

UNAAB

INAUGURAL LECTURE SERIES

---

**THE TRAVAILS OF A COMMUNITY NUTRITIONIST  
IN NIGERIA**

**By**

**Professor (Mrs.) Clara R.B. Oguntona**  
(Professor of Community Nutrition)

*Department of Food Science and Technology, College of  
Agricultural Management, Rural Development and Consumer Studies  
(COLAMRUCS)*

**University of Agriculture, Abeokuta.**



UNAAB INAUGURAL LECTURE  
Series No. 24

Wednesday, 27th August, 2008

---

**Series No 24:** Professor (Mrs.) Clara R.B. Oguntona

UNAAB  
INAUGURAL LECTURE SERIES

---

This 24th Inaugural Lecture was delivered under  
the Chairmanship

of

The Vice-Chancellor  
**Professor Oluwafemi. O. Balogun**  
B.Sc., PhD (Ibadan)

Published August 2008

Reproduction for sale or other commercial  
purposes is prohibited

ISBN:978-978-48250-9-2

---

**Series No 24:** Professor (Mrs.) Clara R.B. Oguntona

Printed by Intec Printers Limited, Ibadan.

UNAAB  
INAUGURAL LECTURE SERIES

---



**Prof. (Mrs.) Clara R.B. Oguntona**, Ph.D (Ibadan), M.Sc. (Loughborough),  
B.Sc. (Dosario– Argentina)  
(Professor of Community Nutrition)

UNAAB

INAUGURAL LECTURE SERIES

---

## **The Travails of a Community Nutritionist in Nigeria**

Mr. Vice-Chancellor, Sir  
Deputy Vice-Chancellors,  
Principal Officers,  
Dean COLAMRUCS,  
Other Deans and Directors,  
My Head of Department,  
Professors and Scholars,  
My other Colleagues,  
The Great UNAABITES,  
My Dear Students,  
Invited Guests,  
Ladies and Gentlemen.

### **1.0 INTRODUCTION**

An inaugural lecture provides the presenter a unique opportunity in an academic career for it allows a critical review of what has been done and what remains to be done. It also should be a moment of reflection on the achievements so far, or lack of such and a pointer to the way forward. For this, I am really delighted to have been given this opportunity and I thank my College for nominating me to present the first Inaugural Lecture from the department of Nutrition

## UNAAB

### INAUGURAL LECTURE SERIES

---

and Dietetics.

In Nutrition, Mr. Vice-Chancellor Sir, as in all the sciences, the rate of progress and new ideas have been enormous during the last 30 years that covers my modest contributions to Nutrition. Long gone are the days when the main and only nutritional problems were “Kwashiorkor and Marasmus.” Globally, significant progress has been made in hunger reduction with the proportion of hungry people in developing countries dropping from 25 % in 1970 to 16 % in 1995 (Rosengrant et al., 2001). The number of chronically underfed people remains unacceptably high at over 840 million; a high proportion of these are women and children and all indications are that these figures may soon be on the increase given the present Food Crisis. Today, we have identified micronutrient deficiencies also called “hidden hunger” as the cause of health impairment of billions of people in developing countries with the most vulnerable groups being children and mothers.

Health statistics from WHO (World Health Organization, 1998) show that over 50 million children in Sub-Saharan Africa alone are affected by vitamin A deficiency, particularly Xerophthalmia with a 60 % fatality rate. According to Micronutrient Initiative and UNICEF (2004) the number of child death per year due to VAD (Vitamin A deficiency) in

## UNAAB

### INAUGURAL LECTURE SERIES

---

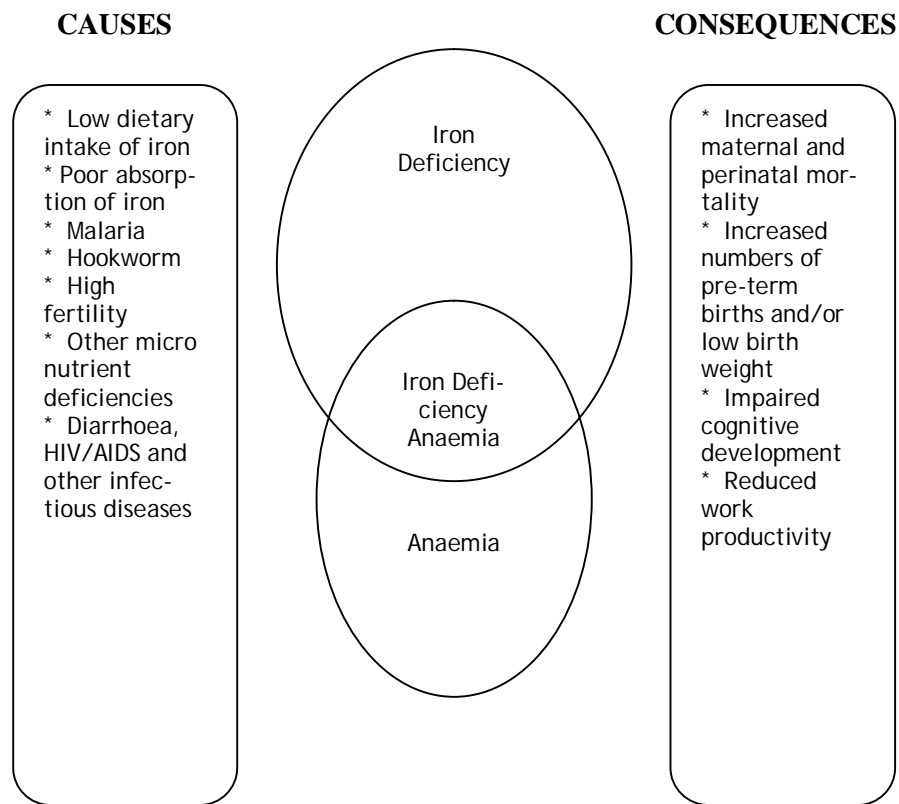
Nigeria was 82,000, while maternal death was 11,000. The loss of productivity by adults for that year in millions of U\$S was 220.3 and the total loss in productivity for the future was calculated to be 334.9 millions U\$S dollars/year. These are indeed alarming figures. However according to Mason et al. (2005), prevalence of vitamin A deficiency in Nigeria among children (0 -72 months) has decreased from 45.4 % in 1990 to 38.2 in 2000; the figures still remain too high.

Another serious concern is Iron deficiency anaemia which is one of the most prevalent nutritional deficiencies in the world, and is reported to affect 4 to 5 billion people (WHO, 2004). It is estimated that 2 billion people suffer from anaemia world wide, 50 % of these are estimated to be due to iron deficiency; a condition of deteriorating iron reserves in the body caused by low dietary intake of iron, poor absorption, hookworm infestation and/or blood loss. The cause-and-effect traits are presented in Fig 1

Anaemia prevalence is highest among pregnant women, infants and young children due to the high iron demand of growth and pregnancy. On the average, 45 % of pregnant women and 49 % of children under five years (U5) are anaemic in developing countries (Mason et al., 2005).

