AGED AWARENESS AND PERCEPTION OF CLIMATE VARIABILITY IN KANKE AND RIYOM LOCAL GOVERNMENT AREAS OF PLATEAU STATE, NIGERIA.

ABSTRACT

Plateau state is an area with contracting climate which results from the differential relief in the environment. The ~~This study examined~~ aged's awareness and perception of climate variability in Riyom and Kanke Local Government Areas (LGA)~~s~~ of Plateau State was investigated in these areas based on its relief. One local government were selected each from ~~There was random selection of one local government are~~a ~~in the upper plateau~~ (Kanke LGA~~)~~ which lies in the upper plateau and Riyom LGA which is in the ~~another local government area in the~~ lower plain of the plateau~~. (Riyom LGA) because of the constrasting climate which is dominantly influenced by the relief in the area.~~ Quantitative ~~The research made use of quantitative~~ data ~~which~~ were obtained through structured questionnaire administered to aged male, and aged female available in the selected houses (the aged are people 60 years and over in age) in the selected rural communities of Riyom and Kanke LGAs of Plateau State, Nigeria. Where there was no combination of the two (aged men and aged women), either of the two was also sufficient. ~~The analysis was done using SPSS.~~ The study revealed there were more aged males than aged females~~:~~. 72.7% were in the age range of 60-69; more than 80% were crop farmers and about 62.6% earned less than N20,000 (56USD) per month. Also 86.3% have heard of climate change; 80.6% felt they understood climate change; while 95% felt the climatic variability was increasingly changing. The study also revealed that age and LGAs were major determinant of perception and awareness of climate change. It was ~~This study therefore~~ concluded that in order to have an effective intervention for climate change impact on the rural aged, their perception and response to climate change and also peculiarities of the areas must be taken into consideration.

Keywords: Climate variability, Climate change, Rural aged, Perception, Awareness

1.0 INTRODUCTION

Climate change is the change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer (IPCC, 2007). Climate variability is defined as variations in the mean state and other statistics of the climate on all temporal and spatial scales, beyond individual weather events (World Metreological Organisation [WMO] 2017).Climate change and ~~variability constitute~~variability constitutes a major challenge~~s~~ in many rural communities in Africa because of its low levels of awareness, human and financial resources and institutional and technological capabilities (IPCC, 2001). This is the case in Nigeria, since a large share of the Nigerian economy is dependent on climate-sensitive natural resources (IPCC, 2001). These challenges are even more compounded in the country because of its low capacity to adapt to climate change due to low levels of awareness, human and financial resources and institutional and technological capabilities (IPCC, 2001).

Comment [S1]: Rephrase, suspected plagraism

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In Nigeria, women, children and the elderly are the most vulnerable to climate change (DFID, 2009) with the elderly being the most vulnerable (Okoye, 2011). These elderly people live mostly in rural areas of the country (Nigeria Bureau of Statistics, 2006). Rural communities of Nigeria are increasingly populated with the very old who might be particularly susceptible to the challenges of climate variability and change. The aged are people 60 years and over in age. The aged are part of the disadvantaged populations in the rural areas and are very vulnerable to many of the challenges due to their physical weakness, powerlessness and isolation which continue to fortify poverty against them (Kolawole and Torimiro, 2006). In Nigeria, rural aged may face higher levels of climate variability challenges than other rural populations and their urban counterparts. This might be because of their level of awareness and perception of climate variability and low social economic status. Therefore, their awareness and perception of this variability is important.

Perception about climate change and variability is important in order to avoid misconception of the situation which can be serious implications (Peters, 1997). It is important to have a good knowledge and understanding of climate and also be able to respond appropriately to it (Thomas *et al*., 2007). The first prerequisite towards adaptation is a reasonable perception of the problem (Falaki *et al.*, 2013, Gbetibouo, 2009). Falaki *et al*, (2013) opined that one cannot adapt to climate change in an adequate way if the present and future climate change is not perceived as a reality. Moniruzzaman (2013) also explained that by knowing the climate literacy and wisdom of vulnerable community it is easier to take sustainable measures; policy and action plan at national and international level.

