

**REPORT ON MAPPING LIVELIHOODS AND NUTRITION IN NIGERIA
USING DATA FROM THE NATIONAL RURAL LIVELIHOODS SURVEY
AND THE NATIONAL FOOD CONSUMPTION AND NUTRITION SURVEY**

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Abstract

Poverty and malnutrition are persistent problems in Africa. Alleviation of these closely-related socio-economic problems must be guided by knowledge of their spatial distribution and relationships to biophysical and development factors. Two country-wide surveys, one on rural livelihoods, poverty and food demand, and the other on food consumption and child nutrition, were carried out in Nigeria by IITA, and the results mapped in order to assist interpretation. The lack of reliable recent census statistics in Nigeria complicates the process of mapping socio-economic variables. The Small Area Estimation technique has been adapted for regression of poverty and nutrition indicators against biophysical and socio-economic variables such as rainfall, soil fertility and travel time to markets and applied to groups of Nigerian States. Where no significant correlation was observed, values were interpolated geostatistically. Preliminary maps of poverty and nutrition are presented, and relationships of these indices to each other and to biophysical and socioeconomic factors is discussed.

Introduction

The FAO Status of Food Insecurity (SOFI) 2000 report (FAO, 2000) revealed a dramatic reduction in undernourishment levels in Nigeria, from 44% of the population in '79-'81, to 16% in '90-'92 down to 8% in '96-'98. This development was largely attributed to efforts such as IITA's breeding and multiplication programmes with specific reference to staple foods such as cassava. The success of these programmes can further be attributed to their affecting policy measures and government investment in distribution of planting material and post-harvest equipment. Nevertheless, due to the size of its population, 25% of all undernourished West-Africans still live in Nigeria.

Despite these reductions in undernourishment, Nigeria has been far less successful in combating its high level of malnutrition, although the Rome Declaration on Food Security (1996) states the need for "adequate access to safe and nutritious food". IFPRI (2001) warns that "unless more aggressive measures are taken, progress against child malnutrition is likely to slow down", yet malnutrition levels in Nigeria have not changed over the past decade. In fact, anthropomorphic studies reported in SOFI (1999) put Nigeria amongst the 10 countries with the highest incidence of underweight, stunted and wasted children under 5 years and show an under-five mortality rate of 191 per 1000 births (1995 figures).

Planning and effective implementation of targeted programs at national, state and even community levels are required to further reduce the current level of undernourishment among children and the population and to improve their nutritional status simultaneously. Unfortunately, little data exist on malnutrition levels of various age groups, particularly for children between 5-11 years of age. According to the National Population Census of 1991 (most current data) about 35% of the population are within this age group. Nutrition programmes targeted to this age group can have far reaching impact on the total population within the targeted period. A sustained programme will only be feasible if it is based on adequate information. For instance, a preliminary study by Kormawa *et al.* (2001)

showed that without knowledge of dietary requirements, urban poor in Nigeria are not likely to take advantage of the nutritional opportunities that the diverse markets in major cities offer.

Poverty is a root cause of undernourishment and malnutrition. In particular, previous studies have identified the following as key determinants of child malnutrition: *per capita* national incomes, women's education, variables related to health services, healthy environment and *per capita* national food availability (Smith and Haddad 2000). Cross-country studies, usually based on aggregated household level data, are used in arriving at these determining factors. Though these capture broad and regional trends they are mostly not appropriate for formulating sub-national level policies and programs. For Nigeria in particular, poverty indicators have steadily worsened since 1986 (FOS 1999). Agriculture and related jobs provide employment for almost 60% of the population, primarily for the rural population. Poverty and performance of the agricultural sector are closely related in Nigeria (D'Situa 1994). Targeting the rural poor is therefore pivotal to fulfil the objectives set by the World Food Summit 1996, to "reduce undernourishment to half the present level by 2015, to eradicate hunger and to achieve food security".

Regrettably, the Nigerian situation is comparable to several other Sub-Saharan countries, as food security and poverty reduction in the region is largely constrained by inappropriate policies and strategies that impact negatively on the rural sector. Consequently, the level of rural poverty is increasing at an alarming rate. In West Africa in particular, the majority of the poor live in the rural areas with more than 60% of them depending directly on agriculture for employment and subsistence, compared to 54% for Nigeria (CIA 2000). Over the past 15 years, *per capita* real agricultural GDP has declined sharply in almost all West African countries.

A major challenge for targeting the rural poor lies in the spatial complexity of the problem. Rural poverty is a function of, for example, restricted access to suitable land, labour or financial resources, market access for agricultural input/output. Each of these parameters has a spatial dimension which can be exploited for building our understanding of possible moderators for improving rural livelihoods at different aggregation levels. Unfortunately, Nigeria can be described as a data-scarce environment, which makes scaling-up or scaling out (following Harrington 1997) of household or village-level surveys difficult and not in all cases justified.

In order to contribute further to the reduction of world food insecurity, rapid implementation of local and national government policies that target the reduction of child malnutrition are required. However, these should be based on empirical data gathered from household, village, state and national level in order to link the spatial and temporal dimension of poverty with child malnutrition. At each of these levels, there are key drivers that need to be targeted for reducing poverty and malnutrition. Such data are presently not available in Nigeria, or where available, they are in formats that can not be used for effective policy and program planning.

Objectives

This research programme, partially reported in this paper, sets out to identify and parameterise key factors and socio-economic / policy drivers that affect poverty, malnutrition and undernourishment levels in Nigeria. Data collection for this research has taken place through household surveys nested within village, local government, regional and state aggregation levels. This information is supplemented by representative anthropometric studies and analysis of blood samples. The objectives of this study are outlined as follows:

- (1) Characterise the livelihoods and food security status of the rural poor on a household level. Parameters that are measured include the recommended core indicators for monitoring food security outcomes of FAO's committee on world food security, which are linked with poverty characteristics that are being collected. The datasets have been collected by an IITA core-funded study into rural livelihoods and food demand structures in Nigeria and by a food consumption and nutrition survey funded through USAID and FAO.
- (2) Collect and generate spatial information on key poverty-affecting parameters and processes. Georeferencing of villages, plus collection of additional data on infrastructure, was undertaken after the initial household surveys.
- (3) Analysis of datasets. Spatial attributes such as land cover, climate and distance to towns, markets and amenities have been incorporated in the statistical analyses of the datasets, and a series of variables indicative of poverty levels, development and nutrition have been mapped. The results of this part of the study are the main subject of this paper.
- (4) Through the combination of the (point-scale) household survey data and multi-disciplinary

spatial information sources, identify external constraints to adequate nutrition levels. These external "factors" that affect rural livelihoods and malnutrition include, amongst others, sources for balanced nutrition, access to input/output markets, land quality/natural resources and presence of agricultural extension/institutional development organisations (farmer groups, NGO's, agricultural extension, commercial advisors). This, the next phase of the study, will draw heavily on the correlations discovered during the mapping phase of the project.

The output of this research will be developed in close contact with the target audience through ongoing IITA projects such as the Rural Sector Enhancement Project (RUSEP), which links state and national government institutions and NGO's to shape a coherent agricultural development policy. The target audience has been identified as policy makers and other key players at national and sub-national levels. In this set-up, the results can play a practical role in ongoing policy-making at the national and state levels within the project timeframe and thus can make a contribution to reaching the 2015 deadline of the Rome Declaration before changes in social, economical and political conditions overtake the research findings and project design.

Data Collection

A) Rural Livelihoods, Poverty and Food Demand

Objectives

- To develop a novel poverty index and use the index to characterize rural poverty levels by livelihood category.
- To examine and quantify the relationship between poverty levels and rural livelihoods in Nigeria.
- To determine the food demand and consumption patterns by poverty and livelihood patterns.
- To determine optimal household production system that will take the farming households out of poverty
- To suggest policy relevant recommendations for reducing poverty and hunger at the household level

Table 1. Parameters Collected, Rural Livelihoods Survey

Category	Parameters	
Village Level		
Education	Primary School	Secondary school
Health	Hospital / Clinic	Tap / Well Water
Other	Electricity	
Enterprise	Formal credit	Pesticide & Herbicide
	Fertilizer	Improved Seed
	Extension	Veterinary Doctor
Household Level		
Composition, Description	Size of HH	Wealth possessions
	Age distribution	
Income	Enterprises	Farm revenues
	Remittances	Livestock revenues
		Tree crop revenues
Expenditure: Food consumption	Per crop	
	Purchased / non-purchased	
Expenditure: Non-food	Staple / non-staple	
	<i>e.g.</i> fuel, soap, tobacco etc., clothing, equipment, maintenance, taxes	
Expenditure: Farm	Seeds	Equipment
	Inputs	Maintenance
Individual Level		
For HH head + spouses	Years in education	

Sampling method

A multi-stage stratified random sampling procedure was used in selecting the sample for this study.

State and ADP Selection

First, the country was divided into three zones, northern, middle and southern Nigeria. In each of the zones, 3 states were randomly selected. Each state is divided up into Agricultural Development Project (ADP) zones, typically 3-5 per state. Each of these zones was sampled proportional to the number of Local Government Areas (LGA) within a zone.

Local Government Area Selection

The number of LGAs selected from each ADP zone was proportional to the size of the zone. The proportionality factor is stated as follows:

$$S_z = \frac{n}{N} * 10 \tag{1}$$

where

- S_z = the number of LGAs sampled from a zone
- n = the number of LGAs in a zone
- N = the number of LGAs in all the zones in the state selected.

10 is the desired number of LGAs from each state selected for the survey, except for Abuja State where all the LGAs (6) were sampled.

Village Selection

The third stage involved using a list of villages for each of the selected LGAs, provided by the state ADP, to make a random selection of 10 villages.

Household Selection

An IITA research team joined the enumerators with the assistance of their supervisors and carried out the following steps:

- (i) House listing in the selected village by using chalk to number the houses.
- (ii) Household listing in each of the listed houses with the addresses of each household to facilitate recall.
- (iii) Random selection of households from the list of households.

The sampling strategy focussed on covering a large number of villages and, as a consequence, a reduced number of respondents per village. While this would reduce the representativity of the households for each village, the increased spatial distribution would improve the estimate at the LGA aggregation level. Between 350 and 400 household questionnaires were expected to be administered per state. These questionnaires were distributed according to a proportionality factor, based on the population of each LGA.

$$S_l = \frac{p}{P} * 400 \tag{2}$$

Where

- S_l = number of questionnaires per LGA
- p = the population of a LGA selected,
- P = the total population of all the selected LGAs,

Thus, the number of households S_v per village was

$$S_v = \frac{S}{v} \tag{3}$$

Where

- v = number of villages selected from a given LGA.