UNAAB  
INAUGURAL LECTURE SERIES

---



**Fig 1: Iron Deficiency, Iron Deficiency Anaemia (IDA) and Anaemia (USAID, 2006)**

## UNAAB

### INAUGURAL LECTURE SERIES

---

A recent meta-analysis (Stoltzfus et al., 2004) shows that correcting anaemia of any severity reduces the risk of death: the risk of maternal mortality decreases by about 20 % for each 1 g/dL increase in Haemoglobin. This is a new finding and different from the earlier view that only severe anaemia is associated with increased mortality. It has important policy and programme implications.

In recent years, co-existing with micronutrient deficiencies and undernutrition is what is described as diseases of affluence – obesity, diabetes, cardiovascular diseases and cancers. Childhood obesity is on the increase and there are reports of increasing rates of diabetes linked to the nutrition transition (Maletnlema, 2002; Swinborn, 2004). Figures from University College Hospital (UCH) show that the number of diabetic patients attending the outpatient clinic has increased from 2,407 in 1997 to 2,915 in 2004, a prevalence rate of 10.33 % in 2004; in 1997, it was 8.94 % (UCH, 2004). The steady increase in the prevalence rates of these diseases has been linked to increasing intakes of diets that are rich in energy but poor on micronutrients and health protecting and promoting phytochemicals provided by fruits and vegetables (Frison et al., 2006).

Urbanization has been linked to the observed reduced access to traditional and indigenous foods in many communities



## UNAAB

### INAUGURAL LECTURE SERIES

---

and the replacement of these foods with energy dense “convenient” foods (Delgado and Rearden, 1987). Also contributing to this is the declining diversity in traditional food systems when these are replaced by mono-cropping agriculture. Similarly, very topical today is the rise of bio-fuels, which is already having dramatic impacts on food prices with alarming effects on the ability of the poor to feed themselves. Filling the tank of a 25 gallon SUV with pure ethanol requires over 200 kg of maize which could provide enough energy to feed 1 person for a whole year (Taylor, 2007).

What is the situation in Nigeria? The findings of the Nigeria Food Consumption and Nutrition Survey of 2003 show some revealing information; severe food insecurity was found in over 40 % of all households surveyed in all the zones. Nationally, 42 % of children U-5 were stunted, indicating chronic malnutrition while 10 % were wasted. This refers to acute ongoing malnutrition, while the percentage of U-5 children who were underweight was 25. These figures indicating that Protein Energy Malnutrition (PEM) is still a major health problem in Nigeria. The survey also showed that 12 % of child-bearing age women were undernourished, the problem being more acute in the dry savanna and rural settings (Maziya Dixon et al., 2004).

## UNAAB

### INAUGURAL LECTURE SERIES

---

At the time of the survey 29.5 % of children had marginal vitamin A deficiency, despite the vitamin A supplementation which was carried out close to the time of the survey.

Moreover, mothers did not fair better since 13 % were also deficient. The highest prevalence was in the dry savanna (19.6 %) while the lowest was in the humid forest. The iron deficiency profile was also alarming. Findings show that 20 % of children surveyed were deficient and another 8 % had iron store depletion which manifests as anaemia. Iron deficiency among non-pregnant women was 12 % while this was 20 % in pregnant women. The survey also indicated that only 21 % of children had complete immunization.

## **2.0 NUTRITION OF ADOLESCENTS**

As a fresh graduate in the 1970s, one was confronted with widespread undernutrition in the developing world, and an emphasis by the scientific community on a whole spectrum of deficiencies caused essentially by lack of food which we now understand better and have named Protein Energy Malnutrition or PEM. Unfortunately, this condition continues to bedevil our part of the world, even today.

In that bleak picture, Mr. Vice-Chancellor, great part of the nutrition efforts at that time had concentrated on the

## UNAAB

### INAUGURAL LECTURE SERIES

---

nutritional status of women and children and rightly so. Indeed, they belong to what in nutrition are called vulnerable groups. These are age groups in the community that have special and/or increased nutrient requirements and are vulnerable to nutritional diseases more readily as a consequence of these increased needs. Adolescents also constitute one such vulnerable group. This is a group that received little attention then. This neglect continues today despite the fact that according to UNFPA's State of World Population (2005) there are 1.2 billion adolescents between 10 – 19 years of age. Adolescents are the future adults and, therefore, this stage in the life cycle is critical to ensuring good nutrition in adulthood and continued proper nutrition in future generations.

Adolescents constitute a nutritionally vulnerable group for several reasons. It is a time of rapid growth, only surpassed by growth in uterus and in the first year of life with increased nutrients needs. It is a time of transition between childhood and adulthood accompanied by enormous physiological, cognitive and psychological changes (WHO, 2003). This stage of the life cycle signals the beginning of independence from the strict parental control of childhood. Adolescents are subjected to peer pressure; they use their judgment in selection of foods and eat more meals outside

## UNAAB

### INAUGURAL LECTURE SERIES

---

the home. The World Health Organization (WHO, 2003) acknowledged that adolescents remain a “neglected, difficult-to-measure and hard to reach population”. Even as at now, they constitute a very large proportion of the population of developing countries like Nigeria.

For all these reasons, the nutrition of adolescents presented a very attractive niche for a young community nutritionist setting out in the 1970s. Before the early 80s, for example, no study had been published on the nutritional and anthropometrical status of Nigerian adolescents until the one on the anthropometric status of adolescents in Borno State (Oguntona and Oguntona, 1983). The study showed that adolescents in Borno had heights and weights that were higher than adolescents in Somalia, and were between those of rich and poor American adolescents. The study of the adolescents was followed by one on the nutritional status of adolescents in the same region of Nigeria (Oguntona et al., 1987; Oguntona, 1999). We found in that study that the energy intake ranged between 62 and 75 % of RDA (Recommended Daily Allowances) for girls and boys. The intake of protein ranged between 50 and 135 % of RDA (Table 1). The problem at that time was of rather poor intake of some of the water soluble vitamins, such as vitamin C. Also, the intake of animal protein was rather low and that

## UNAAB

### INAUGURAL LECTURE SERIES

---

raised some questions on the bioavailability of iron. The intake of iron was relatively fair (68 – 75 % of RDA) but came mostly from plants which is not so easily absorbed.

The research work on adolescents continued in the South West Nigeria in the 1990s. The dietary intake of adolescents in this part of the country showed a much lower intake of iron (7.03-7.11 mg); however, for adolescents studied in Borno State, Nigeria it was 27 – 32 mg (Oguntona and Kanyi, 1993; Oguntona et al., 1999) as presented in Table 1. The energy intake of adolescents in Abeokuta was lower than that of adolescents in Borno. Also, the Borno adolescents had higher intake of calcium; however, high proportion of their calcium intake came from plants, particularly from the consumption of baobab leaves (*Adasonian spp*). Again, this brings to question the bioavailability of this mineral in the local diet.