Issues associated with climate change and variability has generated massive attention in research. To exemplify, scholars have analyzed climate change in terms of its **Causes** (IPCC, 2007; Karl et al, 2009; Odjugo, 2010; Bray, 2010); **Impact** (Deressa, 2007; Boko et al., 2007; Yesuf *et al.*, 2008; Deressa, Hassen, and Ringler, 2008; Muamba and Kraybill, 2010; Jianjun *et al*., 2015); **Responses** (Deressa *et al*., 2009; Smith and Olesen, 2010; Piya *et al*., 2012; McNeely, 2012)and **Awareness and Perception** (Deressa et al, 2009; Tologbonse *et al*., 2010;Sofoluwe *et al*., 2011; Mandleni and Anim, 2011; Iwuchukwu and Onyeme, 2012; Falaki, *et al.*, 2013; Amdu *et al*., 2013; Olajide O. Adeola, 2014; Abid *et al*., 2015; Allahyari et al., 2016). These studies on climate change and variability did not address the issues in relation to the situation of the rural aged. There are dearth in studies on awareness and perception of climate variability by the rural aged population. Therefore this study raised a need for perception and awareness of climate change to be considered in relation to the rural aged.

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2.0 MATERIALS AND METHOD

2.1 Study Area

Plateau State is situated in the central belt of Nigeria lying between latitude $8^{o}30'$ and $10^{o}30'$ North, longitude $7^{o}30'$ and $8^{o}37'$ East of the Equator. It is bordered by Bauchi to the North-West and Kaduna to the North East, Nasarawa to the South-West and Taraba to the South-East (Figure 1). The state has 17 Local Government Areas: Barikin Ladi, Bassa, Bokkos, Jos East, Jos North, Jos South, Kanam, Kanke, Langtang North, Langtang South, Mangu, Mikang, Pankshin, Qua'an Pan, Riyom, Shendam, Wase (www.plateaustate.gov.org) out of which Kanke and Riyom local government areas were selected for this study (Figure 2). The random selection of one local government area in the upper plateau (Kanke LGA) and one local government area in the lower plain of the plateau (Riyom LGA) was done because the upland and lower areas of

Plateau state has a constrasting climate which is dominantly influenced by its relief (Sanni, 2015). Plateau State has an almost temperate climate. It has a mean temperature that range between 18°C and 22°C. The state has its warmest temperature in the dry season in the months of March and April and its cold season between December and February. Also the highest rainfall is recorded in the wet season in the months of July and August. The state average annual rainfall varies from 131.75 cm (52 in) in the Southern part to 146 cm (57 in) on the Plateau.

