

Household Food Insecurity in Nigeria: an Assessment of the Present Status of Protein – Energy Malnutrition among Rural and Low-income Urban Households.

¹Orewa, S.I and ²Iyanbe, C.O

¹Department of Agriculture, Benson Idahosa University, Benin-city, Nigeria.

²Department of Agricultural Economics and Extension Services, University of Benin, Benin-city, Nigeria.

Abstract: This study assessed the present status of protein – energy malnutrition among rural and low-income urban households in Nigeria using two Local Government Areas (LGAs) in Edo State as a case study. The LGAs are Orhionmwon (for rural households) and Ikpoba-Okha (for low-income urban households). Data used were collected between July and October, 2005 through personal interviews using structure questionnaire. Twelve strata (political wards) out of the thirty strata in the study area (14 in Ikpoba-Okha and 16 in Orhionmwon LGAs) were randomly selected, out of which 90 households (made up of 384 members or individuals) were then selected at random for the analysis. Each household member was asked the quantity and type of food he/she consumed the previous day and a day after per meal/day. The estimation of the calorie/protein intake on per capita daily basis was done using the formula proposed by Aromolaran (2005). The study revealed that on the average only 31% of the households in the study areas met the FAO recommended minimum daily calorie intake. More households in the rural area (30.43%) met the minimum recommended daily allowance (RDA) while only 20.45% of the low-income urban households met this RDA. For daily protein intake more of the low-income urban households (25%) met the minimum RDA as compared to 19.6% for the rural households. In all, the study confirmed that the level of undernourishment (low daily calorie intake) and malnutrition (low protein intake) was still very high in Nigeria. Increased emphasis on farming (or agriculture) and the creation of salary earning jobs have been recommended as ways of improving the present low protein – energy malnutrition.

Key words: Household, Food Insecurity, Nigeria, Protein-Energy Malnutrition

INTRODUCTION

Nigeria is a country with a population of 138.3 million people, about 14.3% of the total African population and 2.1% of the world's population ^[18]. Her land area is about 923,768km², half of which is arable ^[15]. Nigeria is richly endowed with abundant natural, human and material resources, but has not been able to harness these sufficiently and efficiently enough to meet the food needs of the poor in the nation. The size of the poor population in Nigeria (who are mostly in the rural areas and among the low income group in the society) rose from 35 million in 1992 to 44 million in 1995 and by the year 2007 it has risen to 70 million persons ^[19,16]. The annual per capita expenditure of the poor rose from N593 in 1985 to N795 in 1992 and then dropped to N720 in 1995 ^[19]. Presently the poor population in Nigeria like most other developing countries spend between 50 to 80 per cent of their income on foods while the poor rural households tend to be met consumers of food ^[10]. More alarming is also the fact that about 50 per cent of the population still

live on US \$ 1 (N140) per day or less and the distribution of wealth remains unequal and exclusive ^[17]. These facts obviously show the worsening nature of poverty in Nigeria, the consequences of which is increasing level of food insecurity.

Deficient in national food self-sufficiency has continued to be a recurring phenomenon in Nigeria. Currently, Nigeria spends about \$ 3 billion annually on food importation^[9]. More recently N80 billion was released from the Natural Resource Development Fund for the importation of 500,000 metric tons of rice and 11,00 metric tons of grains to complement local production ^[16,10]. Food production in the country is also said to have dropped by as much as 25 percent in year 2007 ^[11,12]. The country's average annual deficit per capita daily calories intake has also worsened. During the period 1970 – 1979, the average annual deficient per capita daily calories intake was 24.4% and within the periods 1980 – 1989 and 1990 – 1994 it became 23.58% and 8.38% respectively of the minimum recommended ^[7,2]. Though the per capita income is said to be rising (from \$ 847.4 in 2005 to \$ 1,036.2 in

2006 and about \$ 1,200 in year 2008) the evidence of a decline in real income is not only manifested in the low calorie intake but also in the type of food (and the quality) consumed by Nigerian households [2,13]. Thus, with the growing calorie supply deficient, coupled with the decline in real income, the threat of food insecurity particularly among the low-income groups has deepened.