Since adolescence is a pivotal stage of the life cycle which provides a unique opportunity to foster a healthy transition from childhood to adulthood, it is important to ensure that the nutritional needs of adolescents are met. This is particularly important for girls, since a good nutritional status prior to pregnancy is the best safeguard against low birth weight of infants and a way to prevent the generational

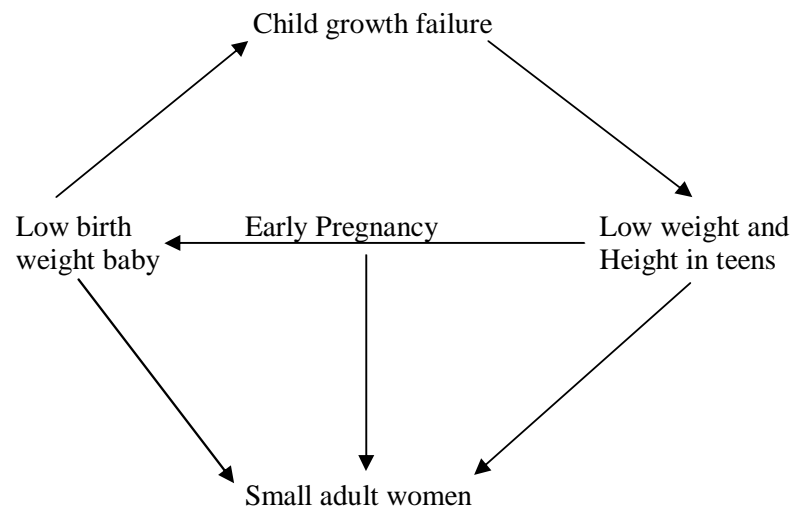
**Table 1: Intake of Energy, Protein and Some Micronutrients as Percentage of RDA for Adolescents in Nigeria**

| Subjects                 | Energy<br>(%RDA) | Protein<br>(%RDA) | Cal-<br>cium<br>(%<br>RDA) | Iron<br>(%<br>RDA) | Vitamin<br>A<br>(%<br>RDA) | Vitamin<br>B1<br>(%<br>RDA) | Niacin<br>(%<br>RDA) | Vita-<br>min<br>B2<br>(%<br>RDA) | Vitamin<br>C<br>(%<br>RDA) |
|--------------------------|------------------|-------------------|----------------------------|--------------------|----------------------------|-----------------------------|----------------------|----------------------------------|----------------------------|
| Urban<br>Borno<br>Male   | 64.9             | 65.06             | 82.0                       | 75.0               | 118                        | 73.3                        | 81.2                 | 83                               | 70                         |
| Urban<br>Borno<br>Female | 74.7             | 50.0              | 90.0                       | 68.0               | 126.7                      | 58.1                        | 120                  | 87.6                             | 60                         |
| Rural<br>Borno<br>Male   | 62.2             | 108.4             | 97.0                       | 81.0               | 135.3                      | 70                          | 81.2                 | 73                               | 56.6                       |
| Rural<br>Borno<br>Female | 72.5             | 135.5             | 110.0                      | 80.0               | 154                        | 90.9                        | 114.9                | 88.5                             | 43.3                       |
| Male<br>Abk<br>(1993)    | 91.5             | 130.1             | 154.0                      | 29.0               | 134.3                      | 150                         | -                    | -                                | 130.0                      |
| Female<br>Abk<br>(1993)  | 113.1            | 148.4             | 185.0                      | 26.2               | 125.4                      | 100                         | -                    | -                                | 121.0                      |
| Male<br>Abk<br>(1999)    | 57.2             | 103.8             | 79.0                       | 19.8               | -                          | -                           | -                    | -                                | -                          |
| Female<br>Abk<br>(1999)  | 61.5             | 105.2             | 82.0                       | 17.6               | -                          | -                           | -                    | -                                | -                          |

vicious circle of malnutrition (Fig.2.). In this regard, I quote a statement from the International Food Policy Research Institute (IFPRI, 2004) “A girl born to a mother that is undernourished will be born stunted in height and low in weight, even at full term. If the infant survives, her growth will be more likely to falter. Her ability to learn will be, to a large extent, irreversibly damaged as will her ability to develop other skills that pay off in the labour market, in the home and in the community. She will be more susceptible to infectious diseases and to non communicable diseases in later life. Throughout her life, her options and her power to make choices about those options will be as stunted as her growth will be. Society will be worse off in a social and economic sense. During her childbearing years, she will bear low birth weight babies of her own”. And so, the cycle of intergenerational poverty and ill-health continues. There are, however, nutritional interventions that enable individuals to break out of the bonds imposed by malnutrition; this same cycle can become a spiral of hope where nutritional improvements are reinforced through the life cycle and each succeeding generation can aspire to an increasingly healthy and prosperous life.

### **3.0 ADOLESCENT PREGNANCY**

Once we had a fairly good picture of the nutritional status



**Fig.2: Regeneration Circle of Malnutrition (Mason, 1994)**

of adolescents in Nigeria our attention was caught by the high percentages of adolescents who got pregnant. According to the Nigerian Demographic and Health Survey of 1999 (NDHS, 1999) 50 % of Nigerian adolescents had begun childbearing.

A more recent publication puts the figure at 25 % (NDHS, 2003). This situation is not exclusive to the developing world; indeed the figures for the prevalence of pregnancy among adolescents are high in the developed world too. The figures were 22% for the USA and 15 % for the UK in 2002



(Darrach et al., 2002).

Pregnancy during adolescence has negative demographic, socioeconomic and sociocultural consequences. Teenage mothers are more likely to suffer from severe complications during delivery, this results in higher morbidity and mortality for both themselves and their children. In addition, the socioeconomic advancement of adolescent mothers in the areas of educational attainment and accessibility to job opportunities may be curtailed. The most common medical problems associated with adolescent pregnancies are low birth weight, premature birth and obstetric complications (Scholl and Hediger, 1993).

A study conducted in Ifo and Abeokuta by Oguntona (1999) on pregnant adolescents showed alarmingly poor nutrient intake (Table 2). The energy intake was even lower than that of non-pregnant adolescent girls in the same area. Only 2 % of subjects had energy intakes between 10 – 10.5 MJ/d which approximates the FAO/WHO/UNU (1985) recommendations. At that time it was thought that the only nutrient abundant in the diet of the pregnant adolescents was vitamin A. Even this was mainly from the conversion of carotenoids to vitamin A. However, this conversion is now considered to be about one fourth of what was previously

## UNAAB

### INAUGURAL LECTURE SERIES

---

thought (Castenmiller and West, 1998) and has now altered the assumption that vitamin A was not critical among these subjects.

Table 2 shows the intake of pregnant adolescents and control as percentages of RDA. The only other nutrient with a relatively acceptable intake was zinc. The results of this study provided some indication of the poor nutritional situation in pregnant adolescents in this area. This situation has potential significance not only for the growth and development of the foetus but also for long term health consequences of the infant (Oguntona and Akinyele, 2002).

