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COMPARATIVE ANALYSIS OF HOUSEHOLDS' SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS AND FOOD SECURITY STATUS IN URBAN AND RURAL AREAS OF KWARA AND KOGI STATES OF NORTH-CENTRAL NIGERIA

Obayelu AE[1*]

Elijah Obayelu

*Corresponding author email: Obayelu@yahoo.com

[1]Department of Agricultural Economics and Farm Management, Federal University of Agriculture Abeokuta (FUNAAB), Ogun State, Nigeria

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ABSTRACT

Food security is a critical issue in Nigeria today as the country struggles with high rates of food prices and poverty. This study analysed the socioeconomic and demographic characteristics of Household Heads (HHH) and classified them according to food security status. Household level data from the cross-sectional survey was employed in November 2006 to February 2007through a well-structured questionnaire to 396 HHH with a multi-stage sampling procedure. Data were analysed through a descriptive statistics and Rasch model. Average age of the HHH was 42.45years with Standard Deviation (SD) of 9.57 years in Rural Areas (RA) against 43.29 years and SD of 9.83 years in Urban Areas (UA). The HHH level of education was much higher in UA compared to RA. The Household Size (HSZ) was 5.88 with SD of 2.29 in RA against 5.91 and SD of 2.17 in UA, and monthly income of ₦9, 244.86 with SD of ₦11, 071.77 in RA against ₦10, 194.15 and SD of ₦14, 936.30 in UA. The results from Rasch Model for classifying households according to food security status show that differences exist between households' food security status in rural and urban areas of Kwara and Kogi States. While 15.6% HHH were food secure (FS) in RA of Kogi State, only 11.1% were FS in the RA of Kwara State. On the other hand, 20.7% HHH were FS in UA of Kogi State compared to 17.1% in UA of Kwara State. Disaggregating food security status of adults and children in households separately revealed that, 25.8% adults in RA of Kogi State were FS compared to 19.2% in Kwara, while 24.4% urban adults were FS in Kogi against 23.2% in Kwara. In addition, 40.6% children in RA of Kogi State were FS against 32.3% in Kwara, while only 29.9% Kogi urban children were FS against 46.3% in Kwara. In general, households were more FS in Kogi State compared to Kwara and more FS in UA compared to RA. The rural children in Kogi State were also more FS compared to the urban, while urban children in Kwara were more FS when compared to rural children. In order to improve households' food security status in both rural and urban areas, there is the need to take into account some significant variables such as reduction in household size through birth control, and increase in household heads' participation in agricultural activities especially those residing in urban areas through urban agriculture.

Key words: food security, household, rural, urban

INTRODUCTION

The importance of studies on food cannot be over-emphasized since knowledge on food is essential to improve both development planning as well as policy decision-making. Research on household food security has to be continuous as long as the food problem is dynamic, changing in magnitude and nature over phases of economic development. Issues on food security in different countries of the world have been an issue of considerable attention since 1970 [1]. Reducing hunger is one of the targets of the Millennium Development Goals and is widely considered a useful measure for evaluating the progress of a country in terms of well-being [2]. Food insecurity is one of the basic developmental challenges facing Nigeria today in spite of evidence that the country is producing more food now than a decade ago (aggregate index of production of 75.2 in 1970 with 1984 as base year and 161.1 in 2005) [3] .

A household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, quantity, safety and culturally acceptable), and when it is not at undue risk of losing such access [4]. Household food security has been widely acknowledged as a major determinant of quality of life [5]. It requires adequate home production of food and/or adequate economic and physical access to food. Economic access comes from an adequate purchasing power, while physical access refers to the proximity of markets or other distribution channels through which food may be acquired. Household food security can be both subjective (as households members perceive it) and objective. Subjectivity is important as coping strategies are designed on the basis of perceived threats of food deficit rather than those revealed by objective indicators. It is possible to be malnourished in a food-secure household through the effect of disease, inadequate care or inequitable food allocation. While a household may be food-secure in terms of calories, dietary quality will determine the likelihood of micronutrient deficiencies occurring in individuals. Assuring food security at the household level is thus a fundamental first step in assuring adequate nutritional status of individuals.

This study on classification of households into food security status in rural as well as urban areas, therefore, becomes relevant at this present time of discussing global food crisis which is threatening households every single day. The rural area in this study is an area that has a population density of less than 1,000 people per square mile, while the urban area is an area with 1,000 and more people per square mile. The results provide useful inputs for effective household food security planning and decision-making processes as well as provision of useful information in selecting priority areas for intervention on household food security.

The focus components of the study are: (i) to compare the socioeconomic and demographic characteristics of rural and urban households in the study areas and, (ii) to determine household food security status based on their location and other socioeconomic and demographic characteristics.

Food Security Policies in Nigeria

Food security is one of the main elements of the mission and strategic purpose of the plan for modernization of agriculture in Nigeria, part of the seven point agenda of the current civilian administration in Nigeria and the Millennium Development Goals (MDG1). Nigeria has, and is currently embarking on a series of projects and programs under the Special Programme on Food Security (SPSF) and the National Economic Empowerment and Development Strategy (NEEDS) at reducing the problems of food insecurity, malnutrition and self-insufficiency in food production.

Some of the specific government policy initiatives aimed at addressing food security in the country since 1999 include the strategic grain reserve programs, the liberalization of different agricultural input delivery systems, introduction of measures to involve the private sector in the agricultural sector, FADAMA (flood plain development) Programme, annual increase in budgetary allocation to the agricultural sector, setting up of Presidential Committees (on rice, cassava and vegetable oils) with the mandate of looking for ways to boost agricultural production. In the area of agricultural finance, some measures were also introduced to encourage the growth of microfinance institutions. Despite the implementation of these policies/ programmes in the country and the study states, the country (including Kogi and Kwara States) merely ends up addressing only food availability leading to about 65 per cent Nigerians food insecure, with insufficient access to the quantity and quality of food for a healthy and productive life [6, 7].

Problem Statement and Justification of the Study

Food and nutrition security depends on strong links between urban and rural areas. Policymakers and planners, however, often ignore this interdependence. Food insecurity in both rural and urban areas is one of the topmost developmental problems facing Nigeria today [8]. The level of food insecurity continued to rise steadily since the 1980s. It rose from about 18% in 1986 to about 41% in 2004 [9] and 65% in 2009[10]. Indicators of socioeconomic characteristics are meant to reflect access to social and economic resources that affect food security status of households [11]. Studies have shown the existence of many indicators of socioeconomic as well as demographic characteristics of households; however, there appears to be little agreement over which indicators are most useful [12, 13]. This study has distinguished itself from other studies on food security/ insecurity in Nigeria from a methodological point of view through the application of Rasch model.