A total of 4400 households were sampled in 748 villages, representing 83 LGAs in 8 states. Preliminary data analysis indicated that coverage of some areas of Nigeria was still insufficient, and sampling of an additional four states using the same sampling techniques was carried out during 2004.

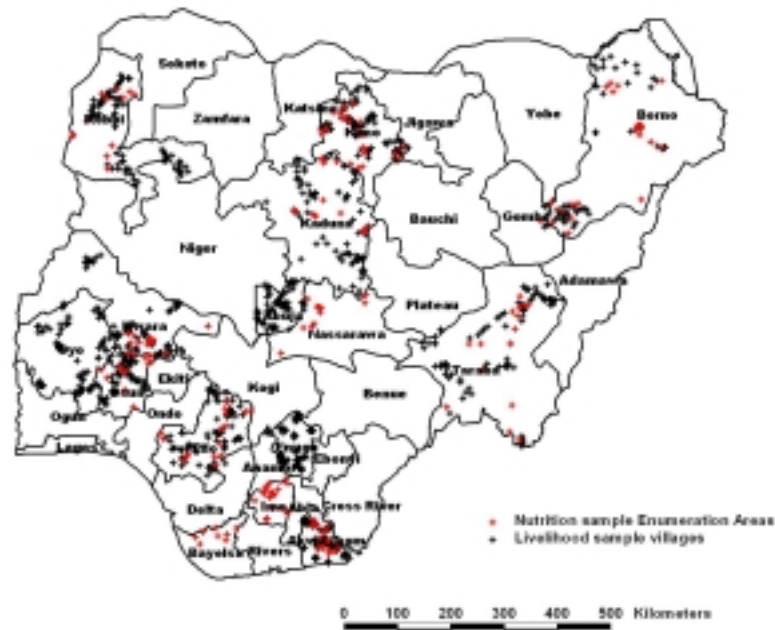


Figure 1. Sample Locations for Rural Livelihoods and Food Consumption and Nutrition Survey

B) Food Consumption and Nutrition Survey (FCNS)

The Food Consumption and Nutrition Survey 2001 (FCNS) is a national survey from which data on the nature and extent of food security, food and nutrient intakes, and anthropometric and biochemical parameters were collected and used to determine the nutritional status of women and children in rural and urban populations in Nigeria. The survey design targeted the entire federation of Nigeria. Considering the obvious and documented relationships between (a) the agroecological zone and type of farming systems; (b) crops grown and foods consumed; and (c) type of food consumed (intake) and micronutrient deficiencies, the federation of Nigeria was initially stratified according to major agroecological zones and predominant food crops within agroecological zones.

Survey design and sampling

A stratified multi-stage procedure, with stratification at 2 levels [agroecological zone * Principal Food Crops] was used. Twelve States, representing a third of the total states of the federation were randomly selected. A total of 72 Local Government Areas (LGAs), 216 Enumeration Areas (EAs) and 30 households from each EA were selected from the selected states, making a total of 6,480 households. A sub-sample of 1080 pregnant women was also included.

Survey tools and manuals

The main data collection instrument (questionnaire) had several sections: questionnaire identification, household/demographic information, socio-economic characteristics of households, food security (food availability and affordability, food consumed away from home, and food-related coping strategies), 24-hr dietary recall, health and care, anthropometry, and biochemical measurements. The following manuals were developed : Survey Design and Operations Manual, Interviewers Manual, Food Instruction Booklet and other survey supporting documents.

The procedures for data collection involved

- Visits to community leaders to introduce the survey
- Mobilization of communities in support of the survey
- Numbering and listing of households and use of maps and local guides to locate sampled households and verify that they meet the selection criteria
- Administering the household questionnaire to all selected households

- Conducting the 24-hour dietary recall with the selected household
- Collecting biochemical samples from mothers and their children under-5 participating in the 24-hour dietary recall
- Conducting the 24-hour recall and collecting biochemical samples from a sub-sample of pregnant women
- Conducting focus group discussions
- Collecting food and salt samples

Table 2. Data sets processed for analysis

Variable	Children under-5	Mothers	Pregnant women
Household questionnaire	N/A	5325	960
Anthropometry	5028	N/A	N/A
Vitamin A	3027	3148	684
Vitamin E	3027	3148	684
Iron	3091	3949	829
Zinc	2725	3779	795
Iodine	2428	3104	660
Body Mass Index	N/A	5031	N/A

A critical component of the FCNS is the food intake portion of the 24-hour dietary recall questionnaire. Respondents were asked to recall what they ate the day before the interview. A guidebook called the Food Instruction Booklet (FIB) was used to aid interviewers in obtaining detailed information on the types of food eaten and the quantity.

The research team in each state consisted of a state supervisor, 4 interview teams with 2 interviewers per team. One pair of the interview teams were the medical laboratory technologists, who were responsible for biological sample (blood and urine) collection and processing. Data collection took place between August and October 2001. All samples were analysed at the Medical Research Council, Tygerberg, Capetown, South Africa.

Only the micronutrient data (Vitamins A and E, Iron, Zinc and Iodine) has so far been made available by the Nutrition research team for mapping. Results for anthropometry and the household questionnaire, especially relationships between malnutrition and diet, will be processed later.

Mapping the Data

Mapping poverty and malnutrition is largely a problem of extrapolation from point data sets based on stratified random sampling to large unsampled areas (Henninger, 1998; Ravallon, 1996). The sampling techniques for the rural livelihoods and child nutrition surveys were different, although the areas covered were similar. Two very different approaches can be used for extrapolation. In the regression technique, exemplified by the Small Area Estimation technique pioneered by the World Bank (Elbers, Lanjouw and Lanjouw, 2002; Elbers et al 2003), a composite regression equation is developed between the variable to be mapped, either an indicator of poverty or development or a measurement of nutrition, measured at sample sites scattered through the study area, and demographic or other socio-economic variables measured, usually in a national census, in all villages or administrative units of the study area. Because of the lack in Nigeria of reliable census data, biophysical variables such as rainfall, soil fertility and vegetation cover and socio-economic variables such as travel times to population centres must be used as proxies for census data. The geostatistical technique is totally different. The variable to be mapped is considered as a regionalised variable (Matheron, 1963), its distribution pattern is analysed, and extrapolation is performed on the basis of the observed distribution, a process known as kriging (Matheron, 1969; Journel and Huijbrechts, 1978).

Indicators of poverty, development and nutrition are mapped at the level of Local Government Areas, the smallest administrative areas for which accurate boundary maps exist in Nigeria. As described above, Rural livelihoods were sampled at the household level, with an average of eight households

sampled per village, and ten villages per LGA. Nutrition was sampled through an average of 20 children from different households in each of three enumeration areas (generally larger than a village) per LGA. When using the small area estimation technique, data was first converted from the household and community level to the LGA level. From the household to the village is a matter of simple arithmetic, since households were selected so as to be representative of the village. Since villages are randomly selected by name from each LGA sampled, their spatial distribution can often be clustered. A test was made using geostatistics to derive spatially adjusted means for LGAs from village data, but it was found that differences between LGA values estimated this way and those derived by simple arithmetic means never differed by more than 5%, and the computationally simple arithmetic mean was used.

A total of eight “independent” variables were used for regression. These were selected on the basis of being available in digital form, and of being fairly objectively derived as well as, hopefully, showing correlation with the socio-economic dependent variables. The variables and their sources are listed in Table 3.

Table 3. Spatial Variables used for Mapping

Variable	Source
Tree Cover %	MODIS 500 metre 2002 vegetation map of the world. University of Maryland 2003
Grass Cover %	
Bare Soil %	
Annual Rainfall	CRU, University of East Anglia
Soil Fertility	FCC Index from FAO Digital Soil Map of World
Population Density	Nigeria Government Census 1992
Number of Households	Data from IITA survey
Travel times to markets	Digitised road network, land cover and settlements

The first three variables are not independent, but are highly correlated in that the sum of all three is, by definition, 100%. In any given district, however, two of the three, for example trees and grass, may be inversely correlated, while the third, soil, shows little or no correlation with either of the other two. Population density is the least “objective” of the variables, based as it is on the 1992 census and subject to serious local distortions. Travel times to markets were calculated for three different sizes of towns; Cities >200,000 people; large towns 50,000-200,000; small towns 20,000-50,000.

Table 4. Zones for Extrapolation

Zone	Sampled States Livelihoods	Sampled States Nutrition	Un-Sampled States
Eastern States	Akwa Ibom, Edo, Enugu	Akwa Ibom, Bayelsa, Edo, Imo	Abia, Anambra, Bayelsa, Cross River, Delta, Ebonyi, Enugu, Imo, Rivers
Kaduna / Nassarawa	Abuja, Kaduna	Kaduna, Nassarawa	Abuja, Nassarawa
Kano / Kebbi	Kano, Kebbi	Kano, Kebbi	Jigawa, Katsina, Sokoto, Zamfara
Kwara / Osun	Kwara, Osun, Oyo	Kwara, Osun	Ekiti, Kogi, Lagos, Ogun, Ondo, Oyo
Taraba / Borno	Borno Taraba	Borno Taraba	Adamawa, Bauchi, Benue, Gombe, Yobe

Raster maps, or grids, were prepared for each of these seven factors for the whole of Nigeria at a resolution of 500 metres. A vector map of LGA boundaries was then used to extract the mean value for each variable for every LGA. For purposes of extrapolation, Nigeria was divided into five zones comprising states with similar agro-ecologies and development status adjacent to states where sampling had been undertaken for the rural livelihood and nutrition surveys. These are listed in Table 4. For each zone, Small Area Estimation using the Poverty and Inequality Mapper Module for SAS (Demombynes,

2002; SAS 2004) started with calculation of regression coefficients between dependent variables (livelihood, nutrition and development indicators) and independent variables (biophysical and socio-economic factors) in the sampled LGAs. If significant correlations were identified, regression equations were then developed and applied to extrapolate dependent variables to the remainder of each zone. The significantly correlated independent variables used in the estimation of Poverty Index, Child Vitamin A and Child Iodine are listed in Table 5.

Where no significant correlations between dependent and independent variables were identified in SAE, values extrapolated by Universal Kriging were used. The Geostatistical Analyst extension of ESRI's ArcGIS9 software (ESRI 2004) was used to derive exponential semi-variograms from village point data, and to analyse anisotropy in the distribution. Universal Kriging was then used to extrapolate values based on the calculated regionalised variables.

The poverty indicator used in this example was mean Daily Household Income in Nigerian Naira, calculated from farm income and production, off-farm and other incomes derived from the household survey. For the purposes of producing the map in Figure 2, values were classified into Very Poor (<N100 pd or US\$0.70); Poor (N100-N150 pd or US\$0.7-1.2); Lower Middle (N150-N250 pd or US\$1.2-1.9); Upper Middle (N250-N500 pd or US\$1.9-3.8) and Relatively Rich (>N500 pd or >US\$3.8).