There is an accumulation of clinical and experimental evidence linking maternal and early childhood undernutrition to premature mortality and health in adult life (Barker, 1995). Children born to malnourished women become vulnerable as adults to non-insulin diabetes mellitus, high blood pressure and cardiovascular heart disease (CDH). This vulnerability was associated with poor food intake during the last trimester of pregnancy (Ravelli et al., 1998). High premature death was also recorded in middle-aged Gambian adults born to mothers who were malnourished during pregnancy (Moore et al., 1997). An important index of pregnancy outcome is birth weight.

**Table 2: Intake of Energy, Protein and Some Micronutrients and Intake as Percentage of RDA by Pregnant Adolescents in Nigeria**

| Subjects      | Energy<br>(%<br>RDA) | Protein<br>(%<br>RDA) | Calcium<br>(%<br>RDA) | Zinc<br>(%<br>RDA) | Iron<br>(%<br>RDA) | Vitamin. A<br>(% RDA) |
|---------------|----------------------|-----------------------|-----------------------|--------------------|--------------------|-----------------------|
| Urban>17 yrs. | 55.5                 | 70.3                  | 56.9                  | 90.6               | 39.3               | 292.4                 |
| Urban≤17 yrs  | 49.3                 | 55.2                  | 48.0                  | 72.0               | 33.0               | 258.1                 |
| Rural>17 yrs. | 53.9                 | 61.7                  | 46.9                  | 80.0               | 36.3               | 301.4                 |
| Urban≤17 yrs. | 52.8                 | 56.0                  | 51.0                  | 70.7               | 32.3               | 275.0                 |

## UNAAB

### INAUGURAL LECTURE SERIES

---

In fact, there is a strong epidemiological evidence of an association between low maternal weight gain during pregnancy and low birth weight (LBW)/intra-uterine growth retardation, especially in undernourished women (Norton, 1994). Intrauterine growth retardation is the most common cause of LBW in the developing world and it is mainly due to poor nutrition. The LBW of babies born to adolescent mothers is more than a case of small babies from small mothers. Young, and still growing adolescents, even when matched for nutritional status have smaller infants than adult mothers (Frisancho et al., 1985).

Pre-pregnancy body weights for these subjects were not available; weight gain during pregnancy in this study was therefore restricted to data available from 16 weeks of pregnancy. The higher weight gain of pregnant adolescents observed in our study (Oguntona and Akinyele, 2004) is consistent with the observation by Scholl et al. (1989) and Frisancho et al. (1985). These workers had reported that compared to mature women, pregnant adolescents who are still growing, gain more weight. Part of this is thought to be a consequence of maternal growth rather than foetal weight (Scholl and Hediger, 1993). Rosso (1985) recommended an increase of 20 % in body mass during pregnancy for normal women of average height and weight. It is also known that

**Table 3: Initial Height (cm) and Mean Weight (kg) of Pregnant Adolescents**

| Subjects      | Height (cm) | 16 weeks | 28 weeks | 40 weeks | Weight gain over 24 weeks |
|---------------|-------------|----------|----------|----------|---------------------------|
| <b>Rural</b>  |             |          |          |          |                           |
| Control       | 156.8 ± 4.3 | 51.3     | 53.9     | 56.9     | 5.60 ± 0.3                |
| ≤ 17 yrs.     | 153.4 ± 3.6 | 48.0     | 50.8     | 54.9     | 6.85 ± 0.4                |
| > 17 yrs.     | 154.7 ± 5.4 | 49.5     | 52.3     | 55.6     | 6.01 ± 0.3                |
| <b>Urban</b>  |             |          |          |          |                           |
| Control       | 156.5 ± 5.1 | 55.3     | 55.3     | 58.6     | 5.47 ± 0.6                |
| ≤ 17 yrs.     | 153.5 ± 3.3 | 52.8     | 52.8     | 56.7     | 6.75 ± 0.5                |
| > 17 yrs.     | 156.9 ± 3.6 | 56.2     | 56.2     | 59.4     | 6.09 ± 0.5                |
| All Controls  | 156.6 ± 6.0 | 54.6     | 54.6     | 57.7     | 5.55 ± 0.7                |
| All urban     | 154.9 ± 4.8 | 54.6     | 54.6     | 58.0     | 6.43 ± 0.6                |
| All rural     | 154.0 ± 4.1 | 51.5     | 51.5     | 55.2     | 6.50 ± 0.5                |
| All ≤ 17 yrs. | 153.3 ± 3.1 | 52.0     | 52.0     | 55.8     | 6.82 ± 0.4                |
| All > 17 yrs. | 155.0 ± 6.0 | 54.1     | 54.1     | 57.5     | 6.00 ± 0.5                |

weight gain is minimal during the first trimester (Efiong and Banjoko, 1975)

Data from our study indicate that the mean weight gain for adolescents ranged from 6.01 to 6.85 kg while the initial weight of the adolescents at 16 weeks ranged from 48 kg to 53.4 kg. If it is assumed that these subjects gained no weight in the first trimester, the weight gain should have been between 9.6 kg to 10.68 kg. The pregnant adolescents in Ogun state therefore achieved, on the average only 62.6 to 64.14 % of their expected weight gain. In mature mothers, maternal weight gain during pregnancy is known to have a clear influence on mean birth weight of infant (Rosso, 1985). Only in the obese or overweight mothers is pregnancy weight known to have no significant influence.

According to the NDHS (2003) the percentage of LBW in Nigeria was 12.1 %. This value refers to children who were delivered in health facilities. Among the subjects of our study, the prevalence of LBW was 59.3 % among the younger cohort and 27.5 % among the older cohort. This value is much higher than the 11.4 % of LBW recently reported in the same area by Olowonyo et al. (2006). The high incidence of LBW in babies of young adolescent mothers is in agreement with the results of earlier work done in

## UNAAB

### INAUGURAL LECTURE SERIES

---

Nigeria (Efiong and Banjoko, 1975) and other parts of the world (Scholl and Hediger, 1993; Mc Cornick et al., 1984). Even in countries where the incidence of LBW is lower, young adolescents are known to have infants that weigh less than those born to mature mothers. Data obtained from a study in Camden (Scholl and Hedger, 1993) have shown that even when all other confounding variables are adjusted, growing adolescents have infants that weigh significantly less than non-growing controls. LBW is generally associated with increased morbidity and mortality, impaired immune function and poor cognitive development for neonates and infants (SCN, 2000). The risk of neonatal death for infants with LBW weighing 2,000-2,499 g at birth is estimated to be four times higher than for infants weighing 2,500 -2,999 g and ten times higher than for infants weighing 3,000 – 3,499 g (Ashworth, 1998).

Sir, effective and large-scale practical interventions to prevent LBW will therefore, have enormous impact on the health and productivity of individual and society. We have demonstrated that the pregnant Nigerian adolescent is as prone to the challenges of pregnancy and child birth as her contemporaries in other parts of the world. There is still work to be done on Adolescents in Nigeria, particularly to find answers on sustainable practices to improve women's

nutritional status prior to pregnancy and their weight gain during pregnancy. It is also important to delay pregnancy until after adolescence.