Empirical evidence has shown that household food insecurity is not only prevalent among rural households but in urban ones as well [8]. Urban areas are faced with the problem of increasing population, increasing inaccessibility to social services, unemployment and underemployment and consequently inadequate supply of food items. Many urban households and individuals inNigeria merely eat for survival despite their involvement in urban agriculture, just like many rural households whose occupation is predominantly believed to be agriculture. Although there are research findings on the comparative analysis of household food security status between rural and urban areas in literature, but there exist some gaps. Some of the reviewed related

studies include the one that merely analysed the food security situation among urban households in Lagos State of Nigeria using the food security index [14]. The socio-economic characteristics and determinants of the food security status of rural farming households in KwaraState of Nigeria using the recommended calorie required and logit approaches was examined by Babatunde *et al*. [15]. The effect of gender on household food security in Imo State, Nigeria was also examined by Ohajianya [16]. Factors affecting food security status of rural households living with HIV/AIDS in southwestern Nigeria using cost of calorie measure and the Logit model was determined by Adenegan and Adewusi [17]. Further, food security status among farming households in Jere Local Government of Borno State, Nigeria using the head count method was analysed by Idrisa *et al*. [18]. The present status of protein- energy malnutrition among rural and low-income urban households through the use of household per capita daily calorie was assessed by Orewa and Iyangbe [19]. The effects of cooperatives in assuring households' food security in rural Nigeria through the use of Dietary diversity Measures (DD) and probit model was investigated by Oluwatayo [20]. Food security and poverty of the rural households in Kwara State, Nigeria with the aid of discriminant analysis and food security index was examined by Omotesho *et al*. [21]. Lastly, investigation of the impact of remittances on food security and nutrition in rural Nigeria through the use of cost of calories and ordinary least square regression was carried out by Babatunde and Martinetti [22].

STUDY AREA AND EMPIRICAL MODEL SELECTION

Study Areas and methods of data collection

Kogi State lies on latitude7.75^{o} N and longitude 6.75^{o}E with a transitional zone between grassland and forest of North and South of Nigeria, respectively while Kwara State extends from latitude 7.45^{o}N in the Southern end, latitude 2.45^{0} E to the West and longitude 6.40^{0} to South-East (Figure1).

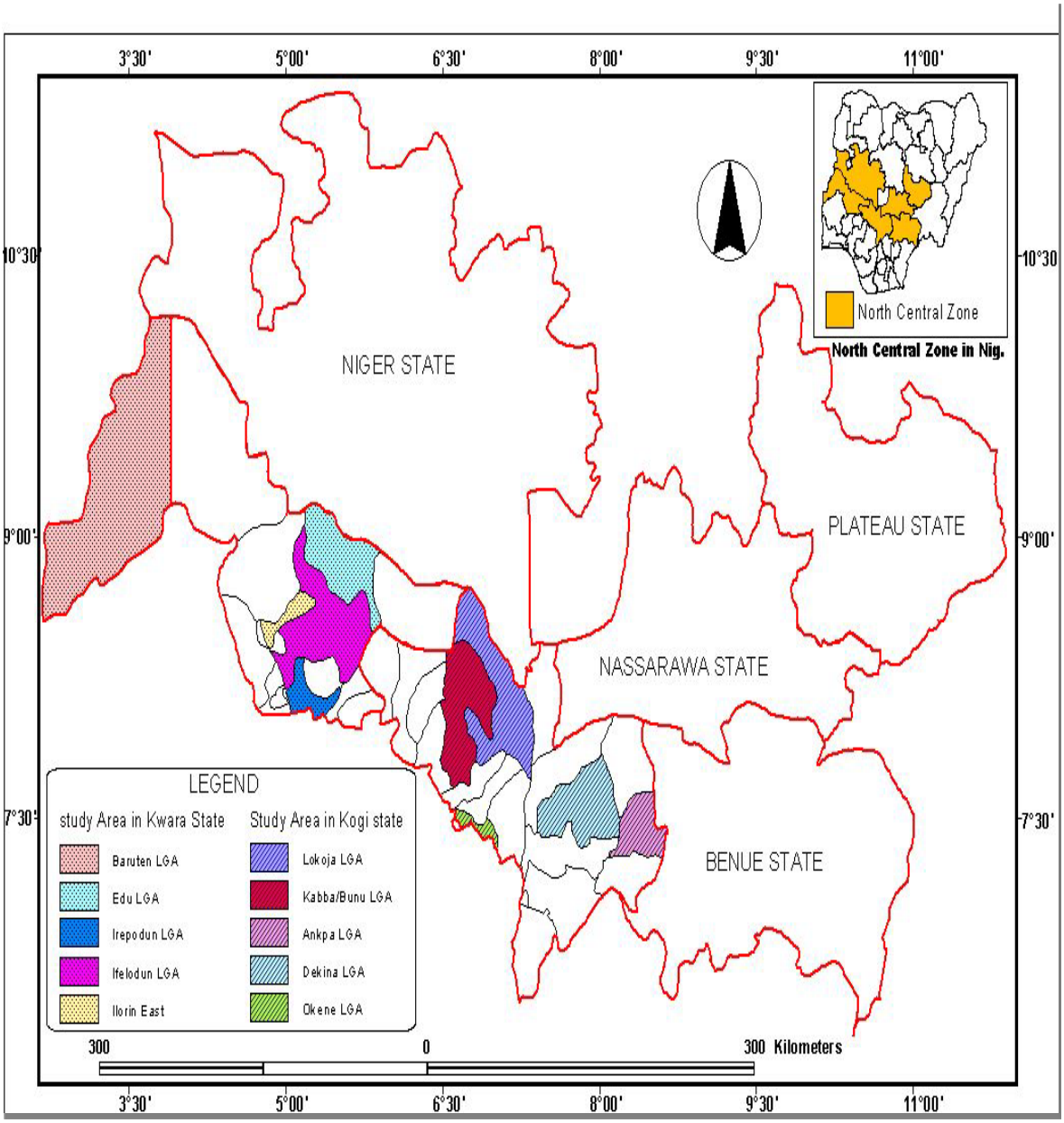

Figure 1: Map of North Central Zone of Nigeria Showing the Study Areas

Data for this study were obtained mainly from primary sources between 2006 and 2007 through the aid of a well-structured questionnaire. A multistage random sampling procedure was employed in the study to select the household heads. The first stage was the purposive selection of Kogi and KwaraStates out of about six states that constitute the North-Central. The second stage was the random selection of 5 Local Government Areas per each state proportionate to the size of the LGA in the state. The third stage was the random selection of 5 Enumeration Areas (EAs) per LGA using the Nigeria National Bureau of Statistics (NBS) Core Welfare Indicator Questionnaire (CWIQ) survey of 2006 categorization of 10 EAs per LGAs as

baseline. The fourth stage was the random selection of four hundred (400) households from the sampling frame of all the houses within the selected EAs. Only the household heads who are the major decision maker were selected. A total of 219 and 181 household heads were selected from Kogi and Kwara States, respectively based on a higher households size in Kogi (389,753) compared to Kwara (326,796) as given by 1991 Nigeria Population Census [23]. However, out of the 400 household heads sampled and interviewed only 396 were found useful for the analysis.

Empirical Model Selection

Both the descriptive statistics such as frequency table, percentages, mean, mode as well as inferential statistics were used. The classification of households into food security status have been greatly influenced by four instruments: the Food Sufficiency Status Question [24]; the Community Childhood Hunger Identification Project instrument [25]; the Radimer/Cornell instrument [26]; and the United States Department of Agriculture's Food Security Survey Module (FSSM) [27]. Of interest to this study is use of United States Department of Agriculture (USDA) food security measure derived from the new food security paradigm, the USDA's Food Security Core Module (FSCM) called the Rasch model /item response model [28]. One of the advantages of this model is its ability to classify households into four food security status categories and to generate a food security scale [29]. In addition, the model provides a convenient framework in which to simultaneously estimate the individual ability and the item difficulty parameters based on a set of questions administered to a group of individuals. Another advantage of the Rasch model is that, the food insecurity severity can be estimated for households with incomplete sets of answers emanating from item non-response or skipping patterns. Also, it is relatively easy to generalize to more complicated settings in which the items have different discriminating powers [30]. The model also provides the basis for "fit" statistics that assess how well each item, each household, and the overall data conform to the assumptions of the measurement model.