Table 5. Examples of Significant Correlations from Small Area Estimation

Dependent Variables	Significant Independent Variables				
	<i>Eastern States</i>	<i>Kaduna/nasarawa</i>	<i>Kano/Kebbi</i>	<i>Kwara/Osun</i>	<i>Taraba/Borno</i>
<i>Child Iodine</i>	none	Travel Time Town Travel time large Town Travel Time City Number of Households	Soil Fertility Indicator Y coordinate	Annual Rainfall % grass cover Y coordinate Travel Time City	X coordinate
<i>Child Vitamin A</i>	Y coordinate X coordinate Annual Rainfall % soil cover Travel Time Town % tree cover	Annual Rainfall	Annual Rainfall Travel Time Town	Number of Households % grass cover	Travel Time City Total Population Y coordinate
<i>Household Livelihood</i>	% soil cover	None	% tree cover % soil cover Total Population Annual Rainfall	X coordinate	X coordinate Travel Time City

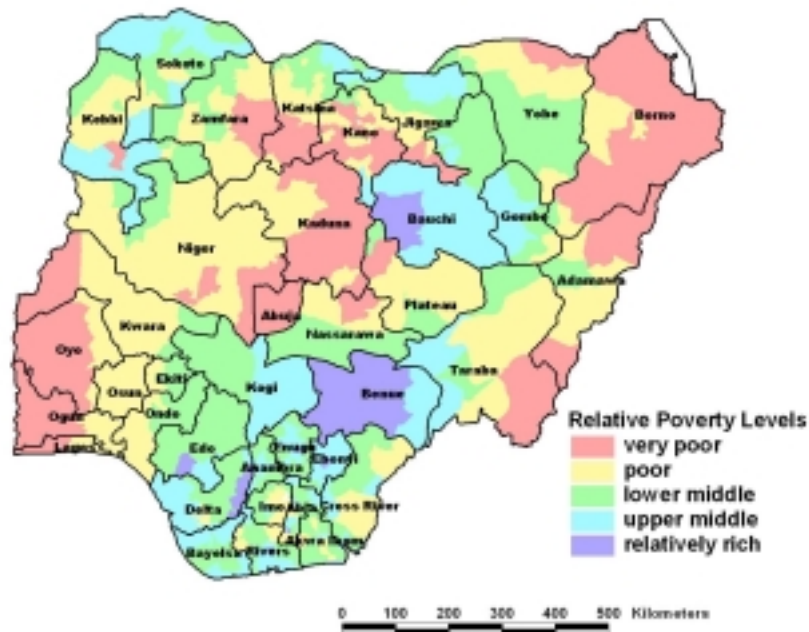


Figure 2. Map of Relative Poverty Levels, based on Household Incomes

Micronutrients were extrapolated as actual values, but can best be visualised in terms of deficiency levels. For serum retinol (Vitamin A), the threshold for marginal deficiency is considered to be at 20 micrograms per decilitre (WHO, 1996), while levels below 10 micrograms per decilitre indicate clinical deficiency. For urinary Iodine, the cut-off for mild deficiency is 100 mcd/lit (ICCIDD.WHO.UNICEF, 2001), moderate deficiency 50 mcd/l and severe deficiency less than 20 mcd/l. These values were used to recalculate raw values to the deficiency indicators used in Figure 3.

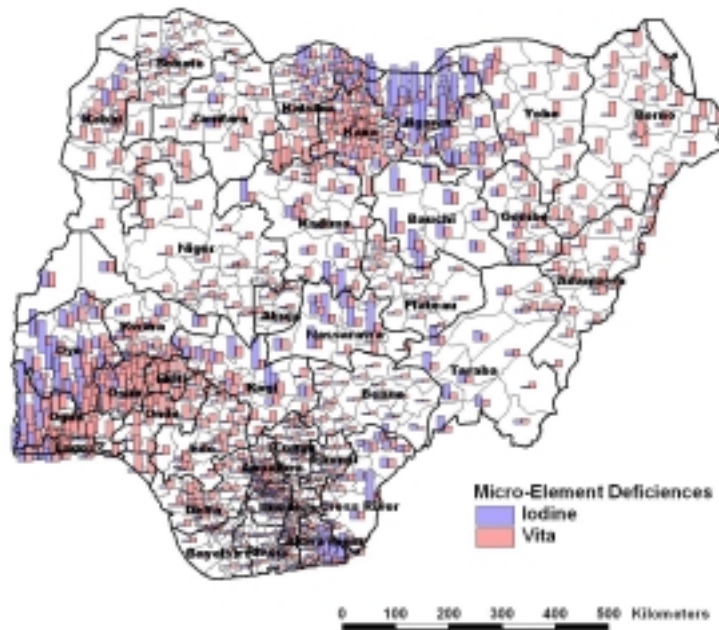


Figure 3. Map of Deficiencies in Two Micro-Nutrients in Children

Results

Livelihoods. The map of estimated relative poverty levels (Figure 2) highlights three major areas of serious poverty in Nigeria. The first is in south-west Nigeria, on the borders with the Benin Republic, in the western portions of Lagos, Ogun, Oyo and Kwara States. The second is in the north-central portion of the country, extending from eastern Niger State, through Abuja and eastern Kaduna to parts of Katsina, Kano and Zamfara States. The third is in the far north-east, occupying most of Borno state and parts of Adamawa and Taraba. The richest areas in Nigeria appear to be in the western parts of Benue and Bauchi States, with some isolated LGAs in Edo and Delta states.

Nutrition. Only micronutrient data have so far been mapped, and examples of two micronutrients are presented as examples. Iodine deficiency is most prevalent in the south-west, in Lagos, Ogun and Oyo states, in the centre, in parts of Kogi, Nassarawa, Kaduna, Bauchi and Plateau states, and in the far north, in Jigawa and Katsina states. There is another pocket of deficiency in the Niger Delta area, mainly in Akwa Ibom. Vitamin A deficiency is often not co-located with iodine deficiency, and is most prevalent in Ogun, Osun, Ekiti and Ondo states in the south-west, Kano and Katsina states in the north, and Borno, Gombe, Yobe and Adamawa states in the north-east.

Table 6. R2 Correlation Coefficients between Nutrition, Poverty and Development Indicators

	Iodine	Vitamin A	Livelihood	Primary School	Secondary School	Health Centre	Public Toilet	Electricity	Tap Water	Well Water
Iodine	0									
Vitamin A	-0.007	0								
Livelihood	0.0116	-0.216	0							
Primary School	0.0065	0.0253	0	0						
Secondary School	0.0085	0.0325	-0.0996	0.2001	0					
Health Centre	0.0763	-0.029	0	0.1835	0.5176	0				
Public Toilet	-0.0033	-0.001	0.0061	0.0023	0.0026	0.041	0			
Electricity	0.0258	0.0221	-0.0562	-0.0029	0.0115	0.0237	-0.006	0		
Tap Water	0.0054	0.0185	-0.1541	0.1662	0.2803	0.3178	0.0045	0.0643	0	
Well Water	0	0.008	-0.0052	-0.0954	0.0087	-0.004	0	0.0884	-0.016	0

Correlations between Livelihood, Nutrition and Development Indicators. Table 6 shows a matrix of correlation coefficients between nutrition, livelihood and development indicators. As might be expected, the internal correlations between different indicators of development (distances to schools, health centres, tap water) are very strong, although distances to the electricity grid and public toilets show poor correlation with the other indicators. Livelihoods correlate poorly with other indicators, except for a strong negative correlation with vitamin A deficiency (see also Figure 4) and a less strong correlation with distance to tap water. The nutrition indicators show generally poor correlation with other indicators, iodine deficiency showing only very weak correlations with livelihoods (positive) and with distance to electricity, while Vitamin A shows a strong negative correlation with Livelihoods, and weak correlations with most of the development indicators.

Drivers of Poverty and Malnutrition. The use of Small Area Estimation to extrapolate Livelihood, Nutrition and development indicators based on regression against biophysical and socio-economic factors relies on correlation between these dependent and independent variables, and thus provides an indication of some of the factors controlling the indicators. The correlations vary from zone to zone, as shown in Table 5. Some common factors emerge, however.

Household livelihoods are strongly correlated with percentage bare soil (as observed by MODIS) in the Eastern States and in the Kano/Kebbi zone. The X-coordinate (relative position east or west) is important in the Kwara/Osun zone and in the Taraba/Borno zone. Travel time to city markets is important in the Taraba/Borno zone, and tree-cover, total population and annual rainfall in the Kano/Kebbi zone. The percentage of bare soil can indicate both the area of land cleared for cultivation

and the severity of soil erosion in the zone, and both of these could have connections with livelihood and poverty. The correlation with east-west location is unexpected, since most obvious gradients in Nigeria (rainfall and vegetation especially) are north-south.

Vitamin A levels correlate with annual rainfall in three of the five zones, with travel time to town markets in two zones, and with the Y-coordinate in two zones. Annual rainfall has a major effect on preferred agricultural systems, and on crop yields, so it is unsurprising that a nutrition indicator is correlated with it, while rainfall change is mainly in a north-south direction, the direction of greatest rainfall gradient in most of the country.

In the case of iodine levels, the only common factor linking more than one zone is travel time to city markets, which is important in two zones. Apart from this, different independent variables are important in each zone.

Much more work, especially on farming systems and diet, is required before drivers of poverty and malnutrition can be more closely defined.