Recently, the National Co-ordinator of the National Poverty Eradication in Nigeria (NAPEP) DR Magnus Kpakol and the National Economic and Empowerment Development Strategies (NEEDS) agency made claims that, past efforts by the Federal Government of Nigeria to boost food production, encourage economic growth and alleviate food insecurity and poverty in the nation have yielded commensurate benefits [16,17]. If the claims are actually true, why is Nigeria still having up to 47% of her populace (especially those below the age of 18 years still victims of stunting, wasting and underweight, all of which are evidence of under-nutrition [1,6]. Or made more explicit why have these efforts not made the desired impact. The aim of this study is to empirically assess the household food security problem in Nigeria using Ikpoba-Okha and Orhionmwon Local Government Areas of Edo State, Nigeria, as case study. Specifically, the study attempted to:

- 1) Establish the calorie and protein intake status of the rural and low-income urban households in the State relative to the Food and Agriculture Organisation (FAO) recommended standards.
- 2) Analyse the structure of per capita daily calorie and protein intake with respect to age, sex and location.
- 3) Identify the group(s) among households that are more affected by the food insecurity.

Hypothesis of the Study: The following null hypotheses were tested by the study:

- (1) That the level of food insecurity between low-income household and rural households are comparable.
- (2) That food security problems between males and females in the low-income urban and rural households are not significantly different.

MATERIALS AND METHODS

Data Collection and Analyses: The primary data used for this study were collected between July and October, 2005 from two Local government areas (LGAs) Edo State, Nigeria – Ikpoba-Okha and Orhionmwon. Data were sourced through personal interviews using structured questionnaire. A combination of stratified

and systematic random sampling techniques were employed to select 120 households, 60 from each LGA. However questionnaire were retrieved from only 90 households (44 from Ikpoba-okha and 46 from Orhionmwon) and used for analysis.

The study was divided along the current political wards to form strata. Twelve strata (wards) out of the thirty strata (wards) in the study area (14 in Ikpoba-Okha and 16 in Orhionmwon LGAs) were randomly selected. The communities in Orhionmwon LGA represent the rural area while those of Ikpoba-Okha LGA represent the low-income urban area. A 48 – hour recall method was used in collecting the data from 460 individuals within 90 households. However, for daily food intake of individual members in each household, a total of 384 members out of the 460 household members in the 90 households sampled were used. The age category of less than 1 year (10 in number) were excluded from the analysis since they were still breast – fed and adequate quantification of the breast – milk intake could not be done. In the same vein, another 67 household members were excluded from the analysis since records of their food intake was not fully disclosed while some others were not available at the time the feed intake records were collected. Thus, 384 household members were used for the consumption analysis. Each household member was asked the food he/she consumed the previous day and a day after. The data collected included type of food consumed and quantity consumed per meal/day. However a gram of yam consumed cannot be equated to a grain of rice except both are converted to gram equivalent before the proportion of each (and other food items) can be estimated from the total food intake. The calorific or protein content in each food item consumed was used for this study in estimating the proportion in the total food intake.

The data collected were subjected to descriptive analysis and nutrient (calorie and protein) estimation.

Nutrient (Calorie / Protein) Intake Estimation: Food intake records collected were cooked food except in few cases where the food need not to be cooked before consumption (fruits, garri, etc). The estimation of calorie / protein on per capita daily basis was done using the formula below as proposed by Aromolaran [5].

$$C_i = \sum_{j=1}^m A_{ij} B_j$$

Where:

C_i = per capita daily calorie (kcal/protein (g)) intake level of the i^{th} individual in the study area.

A_{ij} = the weight in grams of the average daily intake of food commodity j by i^{th} individual.

B_j = the standardized food energy (or protein) content of the j^{th} food commodity as the case may be.

Also the nutrient (calorie/protein) intake status was estimated for each household. This is referred to as the household per capita daily calorie/protein intake. This was done by averaging the weighted sum of the individual's nutrient (calorie/protein) intake using the male adult equivalent. The male adult equivalent refers to the total calorie/protein requirement of a household divided by the calorie requirement of an adult male. An adult male was considered to be a person aged 20 – 45 years (FAO/WHO, 1985). An individual or household is said to be undernourished (i.e insufficient calorie intake) or malnourished (sufficient calories but not enough protein or other essential nutrients) if he/she or the household fails to meet the FAO Recommended Daily Allowance (RDA).

RESULTS AND DISCUSSION

Calorie – Protein Nutrient Status of the Low-Income Urban Dwellers (Ikpoba-Okha LGA): The estimated per capita daily calorie (kcal) and protein (g) intake of the low-income urban dwellers in the study area, by age and gender lines are presented in Table 1.