The 18-item household food security questionnaire in Table 1 includes: 3 items that ask about experiences of the entire household, 7 items that ask about experiences and behaviours of the adult members of the household as a group, or of the adult respondent individually, and 8 items that ask about experiences and conditions of the children in the household as a group. No affirmative response to any question, or affirmative responses to one or two questions of the 18-food security questions by respondent shows that such is food secure. Between 3-7 affirmative responses show that the respondent is food insecure without hunger, between 8-12 affirmative responses imply that the respondent is food insecure with moderate hunger and between 13 to 18 affirmative responses indicate food insecure with severe hunger [31]. Similarly, no affirmative response or affirmative responses to one or two questions on the 10-adult referenced food security questions implies that the respondent is food secure; between 3-5 affirmative responses, food insecure without hunger, 6-8 affirmative responses, food insecure with moderate hunger and between 9-10, food insecure with severe hunger. On the 8 child food security questions, no affirmative response or affirmative response of one or two shows that the respondent

is food secure, between 3-5 affirmative responses, food insecure without hunger and between 6-8 affirmative responses, food secure with moderate hunger.

The statistical model (Rasch model) is a binary variable such as "yes" or "no" response to a survey item. The odds for an affirmative response to item “t” can be described as the probability of a "yes" response divided by the probability of a "no" response. The first assumption of this model is that the log-odds is a simple linear function of a household-specific food-insecurity score (θ) and an item-specific severity calibration (βt) (see equation 1)

$$\ln \{Pt(\theta) / [1 - pt(\theta)]\} = \theta - \beta t \quad (1)$$

Where P is the probability of an affirmative response to item “t” for a household that has a food-insecurity score of θ, 1- pt (θ) is the probability that the household will deny the item. The index “t” runs over the 10 adult-referenced items for childless households and over all 18 items for households with children. The probability of an affirmative response rises as the household food-insecurity score rises and falls as the item severity calibration rises.

The Rasch model employed for this study was fitted using the BILOG-MG program from Scientific Software International using joint maximum likelihood methods. The discrimination parameter was set at unity, while the mean item score was set at the mean of the eight child items in the standard scale described [32]. Initially a one-parameter logistic model (1PL) was fitted to the data for all subjects as a single group [33]. In order to evaluate how well this model fitted the data, the constraints of the 1PL model were then relaxed in each of two ways. First, a two-parameter logistic model (2PL) was fitted in which the slope, or discrimination parameter, of the item characteristic of curves was allowed to vary between items [34]. Fitting the 2PL model allowed for the evaluation of whether the estimation of food security status was sensitive to varying the assumption of equal discrimination for all items. In the 1PL model, subject scores are a function of the number of affirmatives or raw score and all subjects in a raw score category receive the same 1PL score. In the 2PL model, subject scores depend not only on the number of affirmatives but also on which items are affirmed with a range of subject scores possible at a given raw score. Subject scores were compared for the 2PL and 1PL models by means of a box and whisker plot.

Secondly, a differential item functioning (DIF) model was fitted in which the item calibrations were allowed to vary between groups of subjects defined by the state (region) and geographical location of the child. Only the mean of the item calibrations was held constant across groups. Item calibrations were estimated after adjusting for variation in the average level of food insecurity between groups. Fitting the DIF model allowed for the evaluation of whether it was reasonable to assume that calibrations of individual items were the same across groups of subjects defined by region and geographical location. The change in goodness of fit from DIF model as compared to the 1PL model was evaluated by means of likelihood ratio tests.

Differences in item calibrations (95% confidence intervals) were estimated using the Afro-Caribbean group for reference with the evaluation of differences between groups using the ordinal logistic model where the food security status was used as dependent variable.

The weighted infit and outfit statistics of the Rasch model compares the observed responses of all households with the responses expected under the assumptions of the model. This was calculated as follows:

$$INFIT_i = [([X_{i,h}] - [P_{i,h}])^2] / \sum [P_{i,h}] - [P_{i,h}^2] \quad 2$$

Where: [Xi,h] is the observed response of household "h" to item "i" (1 if response is yes, 0 if response is no); $[P_i,h]$ is the probability of an affirmative response by household h to item i under Rasch assumptions, given the item calibration and the estimated level of severity of food insecurity in the household.

The expected value of each item's infit statistic is 1.0 if the data conform to Rasch model assumptions. Values above 1.0 indicate that the item discriminates less sharply than the average of all items in the scale. Infits in the range of 0.8 to 1.2 are generally considered to be quite good, and 0.7 to 1.3 may be acceptable [35].

Similarly, item outfit (an outlier-sensitive fit statistic) compares the observed responses of all households with the responses expected under the assumptions of the Rasch model. It was calculated as the average across households of the squared error divided by the expected squared error and it is given by:

$$OUTFIT_i = \sum [[[X_{i,h}] - [P_{i,h}])^2] / [P_{i,h}] - [P_{i,h}^2]] / N \quad 3$$

Where: [X.i,h] and $[P_i,h]$ as explained above in the infit equation (equation 1); N is the number of households. The expected value of each item's outfit statistic is unity, and values above unity indicate weaker than average association of the items with the underlying condition. Values between 0.8 and 1.2 are generally considered to meet the Rasch assumption of equal discrimination of all items. Items with values between 0.7 and 1.3 may still be acceptable for use as a measure in the applied setting, but values higher than 1.2 indicate questions that are not consistently understood and should be improved or omitted. Items with values lower than 0.8 are more closely associated with the underlying condition and are undervalued in an equal-weighted scale.

Owing to differences in the food security of adults from those of the children in the same household [36], this study first analyzed the 18 food items and later disaggregated them into 10 adult-referenced items and 8 child-referenced items (Table 1). This was meant to produce empirical evidence of food status among children (those whose age is less than 15 years) and adults (those whose age is more than 15 years) to see whether there were differences [37]. The item calibrations and households' food security scores were generated using the Conditional Maximum

Likelihood Estimation (CMLE) from Winsteps scientific software implemented in SAS with a STATA subcommand [38]. The procedure was observed to lead to less biased estimates, particularly for more extreme food security items.

RESULTS

The results in Table 2 show that, about 90.7 percent of household heads are married in rural Kogi state but only 84.9 percent were married in the urban areas of the state. Similarly, 96.95 percent of households in the rural areas of Kwara State were married compared to 89.6 percent of their urban counterparts.

The result of the t-test of the two states shows no significant difference between age of household heads in Kogi and Kwara State. While the mean age of household heads in rural and urban areas of Kogi State were 41.23 and 43.03 years, respectively. In Kwara State, the mean age was 43.16 years in rural and 43.05 years in urban areas (Table 2).

On gender analysis, Table 2 shows that 20.9 percent households were female-headed in the rural areas of Kogi State compared to the urban areas (29.1 percent). But in Kwara State, 30.6 percent and 17.7 percent households in the rural and urban areas, respectively were female-headed. The t-test results of the household size (HHSZ) across Kogi and Kwara in Table 3 shows a difference between selected states which is significant at 10 percent level. In Kogi State for instance, the mean HHSZ was 6.01 (6.15 in rural, 5.88 in urban) while in Kwara State, it was 5.75 (5.61 in rural and 5.94 in urban).While about 53.5 percent of the household heads were not educated in rural areas of Kogi State, only 22.1 percent had no education in the urban areas of the state. In the same manner in Kwara State, 51.8 percent respondents were not educated in the rural areas compared to 35.4 percent in the urban areas (Table 3). In both states, rural households had fairly low unemployment rate (10.7 percent). While the unemployment rate among the respondents in the rural areas of Kogi State was 11.6 percent, it was 9.4 percent in rural Kwara. In the urban areas of Kogi State, 47.7 percent of respondents were unemployed, compared to 37.5 percent in Kwara State.
On access to credit as presented in Table 4, in Kogi State, 87.6 percent of the sampled respondents had no access to credit facility in rural areas and 73.3 percent in the urban areas. Similarly, 85.9 percent and 72.9 percent of the sampled households in rural and urban areas of KwaraState, respectively had no access to credit. The t- test analysis of household monthly income across the two states also shows that household income was significantly different (at 5% level) between Kogi and Kwara States. Rural households in Kogi State had an average monthly income of ₦10, 807.97 while their Kwara counterparts had an average income of ₦8,449.73. Similarly, the urban HHH in Kogi State had an average monthly income of ₦7, 696.24 and in Kwara State ₦12, 716.49 (Table 4).