#### **4.0 NUTRITION OF THE ELDERLY**

Nutrition of the elderly has, in the last two decades or so, started to receive the research attention it deserves. Apart from infants, mothers and adolescents, the elderly (> 65 years old) constitute the only remaining vulnerable group in the community. According to Ismail (1999) it was assumed until recently, that older people represented only a small proportion of the population of developing countries and that they were adequately cared for within the extended family system. He argued that these assumptions need to be challenged.

In these last two decades there has been an unprecedented transition from high birth and death rates to low fertility and mortality worldwide. In 1950, for example there were about 200 million people over 60 years. But, by 2025 there will be 1.2 billion, of whom nearly 70 % will be in developing countries. In the rapidly changing social and economical conditions of these developing countries, the elderly suffer disproportionately (Oguntona et al., 1988). For most of these older people, retirement is not an option. Poverty,



## UNAAB

### INAUGURAL LECTURE SERIES

---

lack of pension on retirement and rural urban migration of younger people are among the factors that compel older people to continue working. Adequate nutrition for a healthy ageing is thus essential to preserve a minimum quality of life.

The population of Nigeria according to the last census is 144,400,000 (RPB, 2008). If the proportion of those aged 65 and above is taken as 3 % as reported by the Reference Population Bureau (2008) that represents more than 4 million individuals, and thus perhaps the largest concentration of elderly people in Africa. Studies on the nutritional status of such a large population of vulnerable elderly in our community are, therefore, of some importance. In 1988, about twenty years ago, we studied the food and nutrient intake of the elderly in Borno (Oguntona et al., 1988) as shown in Table 4.

The study revealed that intake of most nutrients was inadequate. Energy intake was at best 72 % of RDI, considering that the RDI used at that time were higher than the ones in use today. If we use the values recommended now (8.45 MJ for males and 7.68 MJ for females), then, they were not doing too bad. The energy intake for rural men was then higher than for urban male. Protein intake was relatively

**Table 4: Mean Daily Nutrient Intake of Elderly Nigerians as Percent-  
ages of RDAs**

| Subjects             | En-<br>ergy<br>(%<br>RDA) | Protein<br>(%<br>RDA) | Cal-<br>cium<br>(%<br>RDA) | Iron<br>(%<br>RDA) | Vit.A<br>(%<br>RDA) | Vit.B1<br>(%<br>RDA) | Vit.B2<br>(%<br>RDA) | Niacin<br>(%<br>RDA) | Vit.C (%<br>RDA) |
|----------------------|---------------------------|-----------------------|----------------------------|--------------------|---------------------|----------------------|----------------------|----------------------|------------------|
| Rural Borno<br>Male  | 54                        | 84                    | 122                        | 129                | 115                 | 58                   | 28                   | 79                   | 48               |
| Rural Borno female   | 72                        | 126.5                 | 144                        | 49                 | 120                 | 71                   | 85                   | 110                  | 35               |
| Urban Borno male     | 52                        | 103.8                 | 116                        | 97                 | 103                 | 63                   | 39                   | 47                   | 74               |
| Urban Borno female   | 65                        | 110.4                 | 122                        | 36                 | 103                 | 68                   | 54                   | 70                   | 34               |
| *Dry season male     | 46.7                      | 73.4                  | 104                        | 41                 | -                   | 42                   | 31                   | -                    | -                |
| *Dry season female   | 46.2                      | 85.9                  | 108                        | 47                 | -                   | 45                   | 36                   | -                    | -                |
| *Rainy season male   | 55.1                      | 88.3                  | 162                        | 44                 | -                   | 58                   | 46                   | -                    | -                |
| *Rainy season female | 56.6                      | 95.7                  | 176                        | 53                 | -                   | 73                   | 55                   | -                    | -                |

\* Ogun State

## UNAAB

### INAUGURAL LECTURE SERIES

---

high for all groups and there were no differences between rural and urban cohorts.

Iron intake appeared adequate for the men regardless of location, but women had poorer intakes. The RDAs for iron are now based on bioavailability. This criterion was not used for the Borno cohorts (Oguntona et al., 1988), but looking at the situation 10 years after in the rural South West of Nigeria, we find a very poor intake of energy and nutrients during the dry season and a slightly improved situation during the rainy season. The energy intake of these subjects represented around 50 % of RDA when considering the year as a whole. These values were much lower than the ones found in Borno State. In both studies, carbohydrates supplied the bulk of the energy intake and plant sources the bulk of the protein. High dietary fibre and low cholesterol intakes are common features of populations in the tropics. The study in the SW showed an intake of cholesterol that ranged between 10.1 mg/d during the dry season (females and males) to 12.4 mg/d for males during the rainy season. The fibre intake, on the other hand, ranged from 30.2 g/d in the dry season to 38.9 g/d during the rainy season. Both female and male had similar levels of intake (Oguntona et al., 1998).

The anthropometric survey of the elderly in Ogun State

showed a body mass index (BMI) ranging from 18.4 kg/m<sup>2</sup> to 21 kg/m<sup>2</sup>. BMI is an index of thinness and therefore, the energy nutrition of adults. BMI range of 18.5 – 24.9 indicates adequate energy nutrition. In actual fact, 10 % of the subjects had BMI less than 18.5 kg/m<sup>2</sup>, representing Grade I chronic energy deficiency (Oguntona and Kuku, 2000). The heights of the subjects were similar in both urban and rural settings and males had significantly higher values than females.

Our study also measured the waist: hip ratio of the subjects, mean value for rural men was 0.80 and 0.81 for rural women. The values for their urban counterparts were 0.81 and 0.84, respectively. Larsson et al. (1984) highlighted the significance of the distribution of abdominal adipose tissue as a predictor of cardiovascular problems and death in elderly subjects. According to Caterson (1998) a ratio of more than 0.8 in females and higher than 0.9 in males suggests abdominal obesity. We know of no earlier studies in which these variables have been recorded specifically for elderly Nigerians. Values for these indices obtained in this study are, however, below those obtained for healthy elderly Chinese (Side et al., 1995). Our studies suggest a generally poor physical and nutritional status of the elderly in Nigeria with possible serious health consequences. The findings of

these studies have been confirmed by more recent studies in the same region by Ojofeitimi et al. (2002) and Olayiwola and Ketiku (2006).

### **5.0 RECIPE STANDARDIZATION**

While assessing the nutrient intake of different groups of Nigerians, we encountered a very peculiar problem concerning the evaluation of the nutrient content of Nigerian dishes. First, was the absence of standard recipes for commonly consumed dishes. Second, was that many subjects ate outside home and patronized “street foods” for which there was lack of information. We decided to address these two issues.

Many studies had been carried out in Nigeria on the nutrient composition of vegetables, legumes, cereals and tubers (Keshinro et al., 1992; Ajayi and Korode, 1991; Oyeleke, 1988; Eka and Hobbs, 1987; Addo, 1983; Oyenuga, 1968; Oke, 1968). There was, however, a dearth of information on the chemical composition of commonly consumed dishes in Nigeria. Nutritionists in this country therefore, had been presented with the problem of having to rely on published food composition tables from other countries to assess the nutrient composition of different dishes. These food composition tables have several shortcomings; they generally

## UNAAB

### INAUGURAL LECTURE SERIES

---

provide information only on raw foods and many of the local ingredients commonly used in the Nigeria cuisine are not listed. During this period a Food Composition for Nigerian Foods appeared (Oguntona and Akinyele, 1995) and remedied some of these problems but the listing contained nutrient content of only a few dishes and these included part of our own standardized dishes.