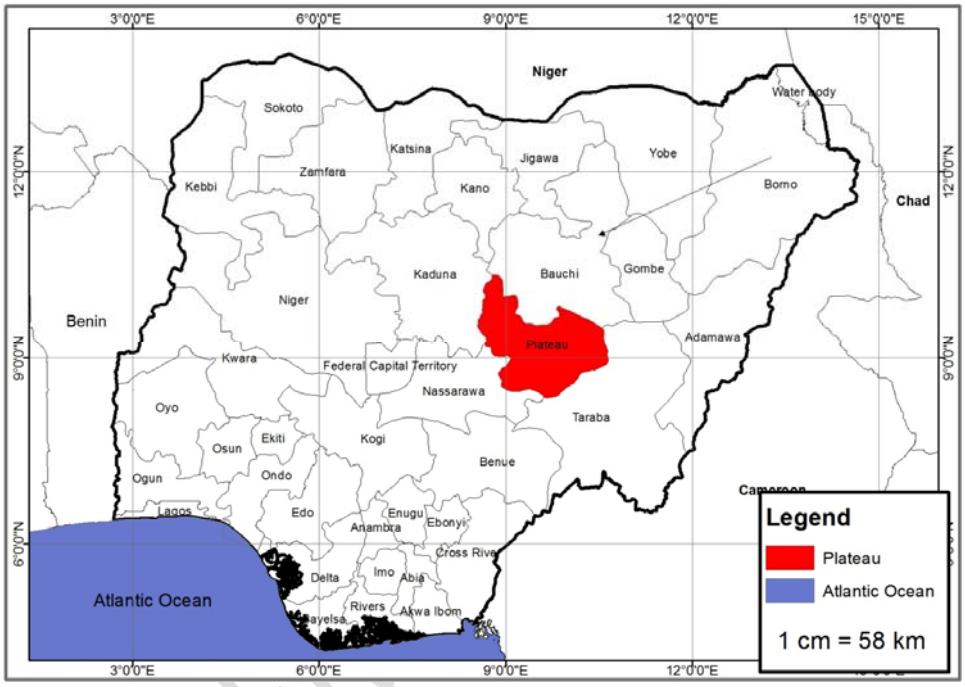

Fig.1. Map of Nigeria illustrating the Study Area

According to the 2006 census, Plateau State had a population of 3,206,531 (1,598,998 males and 1,607,533 females). Riyom LGA of Plateau State had a population of 131,778 in 2006 (NPC, 2006) and in 2016, the projected population was 172,600. Also Kanke LGA population was 124,268 in 2006 (NPC, 2006) and 2016 projected population was 162,800. Riyom local government area has its headquarters in Riyom town while Kanke local government area has its headquarters in Kwal town. There are several Districts & rural communities under Riyom and Kanke local government area. The aged in the selected rural communities of the two LGAs (Riyom and Kanke were few in number) especially in Kanke LGA where the numbers of the aged were extremely very few in number. ~~The selection of Riyom and Kanke local government areas were random selection of one local government area in upper plateau (Kanke LGA) and one local government area in the lower plain of Plateau State (Riyom LGA) because of the contrasting climate.~~

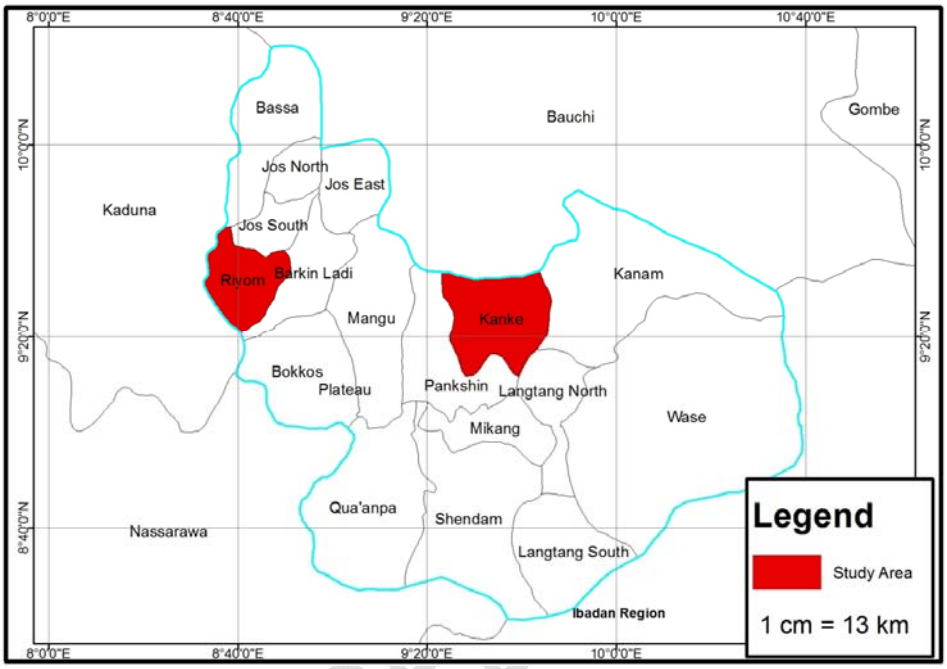

Fig.2. Map of Plateau State showing the Kanke and Riyom Local Government Area as the Study Area

2.2 Data collection

Quantitative primary data was obtained through structured questionnaires and distributed to an aged male and aged female (60 years and above) available in the selected rural communities of the Kanke and Riyom local government areas of Plateau State, Nigeria. Where there was no combination of aged men and aged women, either of the two was seen as sufficient.

