472	0.188	0.303	0.511
Richness	0.657	1.000	0.452	0.519	0.252	0.380	0.497
Timeliness	0.401	0.452	1.000	0.333	0.329	0.367	0.351
Clarity	0.472	0.519	0.333	1.000	0.225	0.315	0.488
Call time	0.188	0.252	0.329	0.225	1.000	0.275	0.199
Language	0.303	0.380	0.367	0.315	0.275	1.000	0.394
Expertise	0.511	0.497	0.351	0.488	0.199	0.394	1.000
	Reproduced correlation						
Quality	0.590[b]	0.624	0.511	0.549	0.345	0.471	0.565
Richness	0.624	0.661[b]	0.540	0.581	0.365	0.498	0.598
Timeliness	0.511	0.540	0.442[b]	0.475	0.299	0.408	0.489
Clarity	0.549	0.581	0.475	0.510[b]	0.321	0.438	0.526
Call time	0.345	0.365	0.299	0.321	0.202[b]	0.276	0.331
Language	0.471	0.498	0.408	0.438	0.276	0.376[b]	0.451
Expertise	0.565	0.598	0.489	0.526	0.331	0.451	0.542[b]
	Residuals[c]						
Quality		0.032	-0.109	-0.077	-0.157	-0.168	-0.054
Richness	0.032		-0.089	-0.061	-0.113	-0.118	-0.101
Timeliness	-0.109	-0.089		-0.142	0.030	-0.041	-0.138
Clarity	-0.077	-0.061	-0.142		-0.096	-0.123	-0.038
Call time	-0.157	-0.113	0.030	-0.096		0.000	-0.131
Language	-0.168	-0.118	-0.041	-0.123	0.000		-0.058
Expertise	-0.054	-0.101	-0.138	-0.038	-0.131	-0.058	

a. Determinant=0.127; b. Reproduced communalities, c. Residuals between observed and reproduced correlations with 16(76.0%) non-redundant residuals with absolute values greater than 0.05.

3.13 Regression analysis for relative contribution of the different indicators of the benefits and operational performance scores of the helpline centre

Regression analysis showed that the relative contribution of benefit parameters of personal, educational, social, career guidance to overall farmers' productivity were 36.0%, 12.5%, 20.1% and 31.4%, respectively (Table 25). Stepwise regression revealed that coefficients of determination (r^2) for the benefit parameters ranged from 0.2450-0.2935, which expressed that the effects of the benefits parameters on farmers' productivity varied from 24.50-29.35%, with the lowest and highest effects on personal and career guidance, respectively.

On the other hand, the regression analysis further showed that the relative contribution of performance parameters of information quality, richness of information, timeliness of the information, clarity of the information, sufficient operation time, language conformity, expertise of operators to overall farmers' productivity were 15.8%,16.0%, 11.7%, 13.7%, 11.5%, 2.2% and 29.1%, respectively (Table 25). Stepwise regression revealed that coefficients of determination (r^2) for the performance parameters depicts effects of 0.4297-0.4829, equivalent to 42.97-48.29% among parameters on farmers' productivity with the lowest and highest effects on richness of information and expertise of operators, respectively.

3.14 Upgrading of the Call Centre to Information Management Centre with Access to Videos and Photo Clips

Table 26 shows farmers recommendation for the upgrading of the centre to information centre where farmers can access videos and photo clips. Results showed that 217 (60.4%) strongly agreed that the centre should be upgraded, while other 111 (30.9) agreed as well. In contrast, 23 (6.4%) disagreed, while other 8 (2.2%) strongly disagreed, who hinged their reasons on the low-grade types of phone they owned.

