***Original Research Article***

# AWARENESS AND PERCEPTION OF CLIMATE VARIABILITY BY THE AGED IN SELECTED RURAL COMMUNITIES OF KANKE AND RIYOM LOCAL GOVERNMENT AREAS OF PLATEAU STATE, NIGERIA.


## ABSTRACT

This study examined aged's awareness and perception of climate variability in Riyom and Kanke LGAs of Plateau State. Quantitative data was obtained through questionnaire administered to aged male and female in the study area. The study revealed there were more aged males than aged females. 72.7% were in the age range 60-69; more than 80% were crop farmers and about 62.6% earned less than N20000 (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. 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**



## 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 (Intergovernmental Panel on Climate Change (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 Meteorological Organization, WMO).Climate variability and change constitute major challenges 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 also the case in Nigeria, especially 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).

In Nigeria, women, children and the elderly are the most vulnerable to climate change (DFID 2009) most especially the elderly in the country who are very vulnerable (okoye, 2011). In Nigeria, many of these elderly live in rural areas (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. In Nigeria, the aged are part of the disadvantaged populations in the rural areas. They are very vulnerable to many of the challenges in the rural areas 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.

Peters (1997) noted that perception is important in order to avoid misconception of the situation which can be serious implications. Thomas et al., (2007) also noted that it is important to have a good knowledge and understanding of climate and also be able to respond appropriately to it. Gbetibouo (2009) and Falaki1 et al, (2013) explained in their studies that the first prerequisite towards adaptation is to have a reasonable perception of the problem. Falaki1 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 have 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;Falaki1, et al., 2013;Amdu et al., 2013;Olajide O. Adeola, 2014;Abid et al., 2015; Allahyari et al., 2016). The commonality with these studies is that they did not address these issues in relation to the situation of the rural aged. For instance, Falaki et al., 2013 examined the demographic determinants of farmers' perception and adaptation to climate change in North Central Nigeria. The study revealed that Age, sex education and household size had significant impacts on the farmers' perception of climate change effect on social, biological and eco-system functions. Also, Ochenje et al. (2016) assesses farmers' climate change perceptions on water resources at farm-level in Kakamega County, Kenya. The study indicated that gender, farm size, distance to the main water source, extension services, access to climate change information and wealth status significantly explained levels of farmers' perception of climate change based on water resources. Although these studies were covering perceptual aspects, their focus was not on the rural aged. This shows that there is dearth in studies on awareness and perception of climate variability by the rural aged population. This study therefore raised a need for perception and awareness of climate change to be considered in relation to the rural aged. In line with this, I examined awareness and perception of climate variability of the rural aged populations in the Kanke and Riyom local government areas of Plateau State, Nigeria. In doing so, I seek to provide answers to the following questions: 1. how do the rural aged perceive climate variability and how many of the aged are aware of it 2. what are the main determinants of their perception and awareness of CV 3. what is the source of awareness of CV of the aged in the study area.

## STUDY AREA

Plateau State is situated in the central belt of Nigeria. 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, (as shown in Figure 1). The State lies between latitude $8^{o}30'$ and $10^{o}30'$ North, longitude

7°30' and 8°37' East of the Equator. 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 (as shown in Figure 2). 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 (The Official Website of Plateau State).

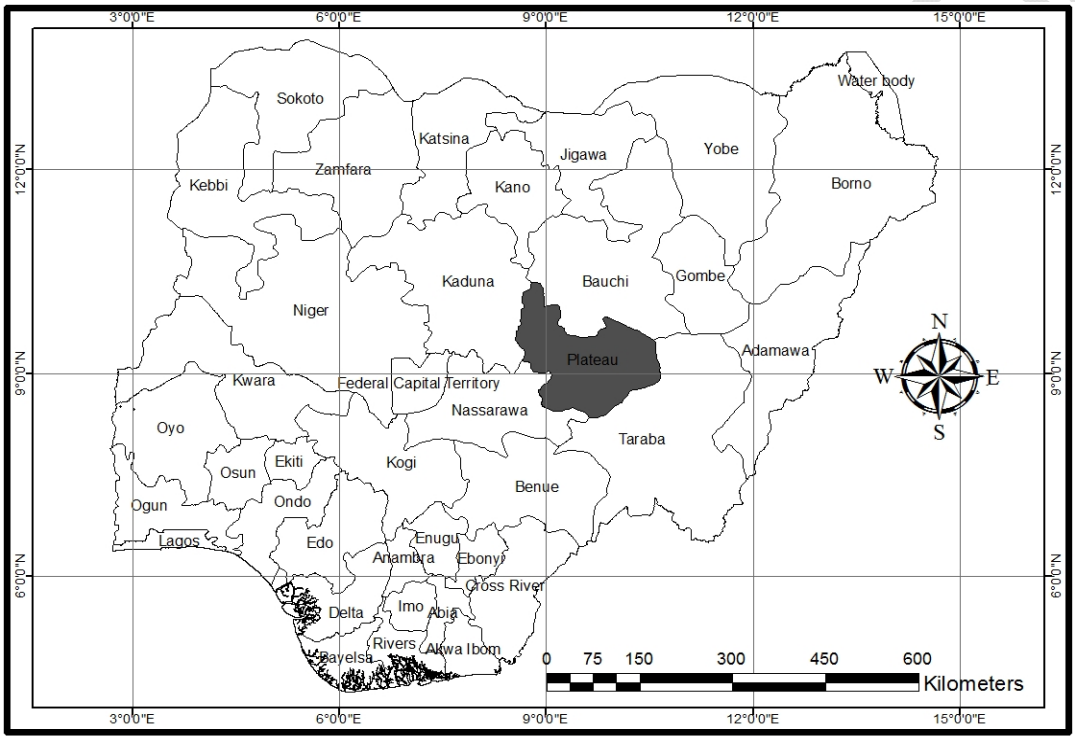


**Fig.1. Map of Nigeria showing Plateau State the Study Area**

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.