The initial stage involved the random selection of one local government area in the upper plateau (Kanke LGA) and one local government area in the lower plain of the plateau (Riyom LGA). This was done because the upland and lower areas of Plateau state has a constrasting climate because the state is dominantly influenced by its relief (Sanni, 2015). The second stage involved the selection of three rural settlements from each of the local government areas which was done by the simple random selection process. The fourth stage is the identification of the houses where the rural aged resides. This was done using a snow ball approach in the respective settlements selected for this research. Where there was no combination of the two (aged men and aged women), either of the two was also sufficient.

2.3 Statistical Analysis

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~~Data obtained was analyzed using a number of analytic methods from SPSS package descriptive~~ Descriptive statistics ~~statistics~~ (frequencies and percentages and likert scale) was used to examine the socio-economic characteristics of the rural aged population. ~~,~~ Awareness, source of awareness and perceived climate variability indicators ~~were created using the descriptive statistics (frequencies, percentages and likert scale).~~ Principal component analysis through Principal Component Extraction estimated from standardized indicator values was used to determine the perception index of climate variability. ~~This was created through Principal Component Extraction estimated from standardized indicator values~~. Bi-variate Correlation Analysis was used to determine factors influencing perception of climate variability of the rural aged while Chi-Square analysis was used to determine the factors influencing awareness of climate variability.

3.0 RESULTS AND DISCUSSION

3.1 Socio-economic characteristics of the Aged

Table 1 shows the socio-economic characteristics of the aged in selected rural settlements of Kanke and Riyom local government areas of Plateau State. The study revealed~~s~~ that there were 51.8% aged males and 48.2% aged females which illustrated the~~. This shows that there are more~~ dominance of aged men ~~than aged females~~ in both ~~the~~ areas. ~~Also m~~Majority of the respondents (72.7%) were in the age range 60-69 years with more than 70% of the respondents married and about 26.6% widowed. The study also showed that 64.7% had no formal education; more than 30% had either primary or secondary education while 3.6% had post secondary education. Also, more than 80% of the respondents are crop farmers and about 3.6% of the respondents are retired civil servants. Majority of the respondents (62.6%) earned less than N20000 (56USD) per month.

3.2 Awareness of climate Variability by the Aged

Table 2 revealed the analysis of the Awareness of climate Variability by the rural Aged in Plateau State. From the table, 86.3% said they have heard of climate change/variability; 80.6% felt they understood what is meant by climate change/variability; while 95% felt the pattern of weather is changing; 20.9% could not recall their source of information on climate change. This indicated~~s~~ that majority of the aged in the areas are aware and understand what climate variability entails. ~~This is in line with~~ Falaki *et al.* (2013) and Gbetibouo (2009) reported ~~who noted that~~ a reasonable awareness of a ~~the~~ problem is the first prerequisite towards adaptation and will~~. This will therefpre~~ enhance their adaptation to the changing climate

3.3 Sources of Information on Climate Variability by the Aged

Table 3 revealed the analysis on multiple responses of sources of information on climate variability by the rural aged in Plateau State. The table showed that the highest number of the respondents (49.6%) got the awareness from friends and neighbors; 17.3% became aware of climate variability from television and radio; 10.8% knew about climate change from Newspaper and magazine while the remaining 2.8% got theirs from Interment and government agencies. However, this contradicts Luka and Yahaya (2012) who examined sources of awareness and

perception of the effects of climate change among sesame producers in the southern agricultural zone of Nasarawa State, Nigeria. From the study, it was discovered that the highest number of respondents got their awareness from the educated farmers (83.3%), followed by 76.6% from the extension agents (76.7%), 61.1% from radio and television, 52.2% from friends (Non farmers), 28.9% from nongovernmental organizations and 18.9% from newspapers. This means that sources to channel climate change information must put into consideration avenues where the target population can easily access the information.