It was in the light of these problems that we proceeded to standardize some of the foods most commonly consumed in Nigeria (Oguntona et al., 1999; Oguntona and Adekoya, 1999; Oguntona et al., 2003). All the recipes were prepared and subjected to proximate analyses and we also provided information on the iron, copper and zinc as well as the phytate content (Onabanjo and Oguntona, 2003). This method has now been adopted by many researchers working on food composition in Nigeria and of course is the method of choice by all our post graduate students working in this area of Nutrition. Table 5 shows the chemical composition of these standardized dishes.

In general, food consumption pattern in Nigeria show wide sociocultural, geographical and regional differences which have long been known to influence both nutrient content of dishes and nutrient intake levels (Nicol, 1959). While foods

# UNAAB

## INAUGURAL LECTURE SERIES

Table 5: Proximate composition, Mineral and Phytate contents of Standardized Nigerian Dishes (per 100 g dry weight)

| Dishes                                | Moisture | CHO   | Prot. (g) | Fat (g) | Energy (Kcal) | Crude Fibre (g) | Ash (g) | Iron (mg) | Zinc (mg) | Copper (mg) | Phytate (mg) |
|---------------------------------------|----------|-------|-----------|---------|---------------|-----------------|---------|-----------|-----------|-------------|--------------|
| Apapafufu with tuwon shinkafa         | 32.58    | 47.00 | 27.21     | 27.20   | 541.73        | 1.29            | 4.09    | 22.10     | 0.78      | 0.46        | 1.20         |
| Amala and alapa with ewedu            | 46.10    | 61.60 | 8.59      | 11.56   | 384.80        | 14.17           | 4.04    | 7.15      | 2.76      | 1.08        | 4.20         |
| Bean pudding (moin moin)              | 48.90    | 5.45  | 49.20     | 38.68   | 289.59        | 0.33            | 6.34    | 3.29      | 0.70      | ND          | 4.30         |
| Burabisko                             | 22.91    | 76.58 | 8.50      | 1.35    | 315.46        | 1.78            | 1.29    | 5.96      | 2.91      | 0.54        | 0.60         |
| Cowpeas and Yam pottage               | 58.54    | 55.97 | 15.59     | 20.94   | 474.7         | 4.37            | 3.13    | 2.28      | 1.19      | 1.09        | 4.10         |
| Eba imoyo                             | 9.70     | 56.13 | 11.87     | 16.19   | 376.45        | 5.05            | 1.24    | 6.94      | 0.45      | ND          | 3.70         |
| Eberipo                               | 51.36    | 61.55 | 6.66      | 10.44   | 367.24        | 18.11           | 5.67    | 2.49      | 4.20      | 1.07        | 2.90         |
| Edikang-ikong                         | 57.84    | 27.2  | 44.17     | 9.79    | 683.01        | 13.48           | 5.29    | 7.93      | 3.65      | 0.68        | 3.00         |
| Gbegiri with eko                      | 37.70    | 61.56 | 27.62     | 6.52    | 415.40        | 4.25            | 3.75    | 3.27      | 1.18      | 0.55        | 2.60         |
| Ikokore                               | 9.70     | 51.32 | 13.81     | 22.60   | 418.92        | 1.02            | 1.55    | 8.84      | 3.02      | 0.38        | 3.30         |
| Jollof rice                           | 41.00    | 26.36 | 46.48     | 20.50   | 280.62        | 2.80            | 3.86    | 9.74      | 3.91      | ND          | 6.00         |
| Melon seed and vegetable soup         | 42.41    | 10.22 | 30.08     | 52.13   | 363.03        | 1.87            | 5.70    | 7.30      | 1.21      | 1.20        | 6.40         |
| Miyani kuka with semovita             | 50.32    | 47.4  | 24.98     | 12.04   | 397.88        | 11.45           | 3.80    | 5.56      | 1.88      | 0.89        | 3.90         |
| Miyani taushe with wania              | 44.93    | 40.48 | 30.02     | 12.03   | 390.27        | 11.79           | 5.55    | 6.89      | 2.25      | 0.66        | 3.80         |
| Ogbono soup                           | 10.20    | 8.80  | 30.25     | 45.70   | 509.62        | 2.43            | 2.62    | 9.81      | 3.54      | 0.97        | 3.20         |
| Okazi soup and eba                    | 39.54    | 54.08 | 15.88     | 20.47   | 464.07        | 2.41            | 7.16    | 2.39      | 2.35      | ND          | 3.80         |
| Pounded yam and dried fish with egusi | 50.93    | 34.76 | 27.56     | 24.73   | 471.85        | 4.57            | 8.38    | 4.49      | 3.24      | 0.97        | 1.70         |
| Stewed beans and fried plantain       | 43.49    | 52.33 | 19.95     | 13.43   | 231.68        | 10.81           | 3.48    | 5.84      | 0.43      | 0.47        | 6.10         |
| Yam and eggs                          | 9.80     | 48.63 | 11.80     | 27.10   | 438.03        | 1.59            | 1.08    | 8.22      | 0.76      | ND          | 4.10         |
| Yam pottage                           | 33.50    | 48.09 | 24.61     | 22.02   | 325.17        | 1.96            | 4.80    | 7.79      | 0.66      | 0.39        | 5.30         |

CHO: carbohydrate; Prot: protein

## UNAAB

### INAUGURAL LECTURE SERIES

---

consumed in the southern regions of the country are mostly from roots and tubers (yam, cocoyam, cassava, sweet potatoes, etc) according to Oguntona et al. (1999a) and those consumed in the northern parts consist mainly of cereals (millet, sorghum, corn, acha, etc.) as reported by Oguntona et al. (1987). The dishes are mostly rich in energy and contain fair amounts of iron and zinc, especially those rich in animal foods. Some of these dishes, however, contain appreciable amounts of phytates which inhibit the absorption of zinc by forming chelates (Gibson and Ferguson, 1999).

Most of the dishes analyzed are of plant origin and with few exceptions that contain small amounts of fish and/or meat. The dish with the highest amount of zinc was Eberipo which is made of cocoyam which contains an appreciable amount of the mineral (Osagie and Eka, 1998). The bioavailability of zinc appears to be worse when the Phytate: zinc molar ratio is 15: 1 or above (Turnlund et al., 1984). None of the standardized dishes had a Phytate : zinc molar ratio approximating that figure (Onabanjo and Oguntona, 2003). Akindunsi and Oboh (1999) have shown that blanching decreases the Phytate content of vegetables. This may explain the low Phytate content of most of these cooked dishes as compared with raw ingredients. Most of



our dishes are, therefore, good sources of nutrients and, although, some may contain high phytate content, the phytate : zinc molar ratio decreases when foods are cooked. Nutrient intake studies have now become more elaborate in terms of scope and understanding due to the contribution of our series of studies.