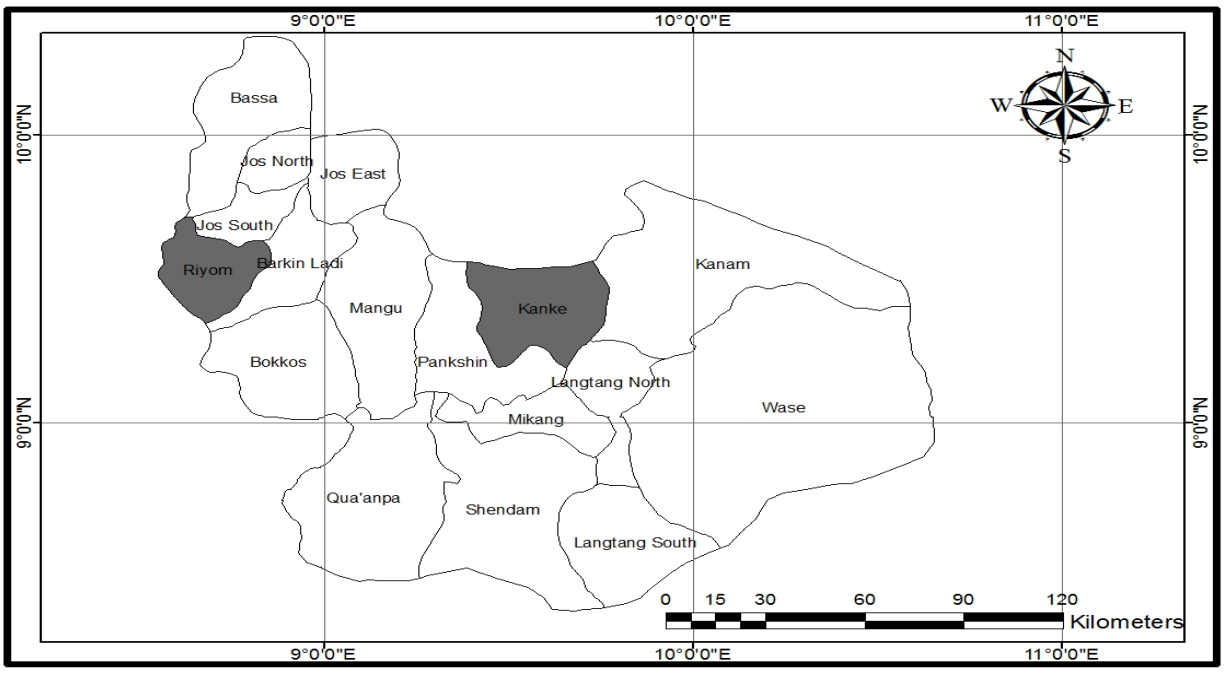


**Fig.2. Map of Plateau State showing the Kanke and Riyom Local Government Area as the Study Area**

## METHODOLOGY

In this research, quantitative primary data was used. The quantitative data was obtained through structured questionnaires distributed to an aged male and aged female available in the selected rural communities of the Kanke and Riyom local government areas of Plateau State, Nigeria. Where there was no combination of the two (aged men and aged women), either of the two was seen as sufficient. Aged people refer to age 60 years and over.

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 upland area of Plateau state has contrasting climate from that of lowland Plateau. In other words, climate of Plateau 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.

Data obtained was analyzed using a number of analytic methods from SPSS package like; descriptive statistics (frequencies and percentages) was used to examine the socio-economic characteristics of the rural aged population. Also awareness, source of awareness and perceived climate variability indicators were created using the descriptive statistics (frequencies, percentages and likert scale). Principal component analysis 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 RESULTSAND 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 reveals that there were 51.8% aged males and 48.2% aged females. The majority of the respondents (72.7%) are in the age range 60-69 years with more than 70% of the respondents married and about 26.6% widowed. The study also revealed 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.

### 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.

**Table I: Socio-economic characteristics of the Aged**

| Socio-economic characteristics | Value label | Local Government Areas | | Total N=139 |
|---|---|---|---|---|
| | | Kanke N= 46 | Riyom N= 93 | |
| 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% |

Source: Author's Field Survey, 2017

### 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 |

Source: Author's Field Survey, 2017

### 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 were 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 indicates 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 Shows 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 signifies 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 shows 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 implies

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 to not 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($X^2$ =113.44; $p<0.05$) and Occupation ($X^2$ =151.570; $p<0.05$). However, Age($X^2$ =27.616; $p>0.05$), Income ($X^2$ =21.435; $p>0.05$), Gender ($X^2$ =14.847; $p>0.05$), Educational Status ($X^2$ =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.

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

| Variable | X2 | DF | 5level 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. This is in line with Falaki1 et al, (2013) which 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.

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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