The study revealed that per capita daily calorie/protein intake of households as compared to the Recommended Daily Allowance (RDA) was adequate except for the male and female pre-schoolers (less than 6 yrs old) and females between the age range of 6 and 10 years who were under nourished in terms of calorie intake. This result confirms Addo's survey findings^[1] in South-West, North-West and North-East of Nigeria which revealed that the pre-schoolers (under 5 years old children) were grossly under nourished. Her survey showed that only 26.6% of the pre-schoolers met their Recommended Daily Allowance (RDA). Aromolaran^[4] also estimated the calorie intake of low income households in Ibadan to be 61% of the FAO recommended standard. The 75.53% and 82.2% levels obtained for female and male pre-schoolers respectively in this study is therefore an improvement over Addo and Aromolaran findings.

The results from the table showed that the average per capita daily calorie and protein intake among the rural dwellers as compared to the Recommended Daily Allowance (RDA) were also adequate. However, this is with the exception of the male pre-schoolers who were under nourished in terms of their daily calorie intake and the aged female (60 years and above) who consumed about 11 percent less than the RDA for protein. The argument then from the facts in Tables 1 and 2 is that there is not much food security problem with respect to calorie and protein intake among the

studied population. This however is not true. A critical consideration of the household as an entity rather than the individual gives the true picture of the household food security state among the population.

Calorie – Protein Nutrient Status among Households in the Study Area: The relation between an individual in a household and the household can be likened to the relation between various components of a machine and the machine. The household is a whole entity having various individuals of different ages and sex making it up. Injury or adverse effect on any of these individuals will affect the household as a whole. On this basis, the household per capita daily calorie and protein intakes were estimated for each household sampled. The results of these are shown in Tables 3 and 4.

Table 3 shows the summary statistics of calorie-protein intake of an average household in the study area by location. The average household per capita daily calorie intake in the low income urban area ranged from 1020.32 to 4956.26 Kcal with both mean and median values of 2066.31 Kcal and 2028.59Kcal respectively being less than the minimum recommended standard of 2400Kcal. In the rural area the per capita daily calorie intake ranged from 996.22Kcal to 5141.39Kcal with a mean value of 2128.16kcal and median value of 1988.22 kcal both less than the minimum recommended standard.

For protein, the average household in both the low income urban and rural area consumed less than the recommended level of 44.4g per capita per day. The mean and median protein daily intakes were 37.63g and 32.85g respectively in the low income urban and 36.86g and 30.86g respectively in the rural area. The range for protein intake in both locations were 3.74g to 118.16g for the low income urban area and 10.05g to 143.72g for the rural area.

These results showed that there were slight differences in protein and calorie intake levels at both locations. The rural area was slightly better off compared to the low income urban households as regard per capita daily calorie intake. However, both locations fell short of the standard recommended for calorie and protein daily intakes. These results provide an evidence that the household as an entity, in the study area, is under nourished. This fact is more evident when the households are categorized by location and their source of earnings/income. The proportion of the households falling within the various percentage level of nutrient (calorie/protein) intake, compared to the minimum RDA are examined in Tables 4 and 5.

On the average 31% of the households in the study area met the recommended calorie intake while the remaining 69% fell below the recommended standard.

More households in the rural area (30.43 percent) met the recommended standard as compared to the low-income urban households (20.45 percent). This situation could be as a result of the fact that the rural households are more involved in farming activities, thus ensuring food security.

The results from the table also showed that 40 and 44 percent of households engaged in farming and salary earning jobs respectively, met the recommended minimum standard calorie intake as compared to that of non-farm farm families (25.71%) and the non-salary earning families (16.22%) in the study area.

As regards protein dietary intake 33.33 percent of the households in the study area met the recommended minimum standard while 20, 22.22 and 18.89 were only able to fulfill between 25-50 percent, 50.1-75 percent and 75.1-99.9 percent respectively of the recommended minimum intake (see Table 5). Unlike the situation with the per capita household calorie intake, more of the low-income urban households (25%) met the minimum RDA as compared to 19.6% for the rural households. These findings support the assertion of Lupien and Menza ^[14] that the demand for proteineous food in the urban area is growing and is expected to rise over time.

Notably, farming and salary earning jobs contributed positively to the level of protein intake by households in the area. About 32.7% of the farming families met the RDA while only 28.6% of the non-farming families met the standard. For the salary-earning families 50% of them satisfied the protein RDA while only 29.73% of the non-salary earning families met the protein RDA.

Majority of the households in all the disaggregated groups fell within the 25-75 percent level of the RDA with few (less than 20% in most cases) struggling into the Fourth quintile range (i.e 75.1-99.9% level of the RDA).

From this analysis it can be said that there is still high level of under nutrition (with less than 32% meeting the RDA of calories) and malnutrition (with less than 34% meeting the RDA of protein. It could therefore be said that food security of a household or an individual, perhaps because of his/her advantage position in the household, does not necessarily guarantee that the household as an entity is food secured.