Table I: Socio-economic characteristics of the Aged

Socio-economic characteristics	Value label	Local Government Areas		
		Kanke N= 46	Riyom N= 93	Total N=139
Gender	Male	54.3%	50.5%	51.8%
	Female	45.7%	49.5%	48.2%
Age	60-64	47.8%	47.3%	47.5%
	65-69	19.6%	28.0%	25.2%
	70-74	13.0%	14.0%	13.7%
	75-79	8.7%	8.6%	8.6%
	80+	10.9%	2.2%	5.0%
Educational level	No Formal Education	60.9%	66.7%	64.7%
	Primary	21.7%	25.8%	24.5%
	Secondary	13.0%	4.3%	7.2%
	NCE/OND	2.2%	2.2%	2.2%
	HND/BSc	2.2%	0.0%	0.7%
	Postgraduate	0.0%	1.1%	0.7%
Marital status	Married or living together	71.7%	69.9%	70.5%
	Never married or Single	2.2%	2.2%	2.2%
	Widowed	23.9%	28.0%	26.6%
	Divorced	2.2%	0.0%	0.7%
Occupation	Crop production	93.5%	84.9%	87.8%
	Cattle rearing	2.2%	0.0%	0.7%
	Trading	2.2%	0.0%	0.7%
	Transportation	2.2%	7.5%	5.8%
	Others	0.0%	5.4%	3.6%
Income	< 20,000	60.9%	63.4%	62.6%
	20001-30000	19.6%	20.4%	20.1%
	30001-40000	4.3%	6.5%	5.8%
	40001-50000	15.2%	9.7%	11.5%

Table 2: Awareness of Climate Variability by the Aged

Awareness of climate Variability Variables	Value Labels	Local Government Areas		Total N= 139
		Kanke N= 46	Riyom N= 93	
Do you understand what is meant by climate change/variability	No	13.0%	5.4%	7.9%
	Yes	69.6%	86.0%	80.6%
	Not sure	17.4%	8.6%	11.5%
Do you think the pattern of weather is changing	No	2.2%	0.0%	0.7%
	Yes	89.1%	97.8%	95.0%
	Not sure	8.7%	2.2%	4.3%
Have you heard of climate change/variability	No	21.7%	9.7%	13.7%
	Yes	78.3%	90.3%	86.3%

Table 3: Sources of Awareness on Climate Variability by the Aged

Sources of Information on Climate Variability	Local Government Areas		Total N= 139
	Kanke N= 46	Riyom N= 93	
Television/Radio	2.2%	24.7%	17.3%
Friends/Neighbor/Colleagues	30.4%	59.1%	49.6%
Internet/Web	0.0%	2.2%	1.4%
Mobile phone/SMS alerts	0.0%	3.2%	2.2%
Newspapers and magazines	0.0%	16.1%	10.8%
Government Agency	0.0%	2.2%	1.4%
Cannot recall source	30.4%	16.1%	20.9%

3.4 Perception of Climate Variability by the Aged

Table 4 shows Ageds' perception of climate variability.79.1% of the aged population perceived climate variability as Flooding; this is followed by 76.3% who perceived it to be Harmattan and Haze. 73.4% felt sees climate variability to mean heavy storm. 68.3% felt its heavy rainfall, 66.2% perceived it to be delayed onset of rain; 60.4% sees it as short rainy season, 56.8% perceived it as drought, while 48.9% sees it as earlier onset of rain.

Table 4: Perception of Climate Variability by the Aged

Perceived Indicators of Climate Variability	Kanke N= 46	Riyom N= 93	Total N= 139
Heavy Rainfall	12.9	55.4	68.3
Flood	29.4	59.7	79.1
Drought	12.9	43.9	56.8
higher temperature/heat	15.8	59.0	74.8
Delayed onset of rain	16.5	49.6	66.2
Earlier onset of rain	18.0	30.9	48.9
Short rainy season	13.7	46.8	60.4
Harmattan /Haze	19.4	56.8	76.3
Storm	16.5	56.8	73.4

3.5. Creating Composite Perception Index

Aged's perception of climate variability indicators (heavy rainfall, flood, drought, higher temperature and heat, delayed onset of rain, earlier onset of rain, short rainy season, harmattan/haze and storm) were converted to Composite Perception Index using Principal Component Analysis. The Perception Index was created through Principal Component Extraction estimated from standardized indicator values. This standardization was performed automatically by SPSS before running PCA. SPSS was used to generate a PCA model for the perception index. The perception index created was also in standardized form.

First, the perceived indicators of climate variability were input into a PCA model to detect their appropriateness for factor analysis. The outputs of the PCA model were four tables: The components matrix, the common variance, communalities table and the KMO-Barlett test. These tables were used to improve the PCA model.