On household food security status, findings in Table 5 indicate that an adapted version ofthe USDA 18 HFSS items is a valid tool to classify households into food security status of adults or children in the area. Table 6 shows that 23.7% households in the

study area were classified as food secure using the 10 adult food security questions, 42.4% household heads were classified as food secure using the 8 child food security questions, but only 15.9% were classified as food secure overall, using all 18 questions.

Upon testing for the reliability and validity of food security scale using the adult items as baseline of the food security data in the study, there were modest differences in standard deviation of adult items' calibration across rural-urban and Kwara-Kogi. Urban was somewhat higher than rural (SD ±0.85 versus ±0.72) and the standard deviation of the items' calibration in Kogi was somewhat higher than Kwara (SD ±0.88 versus ±0.64). The values of the standard deviation of items' calibrations showed that more consistent responses increased the dispersion of the items. An affirmative response to the item with a positive sign in Figures 2 and 3 denotes relatively higher severity of food insecurity in the study areas.

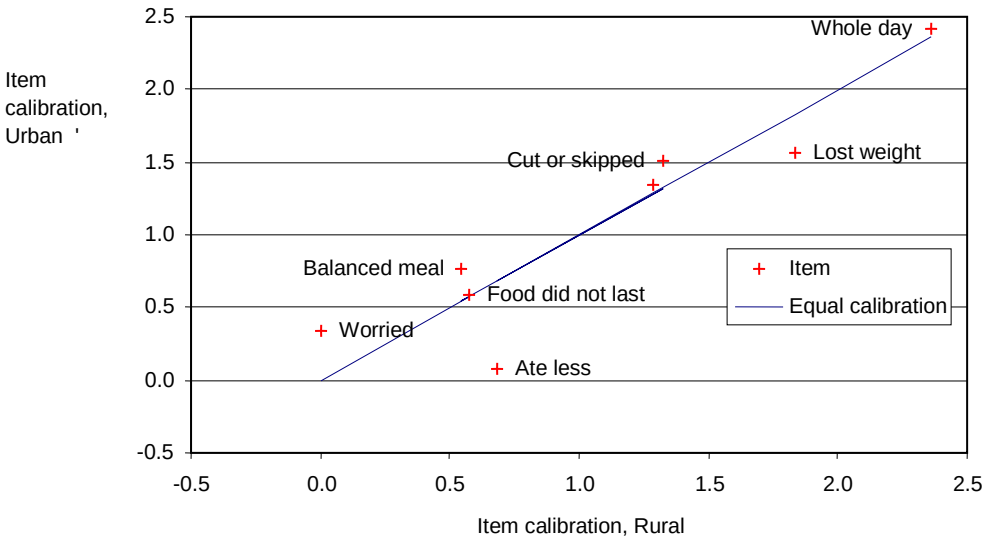

Figure 2: Comparison of items' scores on Adult Food Security Scale, urban versus rural interviewed

Figure 3: Comparison of items' scores on Adult Food Security Scale, Kwara versus Kogi interviewed

Results of the analysis of HHH with and without children (using the complete 18 household food security questions) show that 15.6 percent HHH in rural areas of Kogi State were food secure compared to 11.1 percent of their Kwara rural counterparts; and 20.7 percent HHH in urban areas of Kogi State compared to 17.1 percent (Table 7). A closer look into household food security status with respect to adults and children also shows a differential pattern. As revealed in Table 8, 25.8 percent Kogi adults (ages above 15 years) residing in rural areas were food secure (FS) as compared to 19.2 percent in Kwara State; 24.4 percent of urban adults were FS in Kogi State against 23.2 percent in Kwara.

For child food security status, 40.6 percent of children in rural areas of Kogi State were food secure while 32.3 percent of children in rural areas of KwaraState were FS. On the contrary, 46.3 percent children in urban areas of Kwara were found to be FS with just 29.9 percent children being FS in Kogi (Table 9).

DISCUSSION

The first part of this section discusses the results of household heads' socioeconomic and demographic characteristics in Kogi and Kwara States, while the second part presents the disaggregated results of food security status of rural versus the urban households.

Socioeconomic and Demographic Characteristics of Households Heads

In order to fully understand household food security in study areas, the households' socioeconomic and demographic characteristics were analysed. The descriptive analysis of socioeconomic and demographic characteristics of respondents in Tables 2 to 5 suggests some striking differences between rural and urban areas as well as some interesting similarities.

The proportion of the married households in both states was found to be higher in rural areas than in the urban areas. The difference might be as a result of low level of education by most people living in rural areas leading them to early marriages. The average age of household heads in the selected states indicates that a higher proportion of sampled household heads in the areas were in their active and productive years. The higher proportion of household heads with formal education in urban areas may be as a result of easy access of household heads to schools in the urban areas than in the rural areas coupled with the ability of urban dwellers to finance their education. The low unemployment rates in the rural areas might be due to high level of farming activities in the areas, which serves as a form of employment for the households. This is evidenced by 88.3 percent of the households found to be involved in agricultural activities in rural areas as opposed to 33.0 percent in the urban areas (Table 3).

The low level of access to credit by rural households as revealed in Table 4 may be as a result of a high level of non-membership in cooperative societies. A higher proportion of unemployed urban household heads (42.9 percent) received remittances from their children as opposed to 33.0 percent in their rural counterparts. However, a higher proportion of rural dwellers (60.9 percent) received remittances from friends while 33.8 percent of their urban counterparts received remittances from friends. The variation in the income level between Kwara and Kogi States, rural and urban households in the study could be responsible for the differences in food security status of the households in these areas. The rural respondents could be growing food whereas urban are net buyers as indicated in the level of participation in agriculture in Table 3.

Classification of Rural and Urban Households into Food Security Status

Prior to analysis on the classification of households into food security status, we first examined the goodness-of-fit of the itemsto the expectations of the Rasch model with the Mean square residuals (MnSq).

After item calibrations and household scores had been estimated, assessment was made of how well responses to items corresponded to the Rasch-model assumptions by calculating "infit" and "outfit" through the appropriate statistics. From the results, it was concluded that, the differences in discrimination between the selected states (Kwara and Kogi), rural and urban areas could be attributed to random variation, rather than to enduring effects. The outcome of this analysis also showed that, response to food security items corresponded to the Rasch-model assumptions in the study area. Nearly all the items infit and outfit mean squares were within usual fit

criteria (0.8 - 1.2) (Table 5). The food security items calibration results in Figures 2 and 3 show that the order of severity of items was the same in both sub-populations, and relative items severities were similar, although not identical. Two items differed by statistically significant amounts between the two sub-populations. "**Food you and other household members bought did not last and there wasn't any money to get more**" was more severe (that is, less likely to be reported, given responses to other items) for households interviewed in urban than for those interviewed in rural areas. Lower severity of households **"eating less food"** in urban areas than in rural areas was observed. This implies that, given similar responses to other items, urban households reported this aspect less frequently than the rural households.