## **6.0 STREET FOODS**

All our studies on dietary intake of different groups of Nigerians pointed to the fact that many of the meals Nigerians consumed were not cooked at home but came from Street Foods (SF). Although the term “Street Foods” has only been used for a short period, the sale and consumption of food on city streets go back many centuries (FAO, 1997). The Food and Agriculture Organization (1997) has defined Street Foods as follows: “SF are ready-to-eat foods and beverages prepared and/or sold by vendors especially in streets and other similar places”. Inexpensive SF are widely sold and consumed in cities in Africa, Asia and Latin America. In the last 20 years, there has been increased interest worldwide on the importance of SF as part of a general concern for food security and health. The SF sector is also very important in the context of urbanization in Africa.

## UNAAB

### INAUGURAL LECTURE SERIES

---

This sector, part of the informal economy, influences the process of urbanization and the urban economy in a way that reflects the way of life and the survival strategies adopted by many African urban dwellers (Canet and N'Diaye, 1996). The breakdown of traditional family ties that accompanies rapid urbanization has pushed the generally poor urban dwellers to embrace the SF sector as a provider of cheap food and income. The survival and proliferation of SF stands in these cities reflect the great demand for the sector by the increasingly large urban population. In most countries, the SF industry, even though very extensive and important economically, is considered part of the informal economy. It usually does not get much official or positive recognition. Consequently, governments and cities have not taken the needed steps to improve the quality and safety of foods sold nor have they tried to regulate the practice. The SF industry requires recognition, as it is often very large, involves considerable amounts of money, employs many people and provides a real service to many citizens. The industry is one of the few that can be entered with little capital, relatively little education and only a small amount of expertise. Success requires hard work, ingenuity and street wisdom. These are the characteristics of many unemployed people and of some who enter illegal parts of the informal economy. In countries such as

## UNAAB

### INAUGURAL LECTURE SERIES

---

Nigeria, the majority of persons employed as street food vendors are women, so the sector contributes to the empowerment and economic gains for females (FAO, 1997).

In the cities of the developing countries, SF provide a significant percentage of the total food intake of millions of people. In this context, we looked at the contribution of SF to the nutrient intake of several groups in our society such as adolescents, market women, urban workers, students and unskilled workers living in Abeokuta. A summary of the findings could be seen in Table 6.

**Table 6: Percentage of RDAs of Nutrients supplied by SF among different groups of Nigerians**

| Nutrients            | Male students | Female students | Market women $\leq$ 49 years old | Market women $>$ 49 years old | Male urban workers | Female urban workers |
|----------------------|---------------|-----------------|----------------------------------|-------------------------------|--------------------|----------------------|
| % RDA supplied by SF |               |                 |                                  |                               |                    |                      |
| Energy               | 41.1          | 40.6            | 75.3                             | 93.5                          | 70.2               | 66.8                 |
| Protein              | 51.5          | 23.8            | 103.3                            | 141.1                         | 66.5               | 101                  |
| Calcium              | 67.4          | 48.3            | 87.3                             | 115.1                         | 80.0               | 60.0                 |
| Iron                 | 23.0          | 35.0            | 54.5                             | 77.5                          | 12.9               | 35.2                 |
| Thiamine             | 30.5          | 61.7            | 52.2                             | 173.3                         | 100.0              | 63.6                 |
| Vitamin C            | 51.7          | 57.3            | 172.4                            | 103.3                         | 91.6               | 66.0                 |
| Vitamin A            | 80.1          | 67.7            | 250.0                            | 156.8                         | 112.6              | 94.0                 |

The contribution of SF to nutrient intakes as we can see is substantial across the groups surveyed, supplying between 21.7 and 69.5 % of the energy intake. The animal protein intake of the various groups was rather small and yet SF

supplied between 37.9 % for female students and 86.6% for market women aged  $\leq 49$  years old. SF also contributed significantly to the intake of micronutrients supplying between 67.7 to 80.1 % of RDA for vitamin A, and a little more than 50 % of the RDA for vitamin C (Oguntona and Tella, 1999; Oguntona et al., 1998; Oguntona and Jaiyesimi, 1998; Oguntona and Kanye, 1995). The high level of dependence on SF for many nutrients by urban subjects in Nigeria poses important challenges to the development of Food Science in the country. It suggests great potential for appropriately processed, packaged, safe and nutritious foods to meet the needs of a rapidly growing urban population.

The chemical and microbiological compositions of SF were also investigated. The results of these showed that the nutrient quality was adequate; however the rate of contamination of the water used in the preparation of these foods gave some cause for concern (Sanni, et al., 1999a and b). The values of total bacterial counts in water and waste water ranged between  $4.5 \times 10^3$  and  $5.0 \times 10^3$  cfu/ml. The values of coliform counts ranged from  $3.2 \times 10^2$  to  $5.6 \times 10^2$  cfu/ml. This could have been due to improper storage and unhygienic handling of drinking water. Observation of the food preparation and operational practices of food vendors

## UNAAB

### INAUGURAL LECTURE SERIES

---

in Abeokuta showed poor and unhygienic handling of raw ingredients. Foods were usually prepared in the open, a practice that may have led to environmental contamination. There is an urgent need for LGA authorities to intervene by regulating this growing sector of the economy. It is important that vendors are trained on the basic principles of sanitation, manufacturing qualities and safety. Also, consumer education would be necessary to enable clients to evaluate the nutrition and safety value of the foods offered to them (FAO, 1989)

Mr. Vice Chancellor, Sir, the theme of SF is a continuous one and at present we are looking at the contamination of SF with heavy metals but you may all have to wait for my valedictory lecture to hear the results. We have also assessed the nutrient intake of several other groups such as “Peasants living in Northern Nigeria”, and the distinctive Kanuri people of Borno, (Oguntona et al., 1987) etc., We have also recently looked into the formulation of weaning foods using cassava and other locally available ingredients (Onabanjo, Oguntona et al., 2008) and the fortification of gari and fufu flours with iron (Sanni and Oguntona, in press) in our pursuit of solutions to the problem of hidden hunger.