Kaiser-Meyer-Olkin (KMO) was one of the outputs of PCA model used in the study to detect the appropriateness of carrying out a factor analysis. The higher the KMO value, the more appropriate to carry out the factor analysis of the variables. The KMO value for the study was 0.874 (Table 5). The value was considered very good and also within the acceptable KMO value range. This therefore implies that factor analysis is appropriate for the study and can proceed.

Table 5 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.874
Bartlett's Test of Sphericity	Approx. Chi-Square	391.037
	Df	36
	Sig.	.000

Source: Author's Survey, 2017

Another test of appropriateness of the PCA model is the size of the communalities.. Higher communalities size values means greater share of common variance explained by the extracted components while lower size values indicate smaller share of common variance explained by the extracted components. The value of communalities ranges between 0 and 1 Table6 Shows that the communalities size. The sizes range in value from 0.117 to 0.633. This is considered to fall within the acceptable range.

Table 6 Communalities

	Initial	Extraction
Heavy rainfall	1.000	.599
Floods (Frequency and intensity)	1.000	.379
More frequent drought	1.000	.444
Excessive heat/higher temperature	1.000	.479
Delayed onset of rainfall	1.000	.587
Earlier onset of rainfall	1.000	.117
Short rainy season	1.000	.518
Harmattan haze	1.000	.245
Increase in storm intensity	1.000	.633

Extraction Method: Principal Component Analysis.

Source: Author's Survey, 2017

The correlation matrix was used to extract the factors from the PCA model (Table 7). The number of factors extracted was determined by the user using the eigen value rule in SPSS. Only factors having an Eigen value of 1.0 or more were retained. Table 7 showed that only 1 factor was revealed by this data and this accounted for 44.4% of the total variance in the data. From the table, factor loadings; heavy rainfall, flood, drought, higher temperature/heat, delayed onset of rain, short rainy season, harmattan/haze and storm revealed high positive loadings while earlier onset of rain showed negative loading.

Table 7 Component Matrix

	Component 1
Increase in storm intensity	.795
Heavy rainfall	.774
Delayed onset of rainfall	.766
Short rainy season	.719
Excessive heat/higher temperature	.692
More frequent drought	.666
Floods (Frequency and intensity)	.616

Harmattan/ haze	.495
Earlier onset of rainfall	-.342

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 8 (total variance explained) showed two level components of PCA with Eigen values greater 1.0 extracted using factor loading of 0.50 as the bench mark of explained common variance).The size of an Eigen value represents the amount of variance in the PCA explained by the component. Hence the larger the Eigen value, the more the component is explained by the model's indicator (Henry et al, 2003). This implies that the first two components of PCA with Eigen values greater than 1 as seen in Table 8 (total variance explained) account for high variance while those components with eigen value of less than 1 account for less variance. The total variance explained by the component extracted accounts for 44.4%. Also the cumulative percentage of variance indicated 44.4%.This shows that all variance is considered to be true and common variance.

Table 8: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.000	44.442	44.442	4.000	44.442	44.442
2	1.040	11.560	56.001			
3	.919	10.210	66.211			
4	.737	8.190	74.400			
5	.572	6.360	80.761			
6	.519	5.771	86.532			
7	.465	5.165	91.697			
8	.393	4.369	96.066			
9	.354	3.934	100.000			

Extraction Method: Principal Component Analysis.

Source: Author's Survey, 2017

After assessing the appropriateness of carrying out factor analysis, the standardized values of the component scores were saved as "perception index" a variable in the household data using the final version of the PCA model through the Factor Analysis dialogue box in SPSS. The perception index created was also in standardized form.

3.7. Creating Composite Awareness Index

Aged's awareness of climate variability indicators (heard about climate change/variability, understand the meaning of climate variability, feel the pattern of weather is changing) were converted to Composite Awareness Index using Principal Component Analysis. This was created through Principal Component Extraction estimated from standardized indicator values. This standardization was performed automatically by SPSS before running PCA. SPSS was used to generate a PCA model for the awareness index. Indicators of climate variability awareness were included into a PCA model to detect their appropriateness for factor analysis. Four tables (The components matrix, the common variance, communalities table and the KMO-Barlett test) were gotten as the outputs of the PCA model. The KMO output of the model indicated a value of 0.463 (Table 9). This was considered too weak for factor analysis to proceed. However other output of the model was examined.