Households are profiled into food security status (food secure, food insecure without hunger, food insecure with moderate hunger, food insecure with severe hunger) based on 18 food security items, 10 adult referenced items and 8 child-referenced items (Table 1). The results of the analysis in Tables 7, 8 and 9 show that in both rural and urban areas, food insecurity incidence increases with increase in household size. This is in line with other findings [14] that household sizes which range between 1- 4, 5-8, 9-12 and greater than 12 members are 57.0, 4.0, 3.0 and zero percent food secure, respectively.

In general, children were more FS compared to adults in Kogi and Kwara States. Urban households were also more food secure than rural households, probably as a result of better quality of food eaten in the urban areas as well as the higher level of education and socialization in the urban centres.

CONCLUSION

Analysis and comparisons were made on household food security status in rural and urban areas of Kwara and Kogi states of the North-Central Nigeria using cross-sectional data. Although the Rasch model has widely been used in developed countries, statistical procedures employed in this study had shown that the model is also appropriate for developing country data. The socio-economic and demographic characteristics of household heads were found to affect household food security status. Through the use of the Rasch model, it was ascertained that households' food security had various dimension and different levels (FS, FIWH, FIWMH and FIWSH). Food security status date of adults and children in rural and urban areas of Kogi and Kwara States were disaggregated.

The empirical results show the variation in food security status of both adults and children across urban and rural areas. Significant differences were evident in several socioeconomic and demographic characteristics between urban and rural groups. When compared to the urban household heads, rural respondents were slightly older, less educated and more likely to be employed with the majority involved in agriculture. Food security results indicated that households in urban areas were more food secure than their rural counterparts. In order to improve households' food security status in both rural and urban areas, there is the need for encouraging smaller

family size, and increasing household heads' participation in agricultural activities through urban agriculture.

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Table 1: Eighteen (18) Households' Food Security Items

Number	Questions
Q_1	Adult cut size or skipped meals because there wasn't enough money for food*
Q_2	Adult cut size or skipped meals three or more times in the last 30 days*
Q_3	Adult does not eat whole day because there was no enough food*
Q_4	Adult does not eat whole day three or more times in the last 30 days*
Q_5	Adult eat less than what they felt they should*
Q_6	Adult were hungry but did not eat*
Q_7	Adult lost weight because there wasn't enough food*
Q_8	Cut size of child's meals**
Q_9	Child skipped meal because there wasn't enough money for food**
Q_{10}	Child skipped meal, three or more times in the last 30 days**
Q_{11}	Child being hungry but did not eat because we couldn't afford more food **
Q_{12}	Child not eating for a whole day because there wasn't food**
Q_{13}	Worried whether food would run out before getting money to buy more*
Q_{14}	Food bought did not last and no money to get more*
Q_{15}	Adult could not afford to eat balanced meals*
Q_{16}	Could not feed child with balanced meals because we couldn't afford that**
Q_{17}	Child not eating enough because we couldn't afford enough food**
Q_{18}	Adult feed child with low-cost foods because of inability to buy food**

*are the 10 adult referenced food security items and

** are the child referenced items.

Source: [37]

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Table 2: Distribution of Household Heads According To Marital Status, Age and Gender Distribution

	Kogi			Kwara			Pooled		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
					Marital Status				
Married	117(90.7)	73(84.9)	190(88.4)	82(96.5)	86(89.6)	168(92.8)	199(93.0)	159(87.4)	358(90.4)
Single	12(9.3)	13(15.1)	25(11.6)	3(3.5)	10(10.4)	13(7.2)	15(7.0)	23(12.6)	38(9.6)
Total	129(100)	86(100)	215(100.0)	85(100)	96(100)	181(100.0)	214(100)	182(100)	396(100.0)
Mode	Married	Married	Married	Married	Married	Married	Married	Married	Married
					Age (years)				
≤ 30	10(7.8)	3(3.5)	13(6.0)	10(11.8)	9(9.4)	19(10.5)	20(9.3)	12(6.6)	32(8.1)
31-40	49(38.0)	33(38.4)	82(38.1)	38(44.2)	32(33.3)	70(38.7)	87(40.7)	65(35.7)	152(38.4)
41-50	45(34.9)	36(41.9)	81(37.7)	26(30.6)	30(31.3)	56(30.9)	71(33.2)	66(36.3)	137(34.6)
51-60	15(11.6)	13(15.1)	28(13.0)	6(7.1)	17(17.7)	23(12.7)	21(9.8)	30(16.5)	51(12.9)
61-70	8(6.2)	1(1.2)	9(4.2)	4(4.7)	6(6.3)	10(5.5)	12(5.6)	7(3.8)	19(4.8)
>70	2(1.6)	0(0.0)	2(0.9)	1(1.2)	2(2.1)	3(1.7)	3(1.4)	2(1.1)	5(1.3)
Total	129(100)	86(100)	215(100)	85(100)	96(100)	181(100)	214(100)	182(100)	396(100.0)
Mean age	41.23	42.34	42.34	43.16	43.05	43.41	42.45	43.29	42.83
Mode	40	35	40	40	35	43	40yrs	35yrs	40yrs
Standard deviation	9.38	11.43	10.42	9.65	6.97	8.64	9.57	9.83	9.69
t-value across the two states	0.098 (1.5165)								
					Gender				
Male	102(79.1)	61(70.9)	163(75.8)	59(69.4)	79(82.3)	138(76.2)	161(75.2)	140(76.9)	301(76.0)
Female	27(20.9)	25(29.1)	52(24.2)	26(30.6)	17(17.7)	43(23.8)	53(24.8)	42(23.1)	95(24.0)
Total	129(100)	86(100)	215(100.0)	85(100)	96(100)	181(100.0)	214(100)	182(100)	396(100.0)
Mode	Male	Male	Male	Male	Male	Male	Male	Male	Male

Figures in parentheses are in percentage

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Table 3: Distribution of Household Heads According To Household Size (HHSZ), Educational Status(EDU), Employment and Primary Occupation