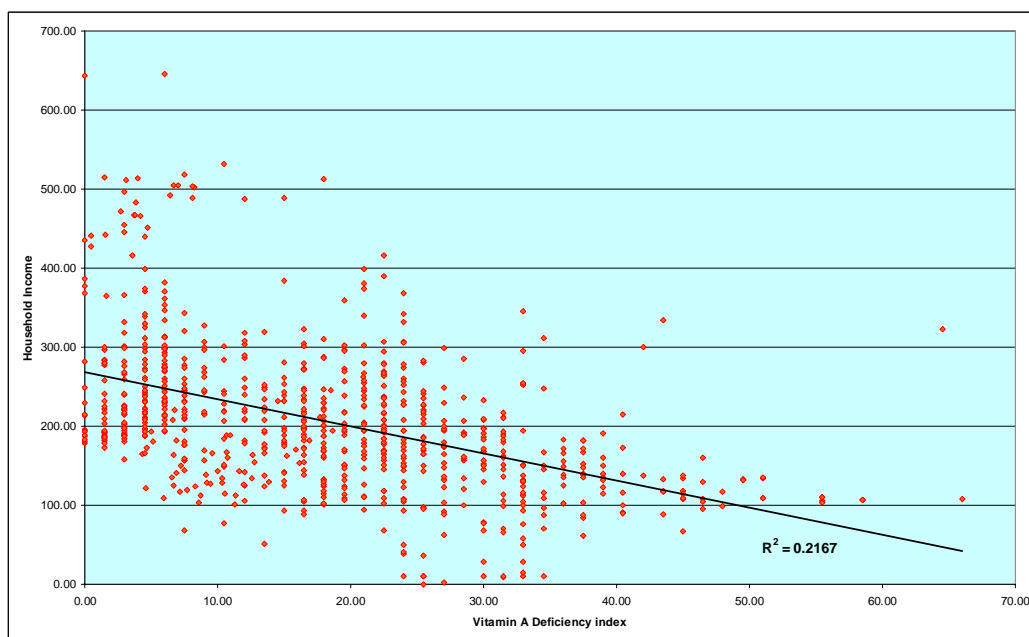


Figure 4. Correlation between Household Income and Child Vitamin A Deficiency

Conclusions

This initial study of the spatial distribution of poverty, malnutrition and development indicators in Nigeria has shown that it is possible to map these types of socio-economic indicators, even in the absence of reliable census data. Broad trends of variability can be identified, and spatial zonation of indicators revealed, although statistical estimates of the reliability of the extrapolation cannot be made.

Severe rural poverty appears to be found in the south-west of Nigeria, in the north-centre, and in the extreme north-east. Iodine deficiency in children is most common in the south-west, centre, and extreme north. Vitamin A deficiency in children is prevalent in the south-west and north-east.

Correlations between livelihoods and iodine deficiency are weak or absent, while vitamin A deficiency shows a strong negative correlation with livelihoods. This suggests that vitamin A levels might depend more on general nutritional standards related to incomes, while iodine is more related to regional differences in dietary habits.

Development indicators such as distances to schools, health centres and piped water are strongly correlated with each other, although distance to mains electricity is less correlated with the other indicators, and distance to public toilets shows no correlation with any other variable.

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Appendix 1. Example data collected on Development Indicators

Parameter	Inua- Eyetikot	Iwuo Achang	Iwuo Okpom	Mkpanak
vf1a__Presence of primary school	0	0	1	1
vf2a__Presence of secondary school	1	0	0	1
vf3a__Presence of hospital/clinic	0	0	0	0
vf4a__Presence of public toilet	0	0	0	0
vf5a__Presence of electricity	0	0	0	0
vf6a__Presence of water (tap)	0	0	0	0
vf7a__Presence of water (wells)	0	0	0	0
vf1b__Distance to nearest primary school	2	4		
vf2b__Distance to nearest secondary school		16	10	
vf3b__Distance to nearest hospital/clinic	8	16	6	10
vf4b__Distance to nearest public toilet	8	16	6	10
vf5b__Distance to nearest electricity	8	16	6	10
vf6b__Distance to nearest water (tap)	8	16	6	10
vf7b__Distance to nearest water (wells)	8	17	12	10
vf1c__Cost to go to primary school (N)	20	40		
vf2c__Cost to go to secondary school (N)		80	80	
vf3c__Cost to go to hospital/clinic (N)	100	80	50	150
vf4c__Cost to go to public toilet (N)	100	80	50	150
vf5c__Cost to go to electricity (N)	100	80	50	150
vf6c__Cost to go to water (tap) (N)	100	80	50	150
vf7c__Cost to go to water (wells) (N)	100	100	100	150
vv1a__Presence of formal credit/microcredit/bank	1	1	0	1
vv2a__Presence of fertilizer dealer	0	0	0	0
vv3a__Presence of pesticide/herbicide dealer	0	0	0	0
vv4a__Presence of improved seed	0	0	0	0
vv5a__Presence of extension agent	0	0	1	0
vv6a__Presence of veterinary clinic/Doctor	0	0	0	0
vv7a__Presence of other village institutions	0	0	0	0
vv1b__Distance to nearest source of formal credit/microcredit/bank	10		16	
vv2b__Distance to nearest source of fertilizer dealer	27	7	24	8
vv3b__Distance to nearest source of pesticide/herbicide dealer	27	7	24	8
vv4b__Distance to nearest source of improved seed	27	7	24	8
vv5b__Distance to nearest source of extension agent	27	7		8
vv6b__Distance to nearest source of veterinary clinic/Doctor	27	7	16	8
vv7b__Distance to nearest source of other village institutions		7		8
vv1c__Cost to go to formal credit/microcredit/bank	20		80	
vv2c__Cost to go to fertilizer dealer	50	40	150	40
vv3c__Cost to go to pesticide/herbicide dealer	50	40	150	40
vv4c__Cost to go to improved seed	50	40	150	40
vv5c__Cost to go to extension agent	50	40		40
vv6c__Cost to go to veterinary clinic/Doctor	50	40	80	40
vv7c__Cost to go to other village institutions		40		40

Appendix 2. Example data on blood Micronutrients

LGA	Gada	Illela	Tangaza	Abadam	Sabon Birni
Child mean Iodine	449.99	336.16	266.90	487.35	333.60
Mother mean Iodine	272.05	230.13	199.34	432.13	224.83
Pregnant mother mean Iodine	236.68	220.42	200.30	268.41	221.37
Child mean Iron	47.12	46.81	44.45	19.45	44.57
Mother mean Iron	22.28	22.22	24.20	34.10	22.99
Pregnant mother mean Iron	29.76	29.83	29.69	18.23	30.27
Child mean Vitamin A	38.94	38.82	37.51	20.26	37.44
Mother mean Vitamin A	21.13	18.19	16.11	39.12	19.43
Pregnant mean Vitamin A	41.38	41.78	44.40	32.53	38.22
Child mean Vitamin E	6.53	6.52	6.41	6.28	6.50
Mother mean Vitamin E	9.02	7.53	6.79	7.37	7.57
Pregnant mean Vitamin E	8.02	7.87	7.82	10.42	8.02
Mother mean Zinc	76.59	76.58	76.44	104.83	76.50
Pregnant mean Zinc	69.51	69.50	69.32	97.51	69.40
Child lower quartile Iron	24.82	24.64	23.22	8.17	23.29
Child upper quartile Iron	66.5	66.2	64.2	43.5	64.3
Mother lower quartile Iron	8.00	7.96	9.47	17.01	8.54
Mother upper quartile Iron	46.33	46.27	48.36	58.85	47.08
Pregnant lower quartile Iron	14.90	14.93	14.86	8.81	15.16
Pregnant upper quartile Iron	61.53	61.62	61.44	46.64	62.19
Child lower quartile Vitamin A	28.50	28.42	27.54	15.88	27.49
Child upper quartile Vitamin A	47.74	47.60	46.04	25.51	45.96
Mother lower quartile Vitamin A	17.48	15.02	13.27	32.55	16.06
Mother upper quartile Vitamin A	30.26	27.33	25.26	48.18	28.56
Pregnant lower quartile Vitamin A	36.12	36.48	38.90	27.97	33.21
Pregnant upper quartile Vitamin A	48.50	48.89	51.48	39.77	45.38
Child lower quartile Vitamin E	4.77	4.76	4.65	4.52	4.74
Child upper quartile Vitamin E	8.32	8.31	8.20	8.07	8.29
Mother lower quartile Vitamin E	7.29	6.11	5.53	5.98	6.14
Mother upper quartile Vitamin E	10.57	9.08	8.33	8.92	9.12
Pregnant lower quartile Vitamin E	6.60	6.45	6.41	8.92	6.60
Pregnant upper quartile Vitamin E	9.24	9.10	9.06	11.46	9.24
Mother lower quartile Zinc	66.96	66.95	66.82	91.92	66.88
Mother upper quartile Zinc	91.27	91.26	91.12	118.70	91.18
Pregnant lower quartile Zinc	62.15	62.14	61.98	87.52	62.05
Pregnant upper quartile Zinc	80.95	80.94	80.76	109.51	80.84
Child lower quartile Iodine	236.95	179.23	144.11	255.90	177.93
Child upper quartile Iodine	716.82	553.94	454.84	770.28	550.28
Mother lower quartile Iodine	161.40	135.97	117.30	258.49	132.76
Mother upper quartile Iodine	403.93	349.03	308.71	613.59	342.09
Pregnant lower quartile Iodine	163.83	150.25	133.45	190.33	151.04
Pregnant upper quartile Iodine	345.12	327.95	306.70	378.63	328.96

Appendix 3. Calculated mean household incomes and iodine and vitamin A deficiencies by Local Government Area for Nigeria

STATE	LGA	Iodine deficiency	Vitamin A deficiency	Income
Abia	Aba North	0.00	0.00	642.62
Abia	Aba South	0.00	1.50	514.67
Abia	Arochukwu	0.00	4.50	249.50
Abia	Bende	0.00	3.00	226.36
Abia	Ikwuano	0.00	4.50	195.21
Abia	Isiala Ngwa North	0.00	3.00	188.90
Abia	Isiala Ngwa South	0.00	1.50	279.39
Abia	Isuikwuato	0.00	3.00	203.33
Abia	Oboma Ngwa	0.00	3.00	221.01
Abia	Ohafia	0.00	3.00	267.65
Abia	Osisioma Ngwa	0.00	1.50	279.39
Abia	Ugwunagbo	0.00	1.50	186.89
Abia	Ukwa East	0.00	3.00	189.19
Abia	Ukwa West	0.00	1.50	184.32
Abia	Umuahia North	0.00	3.00	298.75
Abia	Umuahia South	0.00	3.00	191.45
Abia	Umu-Nneochi	0.00	1.50	284.26
Abuja	Abaji	0.00	11.98	126.16
Abuja	Abuja Municipal	0.00	6.58	134.76
Abuja	Bwari	0.00	4.59	121.16
Abuja	Gwagwalada	0.00	9.16	128.35
Abuja	Kuje	0.00	9.43	127.34
Abuja	Kwali	0.00	11.28	100.71
Adamawa	Demsa	0.00	21.00	205.08
Adamawa	Fufore	0.00	19.50	146.40
Adamawa	Ganye	0.00	13.50	137.67
Adamawa	Girie	0.00	25.50	95.85
Adamawa	Gombi	0.00	22.50	183.53
Adamawa	Guyuk	0.00	22.50	177.64
Adamawa	Hong	0.00	24.00	40.39
Adamawa	Jada	0.00	15.00	141.46
Adamawa	Lamurde	0.00	19.50	195.16
Adamawa	Madagali	0.00	27.00	42.15
Adamawa	Maiha	0.00	24.00	49.47
Adamawa	Mayo-Belwa	0.00	15.00	179.03
Adamawa	Michika	0.00	25.50	50.00
Adamawa	Mubi North	0.00	25.50	50.00
Adamawa	Mubi South	0.00	25.50	40.08
Adamawa	Numan	0.00	19.50	199.63
Adamawa	Shelleng	0.00	24.00	150.08
Adamawa	Song	0.00	24.00	122.75
Adamawa	Teungo	0.00	12.00	105.28
Adamawa	Yola North	0.00	19.50	203.52
Adamawa	Yola South	0.00	18.00	187.52
Akwa Ibom	Abak	0.00	3.00	216.78
Akwa Ibom	Eastern Obolo	0.00	4.50	278.69
Akwa Ibom	Eket	2.50	4.50	258.86
Akwa Ibom	Esit Eket	11.00	6.00	194.32
Akwa Ibom	Essien Udim	0.00	3.00	204.20