Table 9 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.463
Bartlett's Test of Sphericity	Approx. Chi-Square	16.556
	Df	3
	Sig.	.001

Source: Author's Survey, 2017

The communality table is another output of the model used to test the appropriateness of factor analysis. The value of communalities ranges between 0 and 1 Table 10 revealed that the sizes ranged in value of 0.687 to 0.894. This is considered to fall within the acceptable range and therefore indicated the appropriateness of factor analysis and therefore can proceed.

Table 10 Communalities

	Initial	Extraction
Heard about climate change/variability	1.000	.894
Understand what is meant by climate change/variability	1.000	.687
Think the pattern of weather is changing	1.000	.766

Extraction Method: Principal Component Analysis.

Source: Author's Survey, 2017

Table 11 showed the correlation matrix which is one of the output of PCA model. The output was also used to detect the appropriateness of factor analysis. The Table revealed that 2 factors were extracted. Using factor loading of 0.50, the first factor loadings had 2 high positive loadings (heard about climate change/variability and understand the meaning of climate variability). The second factor loading also showed that 'heard about climate variability and change" had high positive loadings and negative loading of changing pattern of weather. This also signified that factor analysis can proceed.

Table 11 : Component Matrix[a]

	Component	
	1	2
understand the meaning of climate change/variability	.828	.041
think the pattern of weather is changing	.695	-.532
Heard of climate change/variability	.390	.862

Extraction Method: Principal Component Analysis.
a. 2 components extracted.

Source: Author's Survey, 2017

Finally, Table 12 shows the total variance explained table with two level components having Eigen values greater than 1.0 extracted using factor loading of 0.50 as the bench mark of explained common variance). The first two components of the table with Eigen values greater than 1 as seen in Table 12 (total variance explained) account for high variance while those components with Eigen value of less than 1 account for less variance. The total variance explained by the first component extracted accounts for 43.99% of the total variance. The second component accounts for 34.23% of the total variance. Also the cumulative percentage of variance indicated 78.218%. This showed that all variance is considered to be true and common variance. Therefore the factor analysis can proceed.

Table 12: Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.320	43.991	43.991	1.320	43.991	43.991
2	1.027	34.227	78.218	1.027	34.227	78.218
3	.653	21.782	100.000			

Extraction Method: Principal Component Analysis.

Source: Author's Survey, 2017

From the assessment of the test of appropriateness of factor analysis, all the output indicated the appropriateness of factor analysis except the KMO test which indicated otherwise because of its weak value. However, the factor analysis still proceeded. After assessing the appropriateness of carrying out factor analysis, the standardized values of the component scores were saved as "Awareness index" a variable in the household data using the final version of the

PCA model through the Factor Analysis dialogue box in SPSS. The awareness index created was also in standardized form.

3.8. Factors Influencing Aged's Perception of Climate Variability

In determining factors influencing the aged population's perception of climate variability, perception of the Aged which is the dependent variable and Ageds' socio-economic characteristics which are the independent variables were correlated and presented in Table 13. Aged's perception of climate variability indicators (heavy rainfall, flood, drought, higher temperature and heat, delayed onset of rain, earlier onset of rain, short rainy season, harmattan/haze and storm) were first converted to Composite Perception Index using Principal Component Analysis. Perception Index was created through Principal Component Extraction estimated from standardized indicator values (Refer to 3.6 Section). This standardization was performed automatically by SPSS before running PCA. The perception index created was also in standardized form. Pearson and Spearman Correlation Coefficients were used to examine the relationship between aged's socio-economic characteristics and their Perceptions. Pearson correlation was used for continuous variables and spearman correlation coefficients for ordinal variables. Results in Table 13 revealed a moderate and positive association between ageds' perception of climate variability and local government areas ($r = 0.347$, $p = 0.000$).This implied that the ageds' perception of climate variability varies with the local government areas they reside in. This might not be far-fetched from the fact that Kanke Local government area is lowland while Riyom Local government area is upland, which according to Sanni (2015) revealed the fact that climate of Plateau state is dominantly influenced by its relief and may influence respondents' perception of climate variability. The result also revealed a weak negative relationship between the respondents perception of climate variability and their Age at ($r = -0.083$, $p=0.332$) and also a weak but positive relationship with Income at ($r = 0.080$, $p=0.347$). This means, the higher the age of the aged, the lower their level of perception and the higher their income the higher is their level of perception. However, gender, marital status, educational status and occupation did not present a meaningful relationship. Therefore they are taken not to be major determinant of perception of climate variability by the aged in Plateau State, Nigeria.