	Kogi			Kwara			Pooled		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
				Household size					
≤3	12(9.3)	12(14.0)	24(11.2)	13(15.3)	20(20.8)	33(18.2)	25(11.7)	32(17.6)	57(14.4)
4-7	83(64.3)	52(60.5)	135(62.8)	58(68.2)	55(57.3)	113(62.4)	141(65.9)	107(58.8)	248(62.6)
8-11	32(24.8)	19(22.1)	51(23.7)	14(16.5)	21(21.9)	34(19.3)	46(21.5)	40(22.0)	86(21.7)
>11	2(1.6)	3(3.5)	5(2.3)	0(0.0)	0(0.0)	0(0.0)	2(0.9)	3(1.6)	5(1.3)
Total	129(100)	86(100)	215(100.0)	85(100)	96(53.0)	181(100.0)	214(100)	182(100)	396(100.0)
Mean HHsz	6.15	5.88	6.01	5.61	5.94	5.75	5.88	5.91	5.89
Mode	4	4	4	4	5	5	4	4	4
Std.deviation	2.45	2.30	2.30	2.10	2.23	2.15	2.29	2.17	2.24
t-value	2.616* (0.8809)								
				Education Status					
No education	69(53.5)	19(22.1)	88(40.9)	44(51.8)	34 (35.4)	44(51.8)	113(52.8)	53(29.1)	166(41.9)
Primary education	34(26.4)	18(20.9)	52(24.2)	21 (24.7)	17 (17.7)	38(21.0)	55(25.7)	35(19.2)	90(22.7)
Secondary education	19(14.7)	25(29.1)	44(20.5)	14(16.7)	28(29.2)	42(23.2)	33(15.4)	53(29.1)	86(21.7)
Tertiary education	7(5.4)	24(27.9)	31(14.4)	6(7.1)	17(17.7)	23(12.7)	13(6.1)	41(22.5)	54(13.6)
Total	129(100)	86(100)	215(100.0)	85(100)	96(100)	181(100.0)	214(100)	182(100)	396(100.0)
Mode	No education	secondary education	No education	No education	No education	No education	No education	Secondary education	No education
				Employment Status					
Govt or private employment	15(11.6)	30(34.9)	45(20.9)	11(12.9)	44(45.8)	55 (30.4)	26(12.1)	74(40.7)	100 (25.3)
Self-employed	99(76.7)	15(17.4)	114(53.0)	66(77.6)	1616.7)	82(45.3)	165(77.1)	31(17.0)	196(49.5)
Unemployed	15(11.6)	41(47.7)	56(26.0)	8(9.4)	36(37.5)	44(24.3)	23(10.7)	77(42.3)	100(25.3)
Total	129(100)	86(100)	215(100)	85(100)	96(100)	181(100)	214(100.)	182(100)	396(100.0)
Mean	1.65	0.70	1.27	1.68	0.72	1.21	1.66	0.575	1.24
Mode	Self-employed	unemployed	Self-employed	Self-employed	Govt/ private employment	Self-employed	Self-employed	unemployed	Self-employed
Std.deviation	0.68	0.75	0.85	0.64	0.71	0.81	0.66	0.73	0.83
				Primary occupation					
Agriculture	116(89.9)	17(19.8)	133(61.9)	73(85.9)	43(44.8)	.16(64.1)	189(88.3)	60(33.0)	249(62.9)
Non-agriculture	13(10.01)	69(80.2)	82(38.1)	12(14.1)	53(55.2)	65(35.9)	25(11.7)	122(67.0)	147(37.1)
Total	129(100)	86(100)	215(100.0)	85(100)	96(100)	181(100.0)	214(100)	182(100)	396(100.0)
Mode	Agriculture	non- agric	agric	agriculture	non-agric	Agric	Agric.	non-agric	Agric

Figures in parentheses are in percentages, *, **,*** are significant levels at 10%, 5 % and 1%, respectively

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Table 4: Distribution of Household Heads According to their Access to Credit, Member of Cooperative Groups and Income

	Kogi			Kwara			Pooled		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
					Access to credit				
Have access	16 (12.4)	23(26.7)	39(18.1)	12(14.1)	26(27.1)	38(21.0)	28(13.1)	49(26.9)	77(19.4)
No access	113(87.6)	63(73.3)	176(81.9)	73(85.9)	70(72.9)	143(79.0)	186(86.9)	133(73.1)	319(80.6)
Total	129(100)	86(100)	215(100.0)	85(100)	96(100)	181(100.0)	214(100)	182(100)	396(100.0)
Mode	No access	No access	No access	No access	No access	No access	No access	No access	No access
					Cooperative group				
Member	46 (35.7)	44(51.2)	90(41.9)	12(14.1)	26(27.1)	38(21.0)	80(37.4)	78(42.9)	158(39.9)
Non- member	83(64.3)	42(48.8)	125(58.1)	73(85.9)	70(72.9)	143(79.0)	1134(62.6)	104(57.1)	238(60.1)
Total	129(100)	86(100)	215(100)	85(100)	96(100)	181(100)	214(100)	182(100)	396(100)
Mode	Non-member	Member	Non- member	Non- member	Non-member	Non-member	Non-member	Non- member	Non- member
					Income				
≤10,000	30(23.3)	27(31.4)	57(26.5)	48(56.5)	37(38.5)	85(47.0)	82(38.3)	67(36.8)	149(37.6)
10,000-20,000	55(42.6)	31(36.0)	86(40.0)	19(22.4)	26(27.1)	45(24.9)	74(43.6)	57(31.3)	131(33.1)
20,001-30,000	24(18.6)	13(15.1)	37(17.2)	8(9.4)	13(13.5)	21(11.6)	32(15.0)	26(14.3)	58(14.6)
30,001-40,000	11(8.5)	5(5.0)	16(7.4)	4(4.7)	7(7.3)	11(6.1)	15(7.0)	12(6.6)	27(6.8)
40,001-50,000	4(3.1)	4(4.7)	8(3.7)	1(3.5)	4(4.2)	7(3.9)	5(2.3)	6(3.3)	11(2.8)
> 50,000	5(3.9)	6(7.0)	11(5.1)	1(3.5)	9(9.4)	12(6.6)	6(2.8)	14(7.7)	20(5.1)
Total	129(100)	86(100)	215(100)	85(100)	96(100)	181(100.0)	214(100)	182(100)	396(100.0)
Mean	10,807.97	7,696.24	9,244.86	8,449.73	12,716.49	10,194.15	9,244.86	10194.15	10,253.34
Mode	5,939.47	5,329.89	5,329.89	3,759.76	5,320.02	5,024.74	7,696.24	8,075.02	5,251.71
Std.deviation	13,294.74	8,075.02	11,071.77	14,899.52	14,725.24	589.83	11,071.77	14,936.30	24,251.01
t-value	2.512** (0.1429)								

Figures in parentheses are in percentages except for t-test where is standard deviation, *, **,*** are significant levels at 10%, 5 % and 1% respectively

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Table 5: Logistic Conditional Analysis Odds Ratio Estimates

	Kogi								Kwara											
	Rural				Urban				Rural				Urban				Combined			
Parameter	P.E	95% confidence	Infit	Outfit	P.E	95% conf.	infit	outfit	P.E	95% conf.	infit	Outfit	P.E	95% conf.	infit	outfit	P.E	95% conf.	infit	outfit
worried	0	0	0.7658	0.5741	0	0	0.9444	0.7713	0	0	0.7767	0.6110	0	0	0.8780	0.6918	0	0	0.8303	0.7713
fnotlast	0.562	0.325	0.9689	0.9584	0.750	0.385	0.6153	0.4886	0.528	0.291	0.8964	0.9109	0.757	0.416	0.7771	0.6592	0.633	0.416	0.8307	0.7820
balmeal	0.583	0.337	1.2273	1.2802	0.601	0.310	1.0803	0.9485	0658	0.361	1.2110	1.0625	0.534	0.296	1.1333	1.1278	0.593	0.390	0.1658	1.1300
cutskip	0.267	0.155	0.9223	0.8503	0.250	0.129	1.0351	1.0372	0.245	0.135	1.0625	1.1304	0.279	0.155	0.8611	0.7407	0.263	0.173	0.9618	0.9167
eatless	0.505	0.293	1.1628	1.3311	1.352	0.684	1.3444	1.8318	0.790	0.432	1.1769	1.2675	0.692	0.382	1.3609	1.6385	0.739	0.484	1.2696	1.4826
hungry	0.276	0.161	0.9725	0.9716	0.306	0.158	0.9963	0.9877	0.209	0.116	0.8184	0.7664	0.400	0.222	1.1175	1.1800	0.290	0.191	0.9756	0.9748
losewt	0.160	0.093	0.9188	0.9015	0.237	0.123	1.0985	0.9639	0.148	0.081	1.0740	0.0919	0.238	0.132	0.9028	0.7858	0.189	0.124	0.9946	0.9218
whlday	0.095	0.054	1.0919	0.9100	0.087	0.043	0.9887	0.7505	0.066	0.035	1.0431	0.8488	0.130	0.071	1.0508	0.8613	0.093	0.060	1.0526	0.8515