Akwa Ibom	Etim Ekpo	0.00	3.00	184.55
Akwa Ibom	Etinan	0.00	4.50	218.29
Akwa Ibom	Ibeno	8.00	6.00	298.27
Akwa Ibom	Ibesikpo Asutan	19.00	4.50	187.80
Akwa Ibom	Ibiono Ibom	0.00	4.50	230.94
Akwa Ibom	Ika	0.00	3.00	188.22
Akwa Ibom	Ikono	0.00	4.50	193.40
Akwa Ibom	Ikot Abasi	0.00	4.50	245.73
Akwa Ibom	Ikot Ekpene	0.00	4.50	238.02
Akwa Ibom	Ini	0.00	4.50	210.76
Akwa Ibom	Itu	14.00	3.00	225.19
Akwa Ibom	Mbo	23.50	4.50	208.68
Akwa Ibom	Mkpat Enin	0.00	4.50	217.88
Akwa Ibom	Nsit Atai	32.00	4.50	196.10
Akwa Ibom	Nsit Ibom	8.00	4.50	188.22
Akwa Ibom	Nsit Ubium	12.50	4.50	192.99
Akwa Ibom	Obot Akara	0.00	4.50	196.54
Akwa Ibom	Okobo	29.50	4.50	221.61
Akwa Ibom	Onna	0.00	4.50	242.98
Akwa Ibom	Oron	29.50	4.50	329.93
Akwa Ibom	Oruk Anam	0.00	3.00	197.94
Akwa Ibom	Udung Uko	33.00	4.50	199.66
Akwa Ibom	Ukanafun	0.00	3.00	187.45
Akwa Ibom	Uruan	23.00	4.50	196.80
Akwa Ibom	Urue Offong /Oruko	30.00	6.00	213.28
Akwa Ibom	Uyo	10.50	4.50	303.81
Anambra	Oyi	0.00	6.00	370.16
Anambra	Aguata	0.00	6.00	207.78
Anambra	Anambra East	0.00	6.00	312.14
Anambra	Anambra West	0.00	7.50	244.21
Anambra	Anaocha	0.00	6.00	234.93
Anambra	Awka North	0.00	6.00	242.76
Anambra	Awka South	0.00	6.00	282.92
Anambra	Ayamelum	0.00	7.50	213.30
Anambra	Dunukofia	0.00	6.00	302.71
Anambra	Ekwusigo	0.00	6.00	236.61
Anambra	Idemili North	0.00	6.00	273.80
Anambra	Idemili South	0.00	6.00	274.58
Anambra	Ihiala	0.00	3.00	223.04
Anambra	Njikoka	0.00	6.00	273.69
Anambra	Nnewi North	0.00	4.50	283.83
Anambra	Nnewi South	0.00	4.50	222.66
Anambra	Ogbaru	0.00	4.50	325.30
Anambra	Onitsha North	0.00	6.00	645.10
Anambra	Onitsha South	0.00	6.00	381.96
Anambra	Orumba North	0.00	6.00	221.48
Anambra	Orumba South	0.00	3.00	214.58
Bauchi	Alkali	22.50	19.50	296.69
Bauchi	Bauchi	36.00	21.00	381.17
Bauchi	Bogoro	44.50	19.50	359.22
Bauchi	Damban	15.50	22.50	237.63
Bauchi	Darazo	19.00	21.00	258.00
Bauchi	Dass	48.00	21.00	398.48

Bauchi	Gamawa	21.00	25.50	226.25
Bauchi	Ganjuwa	33.00	24.00	342.18
Bauchi	Giade	29.00	21.00	254.68
Bauchi	Itas/Gadua	40.50	24.00	260.54
Bauchi	Jama'are	38.00	24.00	274.27
Bauchi	Katagum	25.50	22.50	225.99
Bauchi	Kirfi	21.50	24.00	306.66
Bauchi	Misau	22.00	21.00	243.82
Bauchi	Ningi	55.00	24.00	368.02
Bauchi	Shira	32.50	22.50	265.53
Bauchi	Tafawa-Balewa	47.00	22.50	390.06
Bauchi	Toro	55.50	22.50	416.10
Bauchi	Warji	41.50	24.00	332.24
Bauchi	Zaki	35.50	27.00	228.99
Bayelsa	Brass	0.00	4.50	293.85
Bayelsa	Ekeremor	0.00	6.00	269.53
Bayelsa	Kolokuma/Opokuma	0.00	1.50	299.63
Bayelsa	Nembe	0.00	6.00	231.87
Bayelsa	Ogbia	0.00	4.50	204.43
Bayelsa	Sagbama	0.00	4.50	341.48
Bayelsa	Southern Ijaw	0.00	4.50	231.03
Bayelsa	Yenegoa	0.00	1.50	277.40
Benue	Ado	0.00	8.09	503.54
Benue	Agatu	0.00	7.06	504.37
Benue	Apa	0.00	6.68	504.70
Benue	Bukuru	0.00	1.57	441.53
Benue	Gboko	0.00	2.70	471.87
Benue	Guma	0.00	3.72	467.09
Benue	Gwer East	0.00	3.87	483.31
Benue	Gwer West	0.00	4.00	513.34
Benue	Katsina- Ala	0.00	0.00	377.30
Benue	Konshisha	1.00	2.97	454.66
Benue	Kwande	9.90	0.00	368.47
Benue	Logo	0.00	3.59	416.28
Benue	Markurdi	0.00	3.13	511.41
Benue	Obi	0.00	3.79	467.08
Benue	Ogbadigbo	0.00	10.45	532.16
Benue	Ohimini	0.00	8.09	488.62
Benue	Oju	0.00	4.70	450.97
Benue	Okpokwu	0.00	8.27	501.87
Benue	Oturkpo	0.00	6.43	491.57
Benue	Tarka	0.00	4.19	465.83
Benue	Ukum	0.00	1.65	365.24
Benue	Ushongo	4.09	0.45	440.60
Benue	Vandeikya	19.09	0.48	427.39
Borno	Abadam	0.00	33.00	68.68
Borno	Askira/Uba	0.00	25.50	55.83
Borno	Bama	0.00	30.00	50.00
Borno	Bayo	0.00	27.00	207.06
Borno	Biu	0.00	27.00	131.54
Borno	Chibok	0.00	27.00	62.79
Borno	Dambo	0.00	28.50	99.70
Borno	Dikwa	0.00	33.00	50.00

Borno	Gubio	0.00	33.00	111.96
Borno	Guzamala	0.00	33.00	58.17
Borno	Gwoza	0.00	30.00	68.25
Borno	Hawul	0.00	25.50	97.26
Borno	Jere	0.00	33.00	137.15
Borno	Kaga	0.00	30.00	156.33
Borno	Kala/Balge	0.00	31.50	50.00
Borno	Konduga	0.00	31.50	113.30
Borno	Kukawa	0.00	31.50	49.33
Borno	Kwaya Kusar	0.00	25.50	169.30
Borno	Mafa	0.00	34.50	70.40
Borno	Magumeri	0.00	31.50	145.04
Borno	Maiduguri	0.00	30.00	152.73
Borno	Marte	0.00	33.00	44.62
Borno	Mobbar	0.00	33.00	75.93
Borno	Monguno	0.00	33.00	49.68
Borno	Ngala	0.00	34.50	50.00
Borno	Nganzai	0.00	31.50	98.64
Borno	Shani	0.00	24.00	153.43
Cross River	Abi	0.00	4.50	270.14
Cross River	Akamkpa	17.00	13.50	194.32
Cross River	Akpabuyo	8.00	7.50	221.95
Cross River	Bakassi	8.50	6.00	289.30
Cross River	Bekwarra	14.50	13.50	246.22
Cross River	Biase	8.50	9.00	296.34
Cross River	Boki	20.50	18.00	194.32
Cross River	Calabar Municipal	12.50	6.00	360.94
Cross River	Calabar South	14.50	4.50	373.46
Cross River	Etung	73.00	21.00	373.46
Cross River	Ikom	20.00	15.00	210.96
Cross River	Obanliku	14.50	15.00	188.67
Cross River	Obubra	5.00	12.00	248.43
Cross River	Obudu	16.50	15.00	239.18
Cross River	Odukpani	15.00	7.50	247.63
Cross River	Ogoja	13.50	13.50	219.40
Cross River	Yakurr	0.00	9.00	217.96
Cross River	Yala	9.00	7.50	253.16
Delta	Aniocha North	0.00	12.00	207.85
Delta	Aniocha South	0.00	12.00	222.03
Delta	Bomadi	0.00	10.50	284.21
Delta	Burutu	0.00	12.00	318.11
Delta	Ethiope East	0.00	15.00	232.35
Delta	Ethiope West	0.00	16.50	245.35
Delta	Ika North East	0.00	12.00	208.76
Delta	Ika South	0.00	13.50	252.02
Delta	Isoko North	0.00	7.50	218.20
Delta	Isoko South	0.00	6.00	212.96
Delta	Ndokwa East	0.00	4.50	439.28
Delta	Ndokwa West	0.00	9.00	214.38
Delta	Okpe	0.00	19.50	217.22
Delta	Oshimili North	0.00	7.50	343.51
Delta	Oshimili South	0.00	7.50	518.37
Delta	Patani	0.00	4.50	298.77