Table 13: Correlation between Socio-Economic Characteristics and Ageds' Perception of Climate Variability

Variable 1	Variable 2	Correlation coefficient	Coefficient	P-Value	Mean	Standard Deviation
Age	Aged's perception	Pearson	-0.083	0.0332	1.99	1.192
Income	Aged's perception	Pearson	0.080w	0.347	1.66	1.018
Local Govt Area	Aged's perception	Spearman	0.347**	0.000	4.67	0.472
Gender	Aged's perception	Spearman	-0.012	0.893	1.48	0.501
Marital Status	Aged's perception	Spearman	0.007	0.938	1.58	0.909
Educational Status	Aged's perception	Spearman	-0.003	0.972	1.52	0.871

Occupation	Aged's perception	Spearman	-0.024	0.776	1.46	1.331

Source: Author's Field Survey, 2017

3.9. Chi-square Table of Relationship between Socio-economic Characteristics and Ageds' Awareness of Climate Variability

Age, income, local government areas, gender, marital status, educational status and occupation were examined to determine their influence on ageds' awareness of climate variability. First, aged's awareness of climate variability variables (heard about climate change/variability, understand the meaning of climate variability and thinking the parttern of climate is changing) were first converted to Composite Awareness Index using Principal Component Analysis. The Awareness Index was created through Principal Component Extraction estimated from standardized indicator values (Refer to 3.7 Section). Then, chi-square analysis was done between socioeconomic characteristics and the awareness index created. Result of chi-square analysis is presented in Table 14. The Table revealed that there were positive and significant relationships between awareness of climate variability index and the listed socio-economic variables namely: Marital status ($X2 = 113.44$; $p<0.05$) and Occupation ($X2 = 151.570$; $p<0.05$). From the analysis, it can be stated that marital status and occupation are major determinants of the aged awareness of climate variability. However, Age($X2 = 27.616$; $p>0.05$), Income ($X2 = 21.435$; $p>0.05$), Gender ($X2 = 14.847$; $p>0.05$), Educational Status ($X2 = 59.075$; $p>0.05$) and Local government Area ($X2=11.443$; $p>0.05$) were found to be positive but have no significant relationship with awareness of climate variability. This implies the ageds' age, income, gender, educational status and local government area are not determinant of their awareness of climate variability.

Table 14: Chi-square Table of Relationship between Socio-economic Characteristics and Ageds' Awareness of Climate Variability

Variable	X2	DF	level of Significance
Age	27.616	40	0.931
Income	21.435	30	0.870
Local Govt Area	11.443	10	0.324
Gender	14.847	10	0.138
Marital Status	113.444	30	0.000
Educational Status	59.075	50	0.178
Occupation	151.570	50	0.000

Source: Author's Field Survey, 2017

Conclusion and Recommendation

Climate variability is perceived differently by different people and this perception is based on their observations and experiences of rainfall and temperature patterns. Awareness and perception of Climate variability especially by the rural aged is very important. A good knowledge and understanding of climate change and variability will enable appropriate response

to its impact. From this study, majority of the rural aged in the region are aware of climate change/variability and many of them got the awareness from friends, neighbours, television and radio. The study also revealed they understood climate change/variability and felt the pattern of weather is changing. Their understanding and perception of the reality of climate change will help in their adaptation to the challenges of climate change

Result also indicated that local government area is a major determinant of the ageds' perception of climate variability. For instance, Kanke local government area is upland while Riyom Local government is lowland, therefore their perception of climate variability in the two local government areas will be different due to the peculiarity of the location of the local government areas. Therefore for effective intervention and response to climate change and variability awareness and perception, socio-economic characteristics of the people and peculiarities of the areas must be taken into consideration.

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