Table 25. Regression of benefit parameters upon overall farmers' productivity

Predictor Variables	Regression coefficient	%	Std error	R-squared	T-value	P-value
A: Benefits						
Constant	1.49970	-	0.17327		8.66	0.0000
Personal	0.21519	36.0	0.07403	0.2450	2.91	0.0039
Educational	0.07451	12.5	0.07265	0.2591	1.03	0.3058
Socio-economic	0.12018	20.1	0.06966	0.2755	1.73	0.0854
Career	0.18741	31.4	0.05916	0.2935	3.17	0.0017
Total	0.59729	100				
R^2-value	0.3014					
Adjusted R^2	0.2935					
MSE	0.20571					
Std deviation	0.45355					
F-value	38.18					
P-value	0.0000					
Performance						
Constant	0.87021	-	0.18175		4.79	0.0000
Richness	0.42963	50.8	0.04556	0.4297	9.43	0.0000
Timeliness	0.08948	10.6	0.04204	0.4419	2.13	0.0340
Clarity	0.08685	10.3	0.03819	0.4597	2.27	0.0236
Call time	0.01923	2.3	0.03630	0.4585	0.53	0.5966
Language	0.01646	1.9	0.03949	0.4573	0.42	0.6771
Expertise	0.20444	24.1	0.04752	0.4829	4.30	0.0000
Total	0.84609	100				
R^2-value	0.4916					
Adjusted R^2	0.4829					
MSE	0.15702					
Std deviation	0.39626					
F-value	56.73					
P-value	0.0000					

Table 26. Recommendation for upgrading of the centre to information centre where farmers can access videos and photo clips

Likert scale	Upgrade of call centre	
	Frequency	%
Strongly disagree	8	2.2
Disagree	23	6.4
Agree	111	30.9
Strongly agree	217	60.4

4.0   SUMMARY, CONCLUSION AND RECOMMENDATION

4.1   Summary

The study assessed the impact of National Farmers' Helpline Centers on the productivity of farmers in north eastern Nigeria, in order to determine the extent of awareness about the centre, its effectiveness and the types of agricultural information availed. A total of 2,500 farmers were interviewed for the study out of which only 14.36% of the respondents have patronized the National Farmers' Helpline Centre. The respondents were predominantly males (91.1%), 54.0% were small-scale and 46.0% large-scale farmers, while most (78.0%) of the farmers had experienced formal western education as against the few (22.0%) with non-formal education. The high Cronbach's alpha (α) scores for both derivable benefits (α = 0.884) and operational performance (α = 0.805) have affirmed high reliability of the data set; and Kaiser-Meyer-Olkin KMO values of 0.862 and 0.849 for benefits and performance showed that samples were adequate. From the results of the survey following findings were arrived at:

1. radio and ADPs are predominant agricultural information sources to farmers in the North-east.
2. most farmers own radio (91.6%), while 41.2% own television but print media subscription was very low (5.3%).
3. most of the farmers (54.9%) share their information source, but sharing with fellow farmers (32.6%) outscored families (25.3%).
1. most (83.0%) of the farmers sourced crop-related agricultural information, while those that sourced information in other areas (livestock, marketing, agro-forestry and fisheries) were very few (0.8-1.9%).
2. with respect of aspects of agriculture, most farmers sought information in the area of agronomy of crop production (80.8%), followed by product development, pest and disease management, soil and water management and economics and marketing in that decreasing of priority.
3. results indicate that most (97.5%) farmers own mobile phone, while (93.6%) had used their phones to access agricultural information, and most of the farmers became aware of the centre through radio (34.3%) and neighbours (49.0%).
4. Most farmers highly rated the benefits (95.2-97.5%) and performance (91.4-97.3%) of the National Farmers' Helpline Centers, in which benefit parameters accounted for

12.5-36.0% of overall farmers' productivity, while performance parameters accounted for 2.2-29.1% of the overall farmers' productivity.

4.2   Conclusion

In conclusion, the foregoing results have shown that awareness and patronage of the National Farmers' Helpline Centre is still very (14.36%) among farmers in the North-East. Radio, ADPs and television still remain the predominant agricultural information sources to farmers in the North-east. Information on crops in the aspect of agronomy of crop production formed bulk of the information sought. The benefits and performance of the National Farmers' Helpline Centers were highly rated by farmers.

4.3   Recommendation

In view of the low awareness about the National Farmers' Helpline Centre, and judging by the benefits attested by most farmers and recommendation for upgrade of the centre by most (91.3%) . The following are hereby recommended:

1. Establish and Operate an Agricultural Information and Communication Center alongside the National Farmers' Helpline Center in the Institute as per the attached design.
2. The center should in the interim step up awareness owing to the significance of the center for enhancement of farmers' productivity
3. While the information dissemination in Gombe and Adamawa where the center is already, more attention should be accorded to Bauchi, Borno and Yobe States.