Table 1: Estimated Per Capita Daily Calorie (kcal) and Protein (g) Intake in Low-Income Urban Area by Age and Sex

Age	MALE			FEMALE		
	Actual Intake	RDA*	% Satisfaction	Actual Intake	RDA*	% Satisfaction
<i>Calorie Intake (kcal)</i>						
< 6yrs	1212.13	1475.50	82.15	1023.41	1355.00	75.53
6 – 10yrs	2015.30	1970.00	102.30	1680.12	1740.00	96.56
11 – 18yrs	2550.93	2487.50	102.55	2144.24	1977.50	108.43
19 – 59yrs	3019.92	2530.00	119.36	2519.82	1920.00	131.24
>60yrs	3157.20	2270.00	139.08	2686.14	1870.00	143.64
<i>Average</i>	2391.10	2146.60	111.39	2010.75	1772.50	113.44
<i>Protein Intake(g)</i>						
< 6yrs	20.66	13.25	155.94	22.81	13.25	172.18
6 – 10yrs	25.83	22.80	113.31	26.18	22.80	114.86
11 – 18yrs	45.81	39.95	114.69	35.69	35.10	101.71
19 – 59yrs	54.56	43.50	125.43	42.90	36.60	117.22
> 60yrs	70.11	42.60	164.59	66.67	37.20	179.23
<i>Average</i>	43.39	32.42	134.79	38.85	28.99	134.96

Source: Field Survey data July – Oct, 2005.

* RDA = Recommended daily Allowance, was culled from: Garrow, J.S and W.P.T. James (1993) "Human Nutrition and Dietetics", pp 785-786.

Table 2: Estimated Per Capita daily Calorie (Kcal) and Protein (g) Intake in the Rural Area by Age and Sex

Age	MALE			FEMALE		
	Actual Intake	RDA*	% RDA	Actual Intake	RDA*	% RDA
<i>Calorie Intake (kcal)</i>						
< 6yrs	1327.67	1475.50	89.98	1594.88	1355.00	117.70
6 – 10yrs	2371.10	1970.00	120.39	1931.66	1740.00	111.02
11 – 18yrs	2627.31	2487.50	105.39	2263.60	1977.50	114.47
19 – 59yrs	3388.50	2530.00	132.88	2819.93	1920.00	146.87
> 60yrs	2612.85	2270.00	115.10	2284.40	1870.00	122.16
<i>Average</i>	2465.49	2146.60	112.75	2178.89	1772.50	122.44
<i>Protein Intake (g)</i>						
< 6yrs	20.64	13.25	155.77	27.96	13.25	211.06
6 – 10yrs	38.70	22.80	169.78	34.08	22.80	149.48
11 – 18yrs	47.03	39.95	117.73	36.38	35.10	103.64
19 – 59yrs	62.64	43.50	144.01	51.37	36.60	140.37
> 60 yrs	47.90	42.60	112.45	33.18	37.20	89.20
<i>Average</i>	43.39	32.42	139.95	36.59	28.99	138.75

Source: Field Survey data, July – Oct 2005

* RDA = Recommended Daily Allowance, was culled from Garrow, J.S and W.P.T. James (1993), "Human Nutrition and Dietetics", pp 785-786.

Table 3: Summary Statistics of Nutrient Intake of an Average Household in Low-Income Urban and Rural Areas.

Variable	Freq.	FAO standard	Mean	Median	Std Dev.	Min.	Max.	Skweness
<i>Study Area</i>								
- Per Capita Calorie Intake (Kcal)	90	2400	2097.76	2007.30	836.47	996.22	5141.39	1.42
- Per Capita Protein Intake (g)	90	44.40	37.24	31.40	23.90	3.74	143.73	1.70
<i>Low-Income Urban Area</i>								
- Per Capita Calorie Intake (Kcal)	44	2400	2066.31	2028.59	741.61	1020.32	4956.36	1.43
- Per Capita Protein Intake (g)	44	44.40	37.63	32.85	23.03	3.74	118.16	1.47
<i>Rural Area</i>								
- Per Capita Calorie Intake (Kcal)	46	2400	2128.16	1988.22	924.25	996.22	5149.30	1.35
- Per Capita Protein Intake (g)	46	44.40	36.86	30.86	24.90	10.05	143.73	1.87

Table 4: Calorie Intake Levels of Households by Location, Income Source and Proportion in each Percentile of the RDA