Delta	Sapele	0.00	19.50	295.28
Delta	Udu	0.00	18.00	310.68
Delta	Ughelli North	0.00	10.50	240.88
Delta	Ughelli South	0.00	15.00	194.22
Delta	Ukwuani	0.00	10.50	244.72
Delta	Uvwie	0.00	15.00	384.52
Delta	Warri North	0.00	18.00	287.33
Delta	Warri South	0.00	21.00	339.21
Delta	Warri South-West	0.00	18.00	286.45
Ebony	Ishielu	0.00	1.50	296.49
Ebonyi	Abakaliki	4.00	7.50	320.73
Ebonyi	Afikpo North	0.00	3.00	281.31
Ebonyi	Afikpo South	0.00	3.00	214.38
Ebonyi	Ebonyi	0.00	6.00	346.88
Ebonyi	Ezza North	0.00	3.00	445.93
Ebonyi	Ezza South	0.00	4.50	370.03
Ebonyi	Ikwo	0.00	7.50	284.91
Ebonyi	Ivo	0.00	1.50	221.49
Ebonyi	Izzi	0.00	9.00	326.71
Ebonyi	Ohaozara	0.00	3.00	265.44
Ebonyi	Ohaukwu	0.00	3.00	366.37
Ebonyi	Onicha	0.00	3.00	301.32
Edo	Akoko-Edo	0.00	18.00	229.51
Edo	Egor	0.00	12.00	487.26
Edo	Esan Central	0.00	15.00	198.03
Edo	Esan North-East	0.00	15.00	232.28
Edo	Esan South-East	0.00	12.00	260.28
Edo	Esan West	0.00	16.50	247.44
Edo	Etsako Central	0.00	15.00	253.92
Edo	Etsako East	0.00	13.50	249.16
Edo	Etsako West	0.00	16.50	238.15
Edo	Igueben	0.00	16.50	199.66
Edo	Ikpoba-Okha	0.00	18.00	512.71
Edo	Oredo	0.00	15.00	488.23
Edo	Orhionmwon	0.00	15.00	281.14
Edo	Ovia North-East	0.00	16.50	205.54
Edo	Ovia South-West	0.00	16.50	221.91
Edo	Owan East	0.00	16.50	215.62
Edo	Owan West	0.00	16.50	208.09
Edo	Uhunmwonde	0.00	18.00	246.99
Ekiti	Ado-Ekiti	0.00	27.00	196.21
Ekiti	Efon	0.00	24.00	182.56
Ekiti	Ekiti East	0.00	22.50	216.48
Ekiti	Ekiti South-West	0.00	31.50	187.80
Ekiti	Ekiti West	0.00	30.00	186.29
Ekiti	Emure	0.00	24.00	208.11
Ekiti	Gboyin	0.00	22.50	207.76
Ekiti	Ido-Osi	0.00	22.50	192.04
Ekiti	Ijero	1.00	25.50	185.68
Ekiti	Ikere	0.00	24.00	194.07
Ekiti	Ikole	0.00	25.50	208.52
Ekiti	Ilejemeje	0.00	21.00	193.98
Ekiti	Irepodun/Ifelodun	0.00	16.50	195.88

Ekiti	Ise /Orun	0.00	25.50	202.94
Ekiti	Moba	0.00	28.50	189.86
Ekiti	Oye	0.00	22.50	199.99
Enugu	Aninri	0.00	0.00	229.70
Enugu	Awgu	0.00	1.50	258.51
Enugu	Enugu East	0.00	4.50	272.25
Enugu	Enugu North	0.00	4.50	398.96
Enugu	Enugu South	0.00	4.50	329.90
Enugu	Ezeagu	0.00	4.50	241.60
Enugu	Igbo-Etiti	0.00	6.00	333.99
Enugu	Igbo-eze North	0.00	6.00	202.72
Enugu	Igbo-eze South	0.00	6.00	225.99
Enugu	Isi-Uzo	0.00	4.50	210.51
Enugu	Nkanu East	0.00	1.50	240.74
Enugu	Nkanu West	0.00	3.00	299.80
Enugu	Nsukka	0.00	6.00	274.47
Enugu	Oji-River	0.00	4.50	215.93
Enugu	Udenu	0.00	6.00	260.29
Enugu	Udi	0.00	4.50	338.34
Enugu	Uzo-Uwani	0.00	7.50	231.05
Gombe	Akko	7.00	22.50	294.80
Gombe	Balanga	0.00	21.00	194.20
Gombe	Billiri	5.00	22.50	268.95
Gombe	Dukku	14.00	24.00	278.71
Gombe	Funakaye	1.00	25.50	244.58
Gombe	Gombe	4.50	24.00	305.44
Gombe	Kaltungo	0.00	22.50	236.68
Gombe	Kwami	3.00	25.50	281.21
Gombe	Nafada	4.50	24.00	227.08
Gombe	Shomgom	5.00	21.00	247.74
Gombe	Yamaltu/Deba	0.00	24.00	252.37
Imo	Aboh-Mbaise	0.00	1.50	186.51
Imo	Ahiazu-Mbaise	0.00	1.50	192.54
Imo	Ehime-Mbano	0.00	1.50	191.23
Imo	Ezinihitte Mbaise	0.00	1.50	186.00
Imo	Ideato North	0.00	1.50	203.11
Imo	Ideato South	0.00	1.50	182.38
Imo	Ihitte/Uboma	0.00	1.50	188.22
Imo	Ikeduru	0.00	0.00	180.97
Imo	Isiala Mbano	0.00	0.00	177.94
Imo	Isu	0.00	0.00	193.50
Imo	Mbatoli	0.00	0.00	188.17
Imo	Ngor-Okpala	0.00	0.00	183.26
Imo	Njaba	0.00	0.00	194.75
Imo	Nkwerre	0.00	1.50	191.81
Imo	Nwangele	0.00	0.00	187.39
Imo	Obowo	0.00	3.00	180.97
Imo	Oguta	0.00	1.50	224.61
Imo	Ohaji /Egbema	0.00	0.00	214.56
Imo	Okigwe	0.00	1.50	217.46
Imo	Orlu	0.00	1.50	231.87
Imo	Orsu	0.00	3.00	197.53
Imo	Oru East	0.00	0.00	195.05

Imo	Oru West	0.00	0.00	214.04
Imo	Owerri Municipal	0.00	0.00	435.47
Imo	Owerri North	0.00	0.00	249.00
Imo	Owerri West	0.00	0.00	281.33
Imo	Unuimo	0.00	1.50	172.96
Jigawa	Auyo	81.00	9.00	245.41
Jigawa	Babura	105.50	18.00	199.47
Jigawa	Biriniwa	85.00	9.00	300.18
Jigawa	Birnin Kudu	12.00	13.50	51.61
Jigawa	Buji	26.50	13.50	176.77
Jigawa	Dutse	15.00	7.50	144.30
Jigawa	Gagarawa	85.00	9.00	306.43
Jigawa	Garki	78.00	13.50	223.59
Jigawa	Gumel	83.00	12.00	303.50
Jigawa	Guri	63.50	9.00	262.16
Jigawa	Gwaram	0.00	18.00	109.72
Jigawa	Gwiwa	13.50	16.50	271.22
Jigawa	Hadejia	76.50	9.00	243.56
Jigawa	Jahun	84.00	7.50	159.35
Jigawa	Kafin Hausa	84.00	7.50	210.35
Jigawa	Kaugama	79.50	9.00	274.14
Jigawa	Kazaure	26.50	19.50	238.16
Jigawa	Kiri Kasamma	68.50	9.00	268.69
Jigawa	Kiyawa	41.00	7.50	175.84
Jigawa	Maigatari	84.50	12.00	290.25
Jigawa	Malam Maduri	74.00	7.50	274.40
Jigawa	Miga	92.00	7.50	231.79
Jigawa	Ringim	5.50	7.50	157.25
Jigawa	Roni	0.00	19.50	257.04
Jigawa	Sule Tankarkar	95.50	15.00	243.47
Jigawa	Taura	94.50	7.50	209.38
Jigawa	Yankwashi	13.50	19.50	273.08
Kaduna	Birnin Gwari	55.50	18.00	162.83
Kaduna	Chikun	18.50	18.00	173.16
Kaduna	Giwa	0.00	16.50	106.79
Kaduna	Igabi	9.00	19.50	137.35
Kaduna	Ikara	7.00	16.50	104.01
Kaduna	Jaba	52.50	18.00	133.46
Kaduna	Jema'a	61.00	16.50	138.60
Kaduna	Kachia	12.50	18.00	114.88
Kaduna	Kaduna North	10.50	19.50	151.04
Kaduna	Kaduna South	22.00	19.50	167.68
Kaduna	Kagarko	0.00	18.00	117.96
Kaduna	Kajuru	0.00	19.50	132.04
Kaduna	Kaura	0.00	19.50	121.98
Kaduna	Kauru	3.00	21.00	110.33
Kaduna	Kubau	13.00	19.50	114.09
Kaduna	Kudan	0.00	16.50	92.97
Kaduna	Lere	0.00	22.50	102.24
Kaduna	Makarfi	0.00	18.00	100.79
Kaduna	Sabon Gari	0.00	16.50	88.22
Kaduna	Sanga	1.00	18.00	125.70
Kaduna	Soba	0.00	21.00	111.24

Kaduna	Zangon Kataf	27.50	19.50	108.83
Kaduna	Zaria	0.00	18.00	102.20
Kano	Ajingi	1.00	9.00	169.37
Kano	Albasu	9.50	13.50	124.24
Kano	Bagwai	0.00	19.50	150.27
Kano	Bebeji	6.50	27.00	88.73
Kano	Bichi	3.00	19.50	123.83
Kano	Bunkure	0.00	24.00	144.22
Kano	Dala	0.00	24.00	50.00
Kano	Dambatta	24.50	16.50	189.44
Kano	Dawakin Kudu	0.00	21.00	94.87
Kano	Dawakin Tofa	0.00	22.50	117.87
Kano	Doguwa	0.00	42.00	300.05
Kano	Fagge	0.00	21.00	182.50
Kano	Gabasawa	0.00	10.50	150.97
Kano	Garko	0.00	22.50	108.55
Kano	Garum Mallam	5.00	22.50	156.62
Kano	Gaya	1.00	12.00	125.25
Kano	Gezawa	0.00	15.00	124.56
Kano	Gwale	0.00	24.00	107.63
Kano	Gwarzo	0.00	24.00	104.45
Kano	Kabo	0.00	21.00	126.35
Kano	Kano Municipal	0.00	24.00	58.72
Kano	Karaye	0.00	25.50	177.12
Kano	Kibiya	0.50	27.00	133.39
Kano	Kiru	0.00	27.00	91.59
Kano	Kumbotso	0.00	25.50	96.76
Kano	Kunchi	13.00	18.00	229.20
Kano	Kura	0.00	24.00	194.73
Kano	Madobi	0.00	24.00	129.26
Kano	Makoda	0.00	18.00	235.47
Kano	Minjibir	9.00	18.00	168.33
Kano	Nassarawa	0.00	64.50	322.72
Kano	Rano	15.50	27.00	122.37
Kano	Rimin Gado	0.00	24.00	149.14
Kano	Rogo	4.00	31.50	66.05
Kano	Shanono	0.00	22.50	145.90
Kano	Sumaila	17.00	27.00	103.26
Kano	Takai	0.00	15.00	93.30
Kano	Tarauni	0.00	24.00	159.46
Kano	Tofa	0.00	22.50	151.19
Kano	Tsanyawa	0.00	18.00	178.01
Kano	Tundun Wada	20.00	30.00	190.74
Kano	Ungogo	0.00	22.50	118.17
Kano	Warawa	0.00	18.00	160.03
Kano	Wudil	0.00	18.00	123.82
Katsina	Bakori	0.00	37.50	61.29
Katsina	Batagarawa	0.50	10.50	227.97
Katsina	Batsari	0.00	7.50	175.93
Katsina	Baure	89.50	21.00	266.89
Katsina	Bindawa	20.50	12.00	181.59
Katsina	Charanchi	8.50	10.50	206.64
Katsina	Dandume	0.00	48.00	116.82