QUESTIONNAIRE

STUDY ON IMPACT OF NATIONAL FARMERS' HELP LINE CENTERS BY FARMERS IN NORTH-EAST NIGERIA

Lake Chad Research Institute,

KM 5, Gamboru-Ngala Road

P.M.B. 1293, Maiduguri,

28th February, 2020

Dear Respondent,

The Nigerian Communication Commission (NCC) has approved a 2-year grant for Lake Chad Research Institute (LCRI) to conduct a study titled "Assessment of the Impact of National Farmers' Helpline Centers by Farmers in North East Nigeria". LCRI was established by the Research Institute (Establishment Act) Order 1975, with the national mandate for 1. the genetic improvement of millet, wheat and barley, 2investigation of the problems of all agricultural food crops grown in the broad ecological zone covered by Adamawa, Borno, Taraba, Yobe, Bauchi and Gombe States, 3 and also carry out agricultural extension research liaison with relevant Federal and State Ministries, primary agricultural producers, Industries and any other users of research results within the zone in collaboration with NAERLS, and in carrying out its mandate, the Institute shall collaborate with all other relevant Research Institutes and Organizations, in this case NCC.

The National Helpline center is an e-extension platform that is knowledge based, that provides opportunity to farmers to access agricultural information using Information and Communication Technologies (ICTs) such as mobile phones. This compliment the traditional extension agent/farmers interface. The number for the National Helpline center at NAERLS is 081-3989-0090 while that of the Northeast zonal center in Lake Chad Research Institute is 08002200222.

I therefore kindly solicit your cooperation and indulgence to complete this questionnaire. I assure you that all the information you give will be treated with utmost confidentiality and be used purely for betterment of the lots of farmers in the North East.

Thank you

Yours faithfully,

Dr. A.T.S. Bibinu,
Ag, Executive Director, LCRI

Assessment of the Impact of National Farmers' Helpline Centers by Farmers in North East Nigeria

SECTION A: Demographic Characteristics of the Respondents

1.   Name of Farmer ……………………………………………..

2.   Category of Farmer (Tick below)

   Small-scale {   }

   Large-scale {   }

3.   State ………………………..

4.   LGA ………………………..

5.   Village ………………………..

6.   Gender ………………………..

7.   Age of Respondent ………………………..

8.   Family Size ………………………..

9.   Educational qualification ………………………..

SECTION B: Structured Questionnaires

1. What is your source(s) of agricultural information? Please rank in order importance

Radio {   }

Television {   }

Print media {   }

Neighbors {   }

ADPs {   }

2. Do you own any of the information sources? Yes/No

Radio{   }

Television {   }

Print media {   }

3. If yes, do you use the source of information alone or in group?

Alone {   }

Group with family members {   }

Group with fellow farmers {   }

4. What type of agricultural information do you get from the source(s). Please rank in order importance

Crop { }

Agro-forestry { }

Livestock { }

Fisheries { }

Marketing { }

Weather information { }

5. On which aspect of agriculture do you receive information? Please rank in order importance

Agronomy of crop production { }

Soil and water management { }

Pest and disease management { }

Economics and marketing { }

Product development and value addition { }

6. Have you ever used mobile phone to access agricultural information? Tick Yes or No

Yes { }

No { }

7. Have you ever heard of National Farmers Helpline Centers? Tick Yes or No

Yes { }

No { }

8. If yes, how did you know about it?

Radio { }

Television { }

Print media { }

Neighbors { }

ADPs { }

9. Do you own a mobile phone? Tick Yes or No

Yes { }

No { }

SECTION C: Checklist Questionnaires

INSTRUCTION: Each question has four options. Please tick the appropriate column provided based on your opinion

S/No.	ITEM	SCORE			
		Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
1.	**Benefits of the call center:** Information obtained from the Farmers Helpline center has improved my agricultural practice				
a.	Personal guidance				
b.	Educational guidance				
c.	Social guidance				
d.	Career guidance				
e.	Productivity enhancement (Impact)				
2.	**Information quality:** The information obtained from the helpline center is of high quality				
3.	**Richness of information:** The information obtained from the helpline center is adequate				
4.	**Timeliness of the information:** The information obtained from the helpline center is timely				
5.	**Clarity of the information:** Services from the helpline center is clear (audible)				
6.	**Operation time:** Farmers are satisfied with the frequency (5 days) and period (8 hours)				
7.	**Call center upgrade:** Do you recommend upgrading the center to information center where farmers can access videos and photo clips?				
8.	**Language conformity:** The information from the helpline center is served in my local language.				
9.	**Expertise of operators**: Are the call center operators experts in their fields				