P.E = Point Estimate, from Table 1, worried(Worried whether food would run out before getting money to buy more) = Q_{13};fnotlast (Food bought did not last and no money to get more) = Q_{14} ,; balmeal (Adult could not afford to eat balanced meals) = $Q_{15;}$ cutskip(Adult cut size or skipped meals three or more times in the last 30days) = $Q_{2;}$ eatless(Adult eat less than what they felt they should) = $Q_{5;}$ hungry(Adult were hungry but did not eat) = $Q_{6,;}$ losewt (Adult lost weight because there wasn't enough food =$Q_{7;}$ whlday(Adult does not eat whole day three or more times in the last 30 days) = $Q_{4.}$

Table 6: Percentage Distribution of Household Head by their Affirmative Responses to Food Security Questions

Food Security Status	Adult (10 food security questions)			Child (8 food security questions)			Combined (18 food security questions)		
	Affirmative responses	Freq.	Percentage (%)	Affirmative responses	Freq.	Percentage (%)	Affirmative responses	Freq.	Percentage (%)
FS	0-2	94	23.74	0-2	168	42.42	1-2	63	15.91
FIWH	3-5	126	31.82	3-5	148	37.74	3-7	141	35.61
FIWMH	6-8	132	33.33	6-8	100	25.25	8-12	111	28.03
FIWSH	9-10	44	11.11	-	-	-	13-18	85	21.46

Note:Freq.= Frequency, FS = Food Secure, FIWH = Food Insecure Without Hunger, FIWMH = Food Insecure With Moderate Hunger, FIWSH = Food Insecure With Severe Hunger

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Table 7: Comparative Analysis of Households Food Security Status by Some Selected Demographic and Socioeconomic Characteristics based on 18HFS Items (Kogi versus Kwara)

	Food Security Status (Kogi State)					Food Security Status (Kwara State)				
Characteristics	Sample size	FS	FIWH	FIWMH	FIWSH	Sample size	FS	FIWH	FIWMH	FIWSH
Location		**Demographic characteristics**					**Demographic characteristics**			
Rural	128(100)	20(15.6)	41(32.0)	39(30.5)	28(21.9)	99(100)	11(11.1)	41(41.4)	31(31.3)	16(16.2)
Urban	87(100)	18(20.7)	31(35.6)	17(19.5)	21(24.1)	82(100)	14(17.1)	28(34.1)	24(29.3)	16(19.5)
Total	**215 (100)**	**38(17.7)**	**72(33.5)**	**56(26.0)**	**49(22.8)**	**181(100)**	**25(13.8)**	**69(38.1)**	**55(30.4)**	**32(17.7)**
Gender										
Male	163(100)	30(18.4)	58(35.6)	38(23.3)	37(22.7)	137(100)	12(8.8)	55(40.1)	43(31.4)	27(19.7)
Female	52(100)	8(15.4)	14(26.9)	18(34.6)	12(23.1)	44(100)	13(29.5)	14(31.8)	12(27.3)	5(11.4)
Total	**215 (100)**	**38(17.7)**	**72(33.5)**	**56(26.0)**	**49(22.8)**	**181(100)**	**25(13.8)**	**69(38.1)**	**55(30.4)**	**32(17.7)**
Household size										
0-3	24(100)	6(25.0)	8(33.3)	7(29.2)	3(12.5)	33(100)	8(24.2)	13(39.4)	6(18.2)	6(18.2)
4-7	135(100)	24(17.8)	42(31.1)	37(27.4)	32(23.5)	113(100)	12(10.6)	44(38.9)	39(34.5)	18(15.9)
8-11	51(100)	8(15.7)	22(43.1)	9(17.6)	12(23.5)	35(100)	5(13.8)	12(34.3)	10(28.6)	8(22.9)
≥12	5(100)	0(0.0)	0(0.0)	3(60.0)	2(40.0)	0(0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Total	**215 (100)**	**38(17.7)**	**72(33.5)**	**56(26.0)**	**49(22.8)**	**181(100)**	**25(13.8)**	**69(38.1)**	**55(30.4)**	**32(17.7)**
Marital status										
Married	201(100)	37(18.4)	67(33.3)	52(52.9)	45(22.4)	169(100)	21(12.4)	66(39.1)	52(30.8)	30(17.8)
Single	14(100)	1(7.1)	5(35.7)	4(28.6)	4(28.6)	12(100)	4(33.3)	3(25.0)	3(25.0)	26(16.7)
Total	**215 (100)**	**38(17.7)**	**72(33.5)**	**56(26.0)**	**49(22.8)**	**181(100)**	**25(13.8)**	**69(38.1)**	**55(30.4)**	**32(17.7)**
		Socioeconomic characteristics						**Socioeconomic characteristics**		
Employment status										
Govt/private employed	58(100)	13(22.4)	19(32.8)	13(22.4)	13(22.4)	49(100)	5(10.2)	16(32.7)	15(30.6)	13(26.5)
Self-employed	68(100)	10(14.7)	23(33.8)	17(25.0)	18(26.5)	56(100)	8(14.3)	20(35.7)	19(33.9)	9(16.1)
No employment	89(100)	15(16.9)	30(33.7)	26(29.2)	18(20.2)	76(100)	12(15.8)	33(43.4)	21(27.6)	10(13.2)
Total	**215 (100)**	**38(17.7)**	**72(33.5)**	**56(26.0)**	**49(22.8)**	**181(100)**	**25(13.8)**	**69(38.1)**	**55(30.4)**	**32(17.7)**
Participation in agriculture										
Participate	126(100)	23(18.3)	41(32.5)	31(24.6)	31(24.6)	92(100)	13(14.1)	33(35.9)	28(30.4)	18(19.6)
Do not participate	89(100)	15(16.9)	31(34.8)	25(28.1)	18(20.2)	89(100)	12(13.5)	36(40.4)	27(30.3)	14(15.7)
Total	**215 (100)**	**38(17.7)**	**72(33.5)**	**56(26.0)**	**49(22.8)**	**181(100)**	**25(13.8)**	**69(38.1)**	**55(30.4)**	**32(17.7)**

Values in parentheses are in percentages, HFS is household food security, the single includes the unmarried, divorced and those that have separated
FS = Food Secure, FIWH = Food Insecure Without Hunger, FIWMH = Food Insecure With Moderate Hunger, FIWSH = Food Insecure With Severe Hunger

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Table 8: Comparative Analysis of Households Food Security Status by Some Selected Demographic and Socioeconomic Characteristics based on 10 Adult –Referenced HFS Items (Kogi versus Kwara)