Katsina	Danja	0.00	40.50	90.62
Katsina	Danmusa	0.00	16.50	172.43
Katsina	Daura	30.00	16.50	322.20
Katsina	Dutsi	12.50	16.50	304.37
Katsina	Dutsinma	0.00	13.50	192.18
Katsina	Faskari	0.00	37.50	103.55
Katsina	Funtua	0.00	45.00	66.68
Katsina	Ingawa	1.50	18.00	200.91
Katsina	Jibia	0.00	10.50	219.48
Katsina	Kafur	0.00	31.50	70.33
Katsina	Kaita	28.00	15.00	260.93
Katsina	Kankara	0.00	24.00	93.71
Katsina	Kankia	9.50	13.50	171.39
Katsina	Katsina	72.50	10.50	149.42
Katsina	Kurfi	0.00	10.50	218.70
Katsina	Kusada	0.00	13.50	207.85
Katsina	Mai'Adua	21.50	16.50	272.43
Katsina	Malumfashi	0.00	30.00	68.65
Katsina	Mani	9.00	16.50	234.48
Katsina	Mashi	4.50	16.50	271.72
Katsina	Matazu	0.00	16.50	181.85
Katsina	Musawa	0.00	21.00	146.40
Katsina	Rimi	22.50	12.00	218.20
Katsina	Sabuwa	0.00	46.50	159.92
Katsina	Safana	0.00	9.00	156.96
Katsina	Sandamu	7.50	16.50	301.00
Katsina	Zango	28.00	21.00	234.12
Kebbi	Aleiro	0.00	30.00	209.23
Kebbi	Arewa Dandi	0.00	16.50	197.52
Kebbi	Argungu	31.00	21.00	178.91
Kebbi	Augie	17.00	6.00	214.98
Kebbi	Bagudo	0.00	33.00	345.07
Kebbi	Birnin-Kebbi	34.50	31.50	136.84
Kebbi	Bunza	17.50	30.00	168.34
Kebbi	Dandi	0.00	28.50	191.87
Kebbi	Danko Wasagu	0.00	33.00	254.85
Kebbi	Fakai	0.00	28.50	285.05
Kebbi	Gwandu	0.00	22.50	164.90
Kebbi	Jega	0.00	31.50	150.72
Kebbi	Kalgo	3.00	31.50	192.98
Kebbi	Koko/Besse	0.00	33.00	129.00
Kebbi	Maiyama	0.00	31.50	162.03
Kebbi	Ngaski	0.00	43.50	333.57
Kebbi	Sakaba	0.00	40.50	214.92
Kebbi	Shanga	0.00	33.00	295.61
Kebbi	Suru	0.00	31.50	168.31
Kebbi	Yauri	0.00	34.50	311.80
Kebbi	Zuru	0.00	28.50	157.18
Kogi	Adavi	9.50	27.00	249.42
Kogi	Ajaokuta	3.50	24.00	257.18
Kogi	Ankpa	23.50	22.50	306.32
Kogi	Bassa	60.00	21.00	279.57
Kogi	Dekina	49.50	25.50	283.36

Kogi	Ibaji	0.00	22.50	266.89
Kogi	Idah	0.00	22.50	263.40
Kogi	Igalamela-Odolu	0.00	22.50	277.94
Kogi	Ijumu	0.00	22.50	228.26
Kogi	Kabba /Bunu	26.00	22.50	235.75
Kogi	Koton-Karfe	76.00	19.50	269.38
Kogi	Lokoja	48.00	22.50	251.13
Kogi	Mopa-Muro	27.00	21.00	225.50
Kogi	Ofu	12.00	22.50	280.07
Kogi	Ogori/ Magongo	0.00	21.00	238.46
Kogi	Okehi	0.00	24.00	243.44
Kogi	Okene	0.00	34.50	247.64
Kogi	Olamaboro	0.50	21.00	302.43
Kogi	Omala	0.00	19.50	301.87
Kogi	Yagba East	27.50	22.50	215.97
Kogi	Yagba West	24.00	22.50	207.80
Kwara	Asa	6.00	21.00	158.76
Kwara	Baruten	36.00	31.50	105.59
Kwara	Edu	20.00	22.50	194.55
Kwara	Ekiti	0.00	22.50	201.19
Kwara	Ifelodun	10.50	25.50	185.96
Kwara	Ilorin East	3.50	27.00	174.17
Kwara	Ilorin South	0.00	22.50	169.76
Kwara	Ilorin West	7.50	25.50	164.62
Kwara	Irepodun	0.00	24.00	178.13
Kwara	Isin	8.50	18.00	187.52
Kwara	Kaiama	19.50	19.50	151.57
Kwara	Moro	11.00	21.00	163.31
Kwara	Offa	0.00	19.50	170.45
Kwara	Oke-Ero	5.50	22.50	196.64
Kwara	Oyun	0.00	21.00	168.23
Kwara	Pategi	23.50	18.00	223.27
Lagos	Agege	7.50	58.50	106.53
Lagos	Ajeromi/ Ifelodun	14.00	24.00	107.27
Lagos	Alimosho	7.00	55.50	103.50
Lagos	Amuwo Odofin	13.00	46.50	105.03
Lagos	Apapa	12.50	45.00	109.03
Lagos	Badagry	47.50	37.50	87.87
Lagos	Epe	0.00	42.00	137.33
Lagos	Eti-Osa	6.00	43.50	116.63
Lagos	Ibeju Lekki	0.00	37.50	135.24
Lagos	Ifako/Ijaye	0.50	55.50	106.22
Lagos	Ikeja	5.00	46.50	107.47
Lagos	Ikorodu	0.00	45.00	118.33
Lagos	Kosofe	3.50	55.50	110.75
Lagos	Lagos Island	4.50	45.00	115.16
Lagos	Lagos Mainland	7.50	51.00	109.50
Lagos	Mushin	7.50	66.00	107.78
Lagos	Ojo	12.50	48.00	98.52
Lagos	Oshodi/Isolo	7.50	58.50	106.53
Lagos	Shomolu	7.50	55.50	109.77
Lagos	Surulere	50.00	45.00	107.73
Nassarawa	Akwanga	35.00	18.00	129.64

Nassarawa	Awe	0.00	16.50	232.15
Nassarawa	Doma	0.00	16.50	197.89
Nassarawa	Karu	16.00	16.50	171.78
Nassarawa	Keana	0.00	16.50	218.43
Nassarawa	Keffi	21.00	16.50	163.80
Nassarawa	Kokona	67.00	16.50	155.03
Nassarawa	Lafia	74.50	18.00	169.46
Nassarawa	Nassarawa	50.00	18.00	220.44
Nassarawa	Nassarawa Egon	45.00	15.00	130.58
Nassarawa	Obi	0.00	19.50	218.32
Nassarawa	Toto	23.50	21.00	202.35
Nassarawa	Wamba	0.00	18.00	132.11
Niger	Agai	0.00	11.59	143.03
Niger	Agwara	0.00	20.95	262.28
Niger	Bida	0.00	8.57	102.93
Niger	Borgu	0.00	18.63	194.13
Niger	Bosso	0.00	10.73	160.38
Niger	Chanchaga	0.00	10.67	166.67
Niger	Edati	0.00	12.55	133.94
Niger	Gbako	0.00	10.35	133.99
Niger	Gurara	0.00	7.13	117.32
Niger	Katcha	0.00	9.15	138.07
Niger	Kontagora	0.00	15.90	170.67
Niger	Lapai	0.00	13.84	129.96
Niger	Lavun	0.00	12.74	154.28
Niger	Magama	0.00	17.73	211.41
Niger	Mariga	0.00	16.88	181.61
Niger	Mashegu	0.00	15.22	162.27
Niger	Mokwa	0.00	16.15	153.73
Niger	Muya	0.00	7.20	149.83
Niger	Paikoro	0.00	6.72	125.10
Niger	Rafi	0.00	10.94	188.48
Niger	Rijau	0.00	18.54	245.12
Niger	Shiroro	0.00	10.69	189.03
Niger	Suleja	0.00	7.70	119.62
Niger	Tafa	0.00	5.94	108.65
Niger	Wushishi	0.00	12.66	163.90
Ogun	Abeokuta North	64.00	40.50	100.42
Ogun	Abeokuta South	22.00	51.00	108.59
Ogun	Ado Odo/Ota	39.00	46.50	95.09
Ogun	Egbado North	66.50	43.50	88.40
Ogun	Egbado South	53.50	40.50	89.42
Ogun	Ewekoro	38.00	36.00	101.79
Ogun	Ifo	0.00	19.50	106.50
Ogun	Ijebu East	0.00	39.00	150.35
Ogun	Ijebu North	0.00	45.00	137.16
Ogun	Ijebu North-East	0.00	37.50	138.88
Ogun	Ijebu-Ode	0.00	36.00	135.77
Ogun	Ikenne	0.00	39.00	123.22
Ogun	Imeko-Afon	74.00	34.50	87.45
Ogun	Ipokia	58.50	37.50	83.73
Ogun	Obafemi-Owode	3.50	40.50	116.41
Ogun	Odeda	33.00	39.00	114.35