Household Categories	Total Freq.	Proportion of Household in Each Percentile of the RDA				
		<25%	25%-50%	50.1%-75%	75.1%-99.9%	≥ 100%
- Low-Income Urban Area	44	-	4 (9.09)	17 (38.64)	14 (31.82)	9 (20.45)
- Rural Area	46	-	5 (10.87)	15 (32.61)	12 (20.09)	14 (30.43)
Farm Family in the study Area	55	-	5 (9.09)	13 (23.64)	15 (27.27)	22 (40.00)
Non-Farm Family in the study Area	35	-	4 (11.43)	12 (34.29)	10 (28.57)	9 (25.71)
Salary Earning Family in the Study Area	16	-	1 (6.25)	4 (25.00)	4 (25.00)	7 (43.75)
Non-Salary Earning Family in the Study Area	74	-	8 (10.81)	34 (45.95)	20 (27.03)	12 (16.22)
<i>Aggregate</i>	90	-	9 (10.00)	38 (42.22)	15 (16.67)	28 (31.11)

* Figures in parenthesis represent the percentage of the total sampled household whose calorie intake level attained the Recommended Daily Allowance (RDA)

Source: Field Survey data, July-Oct. 2005.

Table 5: Protein Intake Levels of Households by Location, Income Source and Proportion in each Percentile of the RDA

Household Categories	Total Freq.	Proportion of Household in Each Percentile of the RDA				
		<25%	25%-50%	50.1%-75%	75.1%-99.9%	≥ 100%
- Low-Income Urban Area	44	2 (4.55)	10 (22.73)	12 (27.27)	9 (20.45)	11 (25.00)
- Rural Area	46	2 (4.35)	14 (30.43)	15 (32.61)	6 (13.04)	9 (19.56)
Farm Family in the study Area	55	2 (3.64)	11 (20.00)	16 (29.09)	8 (14.54)	18 (32.73)
Non-Farm Family in the study Area	35	3 (8.57)	8 (22.86)	8 (22.86)	6 (17.14)	10 (28.57)
Salary Earning Family in the Study Area	16	-	3 (18.75)	3 (18.75)	2 (12.50)	8 (50.00)
Non-Salary Earning Family in the Study Area	74	6 (5.40)	15 (20.27)	20 (27.03)	13 (17.57)	22 (29.73)
Aggregate	90	5 (5.56)	18 (20.00)	20 (22.22)	17 (18.89)	30 (33.33)

* Figures in parenthesis represent the percentage of the total sampled household whose calorie intake level attained the Recommended Daily Allowance (RDA)

Source: Field Survey data, July-Oct. 2005.

Some Policy Implications: Improving subsistence food crop production and cash income for the poor people should be the main focus in attempting to improve food security situation in Nigeria. This is evident from this study that showed that a higher percentage of those farming and salary-earning households attained the RDA as compared to the non-farming and non-salary earning households. However the low percentages of farming households (40%) and salary earning families (43.75%) that attained the recommended calorie intake and 32.73% and 50% respectively that attained the recommended protein intake calls for a total re-engineering, re-structuring, re-directing, re-modelling and a holistic re-invention of the Nigerian agriculture as the sector has not made a significant impact on food intake by the citizenry. Not only are the Nigerian farmers to be helped in terms of subsidized inputs (which at present are not easily accessible), help is needed in areas of extension services, appropriate input supply mechanisms, research support, financing schemes, marketing training, processing facilities, technology transfer and/or adoption among others. In particular, improvements to transport infrastructure, especially maintenance of rural roads would help to reduce produce transportation cost and therefore enhanced income and improved food security.

Better marketing through provision of market price information to rural villagers is critical. Increasing the diversity of income sources so that people are less subjected to fluctuations in prices for one commodity will also help peoples ability to buy food when their subsistence crops fail.

Improving cash income for the urban poor through enhanced job creation, will also increase their food security as well as improve other welfare aspects.

Conclusion: This study has revealed that there is still a high level of protein-energy malnutrition among

Nigerian rural and low-income urban households. With just 31% and 33% of the households sampled attaining the recommended calorie and protein intakes respectively, it highlights the seriousness of the food insecurity problem in the country. The study like most other previous studies in the country showed that the pre-schoolers are the more affected. One of the ways this problem can be ameliorated is by increasing the diversity of cash income sources of both the urban and rural dwellers in the country. This study believes that more can be achieved through the re-engineering restructuring the agricultural sector with emphasis on improved input distribution mechanism, improved marketing and financing schemes and infrastructural development especially transportation.

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