	Food Security Status (Kogi State)					Food Security Status (Kwara State)				
Characteristics	Sample size	FS	FIWH	FIWMH	FIWSH	Sample size	FS	FIWH	FIWMH	FIWSH
			Demographic characteristics					Demographic Characteristics		
Location										
Rural	128(100)	33 (25.8)	39 (30.5)	45 (35.2)	11 (8.6)	99(100)	19 (19.2)	33 (33.3)	35 (35.4)	12 (12.1)
Urban	87(100)	23 (24.4)	25 (28.7)	26 (29.9)	13 (14.9)	82(100)	19 (23.2)	29 (35.4)	26 (31.7)	8(9.8)
Total	215 (100)	56(26.0)	64(29.8)	71(33.0)	24(11.2)	181 (100)	38(21.0)	62(34.3)	61(33.7)	20(11.0)
Gender										
Male	163(100)	41(25.2)	48(29.4)	56(34.4)	18(11.0)	137(100)	27(19.7)	42(30.7)	53(38.7)	15(10.9)
Female	52(100)	15(28.8)	16(30.8)	15(28.8)	6(11.5)	44(100)	11(25.0)	20(45.5)	8(18.2)	5(11.4)
Total	215 (100)	56(26.0)	64(29.8)	71(33.0)	24(11.2)	181 (100)	38(21.0)	62(34.3)	61(33.7)	20(11.0)
Household size										
0-3	24(100)	6(25.0)	1(4.2)	9(37.5)	8(33.3)	33(100)	8(24.2)	14(42.4)	10(30.3)	1(3.0)
4-7	135(100)	35(25.9)	45(33.3)	43(31.9)	12(8.9)	113(100)	25(22.1)	31(27.4)	42(37.2)	15(13.3)
8-11	51(100)	15(29.4)	18(35.3)	15(29.4)	3(5.9)	35(100)	5(14.3)	17(48.6)	9(25.7)	4(11.4)
≥12	5(100)	0(0.0)	0(0.0)	4(80.0)	1(20.0)	0(100)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Total	215 (100)	56(26.0)	64(29.8)	71(33.0)	24(11.2)	181 (100)	38(21.0)	62(34.3)	61(33.7)	20(11.0)
Marital status										
Married	201(100)	51(25.4)	60(29.9)	68(33.8)	22(10.9)	169(100)	37(21.9)	55(32.5)	58(34.3)	19(11.2)
Single	14(100)	5(35.7)	4(28.6)	3(21.4)	2(14.3)	12(100)	1(8.3)	7(58.3)	3(25.0)	1(8.3)
Total	215 (100)	56(26.0)	64(29.8)	71(33.0)	24(11.2)	181 (100)	38(21.0)	62(34.3)	61(33.7)	20(11.0)
			Socioeconomic characteristics					Socio-economic characteristics		
Employment status										
Govt/private employed	58(100)	17(19.1)	25(28.1)	38(42.7)	9(10.1)	49(100)	11(22.4)	17(34.7)	18(36.7)	3(6.1)
Self-employed	68(100)	14(24.1)	17(29.3)	17(29.3)	10(17.2)	56(100)	15(26.8)	14(25.0)	19(33.9)	8(14.3)
No employment	89(100)	25(36.8)	22(32.4)	16(23.5)	5(7.4)	76(100)	12(15.8)	31(40.8)	24(31.6)	9(11.8)
Total	215 (100)	56(26.0)	64(29.8)	71(33.0)	24(11.2)	181 (100)	38(21.0)	62(34.3)	61(33.7)	20(11.0)
Participation in agriculture										
Participate	126(100)	35(27.8)	39(31.0)	40(31.7)	12(9.5)	92(100)	24(26.1)	31(33.7)	27(29.3)	10(10.9)
Do not participate	89(100)	21(23.6)	25(28.1)	31(34.8)	12(13.5)	89(100)	14(15.7)	31(34.8)	34(38.2)	10(11.2)
Total	215 (100)	56(26.0)	64(29.8)	71(33.0)	24(11.2)	181 (100)	38(21.0)	62(34.3)	61(33.7)	20(11.0)

Values in parentheses are in percentages, HFS is household food security, and the single includes the unmarried, divorced and those that have separated
FS = Food Secure, FIWH = Food Insecure Without Hunger, FIWMH = Food Insecure With Moderate Hunger, FIWSH = Food Insecure With Severe Hunger

Table 9: Comparative Analysis of Households Food Security Status by Some Selected Demographic and Socioeconomic Characteristics based on 8 Children –Referenced HFS Items (Kogi versus Kwara)

Characteristics	Food Security Status (Kogi State) Sample size	FS	FIWH	FIWMH	Food Security Status (Kwara State) Sample size	FS	FIWH	FIWMH
	Demographic characteristics				**Demographic characteristics**			
Location								
Rural	128(100)	52(40.6)	45(35.2)	31(24.2)	99(100)	32(32.3)	46(46.5)	21(21.2)
Urban	87(100)	26(29.9)	30(34.5)	31(35.6)	82(100)	38(46.3)	27(32.9)	17(20.7)
Total	**215 (100)**	**78(36.3)**	**75(34.5)**	**62(28.8)**	**181(100)**	**70(38.7)**	**73(40.3)**	**38(21.0)**
Gender								
Male	163(100)	59(36.2)	55(33.7)	49(30.1)	137(100)	50(36.5)	58(42.3)	29(21.2)
Female	52(100)	19(36.5)	20(38.5)	13(25.0)	44(100)	20(45.5)	15(34.1)	9(20.5)
Total	**215 (100)**	**78(36.3)**	**75(34.5)**	**62(28.8)**	**181(100)**	**70(38.7)**	**73(40.3)**	**38(21.0)**
Household size								
0-3	24(100)	5(20.8)	9(37.5)	10(41.7)	33(100)	19(27.6)	8(24.2)	6(18.2)
4-7	135(100)	49(36.3)	52(38.5)	34(25.2)	113(100)	42(37.2)	49(43.4)	22(19.5)
8-11	51(100)	23(45.0)	14(27.5)	14(27.5)	35(100)	9(25.7)	16(45.7)	10(28.6)
≥12	5(100)	1(20.0)	0(0.0)	4(80.0)	0(0)	0(0.0)	0(0.0)	0(0.0)
Total	**215 (100)**	**78(36.3)**	**75(34.5)**	**62(28.8)**	**181(100)**	**70(38.7)**	**73(40.3)**	**38(21.0)**
Marital status								
Married	201(100)	73(36.3)	69(34.3)	59(29.4)	169(100)	65(38.5)	69(40.8)	35(20.7)
Single	14(100)	5(35.7)	6(42.9)	3(21.1)	12(100)	5(41.7)	4(33.3)	3(25.0)
Total	**215 (100)**	**78(36.3)**	**75(34.5)**	**62(28.8)**	**181(100)**	**70(38.7)**	**73(40.3)**	**38(21.0)**
	Socioeconomic characteristics				**Socioeconomic characteristics**			
Employment status								
Govt/private employed	58(100)	22(37.9)	16(27.6)	20(34.5)	49(100)	26(34.2)	35(46.1)	15(19.7)
Self-employed	68(100)	27(39.7)	25(36.8)	16(23.5)	56(100)	22(44.9)	18(36.7)	9(18.4)
No employment	89(100)	29(32.6)	34(38.2)	26(29.2)	76(100)	22(39.3)	20(34.7)	14(25.0)
Total	**215 (100)**	**78(36.3)**	**75(34.5)**	**62(28.8)**	**181(100)**	**70(38.7)**	**73(40.3)**	**38(21.0)**
Participation in agriculture								
Participate	126(100)	52(41.3)	42(33.3)	32(25.4)	92(100)	43(46.7)	34(37.0)	15(16.3)
Do not participate	89(100)	26(29.2)	33(37.1)	30(33.7)	89(100)	27(30.3)	39(43.8)	23(25.9)
Total	**215 (100)**	**78(36.3)**	**75(34.5)**	**62(28.8)**	**181(100)**	**70(38.7)**	**73(40.3)**	**38(21.0)**

Values in parentheses are in percentages, HFS is household food security, and the single includes the unmarried, divorced and those that have separated.FS = Food Secure, FIWH = Food Insecure Without Hunger, FIWMH = Food Insecure With Moderate Hunger.

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