Ogun	Odogbolu	0.00	46.50	129.48
Ogun	Ogun Waterside	0.00	36.00	155.55
Ogun	Remo-North	0.00	36.00	125.09
Ogun	Shagamu	0.00	43.50	118.13
Ondo	Akoko North-East	0.00	24.00	227.69
Ondo	Akoko North-West	0.00	25.50	219.97
Ondo	Akoko South-East	0.00	21.00	225.91
Ondo	Akoko South-West	0.00	25.50	215.06
Ondo	Akure North	0.00	27.00	199.45
Ondo	Akure South	0.00	39.00	191.43
Ondo	Ese-Odo	0.00	36.00	183.48
Ondo	Idanre	0.00	30.00	196.99
Ondo	Ifedore	0.00	28.50	188.37
Ondo	Ilaje	0.00	40.50	173.07
Ondo	Ile-Oluji/Okeigbo	0.00	30.00	182.41
Ondo	Irele	0.00	31.50	183.37
Ondo	Odigbo	0.00	37.50	171.25
Ondo	Okitipupa	0.00	36.00	171.89
Ondo	Ondo East	0.00	37.50	182.08
Ondo	Ondo West	0.00	30.00	172.13
Ondo	Ose	0.00	25.50	218.52
Ondo	Owo	0.00	31.50	210.31
Osun	Aiyedaade	0.00	37.50	152.52
Osun	Aiyedire	20.50	34.50	149.64
Osun	Atakumosa East	0.00	27.00	174.98
Osun	Atakumosa West	0.00	30.00	168.67
Osun	Boluwaduro	0.00	21.00	175.50
Osun	Boripe	8.50	24.00	169.68
Osun	Ede North	0.00	28.50	161.75
Osun	Ede South	16.00	31.50	160.16
Osun	Egbedore	6.50	28.50	158.96
Osun	Ejigbo	19.50	27.00	152.88
Osun	Ife Central	0.00	34.50	166.53
Osun	Ife East	2.50	37.50	166.67
Osun	Ife North	0.00	39.00	160.36
Osun	Ife South	0.00	36.00	165.73
Osun	Ifedayo	4.00	22.50	184.34
Osun	Ifelodun	56.50	22.50	168.24
Osun	Ila	8.50	22.50	179.96
Osun	Ilesha East	0.00	27.00	173.66
Osun	Ilesha West	0.00	25.50	171.38
Osun	Irepodun	10.50	24.00	162.03
Osun	Irewole	6.00	36.00	148.73
Osun	Isokan	5.50	37.50	147.44
Osun	Iwo	25.50	34.50	145.16
Osun	Obokun	0.50	24.00	173.78
Osun	Odo-Otin	8.00	22.50	169.81
Osun	Ola-Oluwa	18.00	27.00	147.40
Osun	Olorunda	0.50	27.00	164.86
Osun	Oriade	0.00	27.00	179.01
Osun	Orolu	14.50	22.50	160.55
Osun	Osogbo	0.00	25.50	165.20
Oyo	Afijio	34.50	49.50	133.16

Oyo	Akinyele	39.00	39.00	134.73
Oyo	Atiba	36.50	28.50	133.94
Oyo	Atisbo	75.00	33.00	104.00
Oyo	Egbeda	8.50	39.00	140.30
Oyo	Ibadan North	19.00	51.00	134.31
Oyo	Ibadan North-East	29.00	51.00	135.01
Oyo	Ibadan North-West	20.00	43.50	132.87
Oyo	Ibadan South-East	3.50	45.00	134.01
Oyo	Ibadan South-West	8.50	49.50	132.22
Oyo	Ibarapa Central	70.50	36.00	102.57
Oyo	Ibarapa East	57.50	33.00	115.89
Oyo	Ibarapa North	41.00	33.00	99.72
Oyo	Ido	42.50	33.00	123.99
Oyo	Irepo	24.00	27.00	136.79
Oyo	Iseyin	50.50	34.50	115.44
Oyo	Itesiwaju	46.50	33.00	112.91
Oyo	Iwajowa	51.00	33.00	93.70
Oyo	Kajola	56.50	34.50	108.93
Oyo	Lagelu	25.50	37.50	140.05
Oyo	Ogbomosho North	9.50	33.00	150.31
Oyo	Ogbomosho South	11.00	30.00	149.52
Oyo	Ogo Oluwa	17.50	25.50	150.01
Oyo	Olorunsogo	24.00	25.50	143.71
Oyo	Oluyole	12.00	39.00	132.10
Oyo	Ona Ara	12.50	40.50	139.65
Oyo	Orelope	37.50	30.00	129.12
Oyo	Ori-Ire	23.00	30.00	145.91
Oyo	Oyo East	24.50	36.00	138.75
Oyo	Oyo West	35.00	33.00	130.66
Oyo	Saki East	39.00	28.50	120.02
Oyo	Saki West	62.00	34.50	96.75
Oyo	Surulere	2.50	3.00	158.00
Plateau	Barkin Ladi	0.00	8.34	123.97
Plateau	Bassa	0.00	14.51	232.04
Plateau	Bokkos	0.00	6.86	140.42
Plateau	Jos East	0.00	10.31	128.49
Plateau	Jos North	0.00	11.38	112.00
Plateau	Jos South	0.00	10.51	115.26
Plateau	Kanam	0.00	4.31	164.99
Plateau	Kanke	0.00	6.70	163.55
Plateau	Langtang North	0.00	5.00	193.62
Plateau	Langtang South	0.00	6.73	220.90
Plateau	Mangu	0.00	10.01	143.51
Plateau	Mikang	0.00	6.90	182.35
Plateau	Pankshin	0.00	9.58	165.34
Plateau	Qua'an Pan	0.00	5.11	180.29
Plateau	Riyom	0.00	8.70	112.13
Plateau	Shendam	0.00	6.64	208.25
Plateau	Wase	0.00	4.68	172.16
Rivers	Abua /Oduval	0.00	3.00	194.32
Rivers	Ahoada East	0.00	1.50	208.56
Rivers	Ahoada West	0.00	1.50	193.63
Rivers	Akuku-Toru	0.00	3.00	258.67

Rivers	Andoni	0.00	6.00	293.11
Rivers	Asari-Toru	0.00	3.00	331.83
Rivers	Bonny	0.00	4.50	311.06
Rivers	Degema	0.00	3.00	276.00
Rivers	Eleme	0.00	3.00	240.68
Rivers	Emuoha	0.00	3.00	202.09
Rivers	Etche	0.00	1.50	193.82
Rivers	Gokana	0.00	4.50	261.75
Rivers	Ikwerre	0.00	3.00	220.70
Rivers	Khana	0.00	4.50	211.51
Rivers	Obio/Akpor	0.00	0.00	386.02
	Ogba/ Egbema/			
Rivers	Ndoni	0.00	1.50	283.46
Rivers	Ogu /Bolo	0.00	4.50	207.88
Rivers	Okrika	0.00	3.00	318.33
Rivers	Omumma	0.00	1.50	178.82
Rivers	Opobo /Nkoro	0.00	6.00	256.47
Rivers	Oyigbo	0.00	3.00	239.78
Rivers	Port Harcourt	0.00	3.00	496.47
Rivers	Tai	0.00	4.50	217.09
Sokoto	Binji	0.00	6.00	298.08
Sokoto	Bodinga	0.00	7.50	180.17
Sokoto	Dange-Shuni	0.00	6.00	192.84
Sokoto	Gada	0.00	6.00	278.47
Sokoto	Goronyo	0.00	6.00	313.30
Sokoto	Gudu	0.00	6.00	312.04
Sokoto	Gwadabawa	0.00	6.00	251.09
Sokoto	Illela	0.00	6.00	297.98
Sokoto	Isa	0.00	6.00	270.42
Sokoto	Kebbe	0.00	27.00	298.43
Sokoto	Kware	18.50	7.50	238.85
Sokoto	Rabah	0.00	7.50	259.82
Sokoto	Sabon Birni	0.00	6.00	246.04
Sokoto	Shagari	0.00	13.50	233.71
Sokoto	Silame	0.00	4.50	239.87
Sokoto	Sokoto North	0.00	7.50	195.87
Sokoto	Sokoto South	0.00	7.50	157.12
Sokoto	Tambuwal	0.00	19.50	188.36
Sokoto	Tangaza	0.00	6.00	353.16
Sokoto	Tureta	0.00	10.50	300.71
Sokoto	Wamako	0.00	6.00	229.87
Sokoto	Wurno	0.00	7.50	277.49
Sokoto	Yabo	0.00	9.00	216.07
Taraba	Ardo-Kola	3.50	13.50	166.05
Taraba	Bali	7.50	12.00	141.87
Taraba	Donga	27.00	12.00	239.78
Taraba	Gashaka	1.00	10.50	77.56
Taraba	Gassol	21.00	12.00	178.84
Taraba	Ibi	38.50	16.50	280.00
Taraba	Jalingo	0.00	15.00	174.65
Taraba	Karim Lamido	11.00	18.00	212.20
Taraba	Kurmi	20.00	10.50	184.42
Taraba	Lau	0.00	16.50	186.22
Taraba	Sardauna	4.00	7.50	67.66

Taraba	Takum	33.50	12.00	286.43
Taraba	Ussa	36.00	12.00	308.17
Taraba	Wukari	41.50	13.50	318.89
Taraba	Yorro	0.00	15.00	177.76
Taraba	Zing	0.00	15.00	181.47
Yobe	Bade	25.50	31.50	216.87
Yobe	Borsari	0.50	33.00	194.62
Yobe	Damaturu	0.00	30.00	233.49
Yobe	Fika	4.00	25.50	226.93
Yobe	Fune	0.00	28.50	236.49
Yobe	Geidam	0.00	33.00	151.58
Yobe	Gujba	0.00	28.50	206.79
Yobe	Gulani	0.00	27.00	194.17
Yobe	Jakusko	14.00	30.00	208.11
Yobe	Karasuwa	25.50	31.50	189.88
Yobe	Machina	51.00	33.00	252.51
Yobe	Nangere	10.00	25.50	235.00
Yobe	Nguru	36.00	30.00	197.72
Yobe	Potiskum	5.50	25.50	241.45
Yobe	Tarmuwa	0.00	31.50	211.38
Yobe	Yunusari	0.00	33.00	132.03
Yobe	Yusufari	15.50	31.50	179.23
Zamfara	Anka	19.00	24.00	231.36
Zamfara	Bakura	0.00	7.50	245.36
Zamfara	Birnin-Magaji/Kiyaw	0.00	13.50	172.24
Zamfara	Bukkuyum	2.00	19.50	193.59
Zamfara	Bungudu	0.00	22.50	68.47
Zamfara	Gummi	0.00	18.00	207.25
Zamfara	Gusau	0.00	30.00	78.33
Zamfara	Kaura Namoda	0.00	16.50	144.10
Zamfara	Maradun	15.00	6.00	230.67
Zamfara	Maru	0.00	37.50	181.37
Zamfara	Shinkafi	0.00	4.50	232.80
Zamfara	Talata-Mafara	20.50	15.00	141.69
Zamfara	Tsafe	0.00	30.00	76.86
Zamfara	Zurmi	0.00	4.50	165.77