The nutritional status of most Nigerians is not the best,

## UNAAB

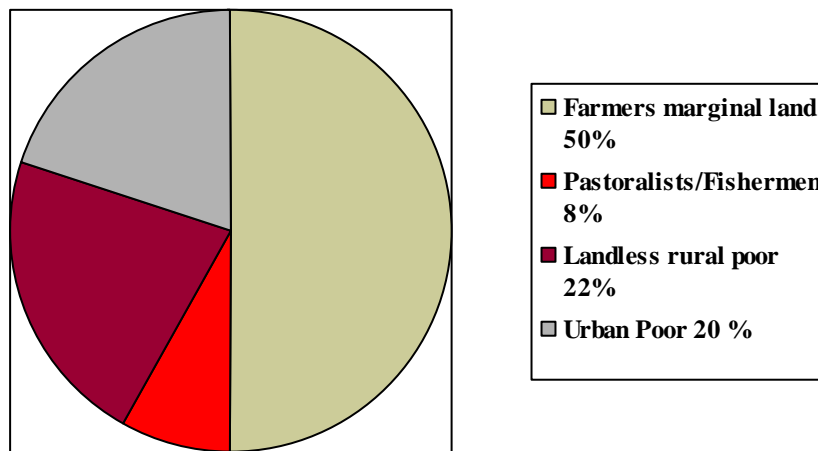
### INAUGURAL LECTURE SERIES

---

indeed it needs urgent attention. The causes of malnutrition are multifaceted but underlying these multiple causes is poverty. Sir, as you know, 70 % of Nigerians earn less than \$ 1 a day (UNESCO, 1992-2002). Poverty and hunger are highly interrelated and improvements in one lead to improvements in the other. Also, according to Müller (2007) 70 % of all undernourished people live in rural areas and depend directly on agriculture for their food and livelihoods. He argued that it is in the rural areas where the battle against hunger and malnutrition must primarily be fought, and sustainable livelihoods are the main weapons.

People affected by hunger are mainly living in rural areas, in all parts of the world. They are usually pastoralists, fishermen or farmers producing their own food, often on low potential land, or they are landless working on other people's land. Ironically, many of those who are hungry are living in rural areas depending on agriculture and are producing food (Cleaver, 2007) as seen in Fig. 3.

Many studies have shown how agricultural growth reduces poverty and hunger, even more than urban or industrial growth. The only group of countries to reduce hunger during the 1990s was the group in which the agriculture sector grew (FAO, 2006). This is where all of us, as staff in the University of Agriculture come in. We have a pivotal role



**Fig. 3: Land Use in Rural Communities (Adapted from United Nations Millennium Project, 2005)**

role in the battle against hunger and malnutrition. We have more than a role, we have a huge responsibility because we have the expertise and the country has very highly justifiable expectations.

### **7.0 UNAAB and University Education**

This, Mr. Vice-Chancellor, Sir, Ladies and Gentlemen, brings me to the topic of the role of the universities and particularly UNAAB in affecting the state of Agriculture and, therefore, nutrition in our catchment area.

## UNAAB

### INAUGURAL LECTURE SERIES

---

The idea behind the creation of universities of agriculture was based on the land-grant universities which were established in the USA in the middle of the XIX century. These were created with a 3-fold mandate of agricultural research, extension and training. The extension component was designed to link the land-grants academic and research programmes to societal needs. Fiduciary responsibility and a public service ethos were part of the mission. This was done when 50 % of the US population lived in farms; agriculture was the main business of the day and became a prime focus of the land-grants.

According to Rahn (2003) the significance of these institutions lied in the fact that the land-grant system created a government-university-private sector partnership for the advancement of research and technology transfer. This experiment in the US was very successful and many recognized well known, prestigious universities in that country today started as land-grant Institutions. These universities fulfilled their mission successfully, contributing to the transformation of the American agriculture by creating a cadre of well informed farmers which applied the scientific information to improve production and changed for ever farming practices, not only in the USA, but throughout the world.

It appears to me that after 20 years of UNAAB we have



## UNAAB

### INAUGURAL LECTURE SERIES

---

hardly had a noticeable impact on agricultural practices in our catchment area. Today we are on the way, for example, to producing more graduates in the pure sciences than in agriculture. In our last convocation there were, for the 05/06 Session, 70 graduates from COLPLANT, 157 from COLANIM, 246 from COLAMRUCS and 251 from COLNAS. The list of graduates for the 06/07 session was as follows: COLPLANT 92, COLANIM 141, COLAMRUCS 246 and COLNAS 356. Therefore, most of our efforts were for none agriculture students and the trend as shown is in that direction. We have somehow missed the way. Our advocacy measures in selling the virtues of our agriculture programmes have so far failed and we run the risk of losing track of our mission completely.

What happened? I have no ready answers to this but the fact that the universities of agriculture were moved from the Ministry of Agriculture to the Ministry of Education did not help. All the land-grant universities in the US were under the Ministry of Agriculture. For one the movement reduced our financial allocations. Additionally we speak the same language with the staff of the Ministry of Agriculture. Our programmes could be made to fit those of that Ministry. In the Ministry of Education we are only one university among many others. We do not share the common objective of

## UNAAB

### INAUGURAL LECTURE SERIES

---

transforming the agriculture practices of our farmers and improving the lot of the rural households.

Incidentally, most candidates seeking admission into the Nigerian Universities do not normally show interest in selecting agricultural courses as their fields of study. Indeed, 95% of the admissions into COLPLANT and COLANIM referred to earlier did not choose courses in agricultural disciplines. This should be of major concern to all stakeholders.

Of recent also, there have been pressures from the local community for a conventional university in Abeokuta rather than a university of agriculture. It seems to me that we have not been able to convince them of the long term benefits of this type of institutions in Nigeria. We all have to share the blame of this state of affairs and ought to find a way to remedy this.

According to the World Bank (2000) specialization is increasingly important. Institutions of higher education need to provide opportunities for in - depth study of particular fields and yet our attempt at specialization is not succeeding. This is, however, not surprising given the state of Education in Nigeria today and in many developing countries. According to the same report by the World Bank

## UNAAB

### INAUGURAL LECTURE SERIES

---

in most developing countries, higher education exhibits severe deficiencies. Demand for increased access is likely to continue, with public and private sector seeking to meet it with an array of new higher education institutions. Rapid and chaotic expansion is usually the result, with the public sector generally underfunded and the private (for profit) sector having problems establishing quality programmes that address anything other than short-term, market-driven needs.

Universities and knowledge have become very important in the world of the XXI century so much so that the World Trade Organization is now focusing on higher education and there have been efforts to integrate higher education into the legal structures of the world trade through the World Trade Organization, WTO (Altbach, 2002).

In developing countries such as Nigeria the enrolment in tertiary institutions remains very low. According to Jibril (2005) only 5 % of people aged between 18 and 25 were enrolled in tertiary education in Nigeria in the year 2000. This has slightly improved, since for the last few years the percentage of applicants that were admitted into the universities was around 10 % (JAMB, 2008). There are many reasons for this. To start with, the university cannot take all the students that qualify, but also, very few candi-

## UNAAB

### INAUGURAL LECTURE SERIES

---

dates qualify in respect of combination of required subjects at SSCE. Nigeria was supposed to have 17 million students in secondary school by the year 2000, Jibril (2005) estimates that only about 6 million were accommodated by that year: that is about 35 % of the age cohort were attending secondary school. Only 800,000 sat for the SSCE in 1999.

The system is therefore too small to guarantee the production of the kind of manpower that can be used as a vehicle for rapid development. The problem does not limit itself to higher education and secondary school enrolment. In fact, according to the Federal Minister of Education (2008), there are 11 million Nigerian children of school age out of school. This is more than 10 % of the world figure for out of school children. These figures are really alarming and for the long term consequences, I would like to quote a segment of an article that appeared in *The Guardian* not long ago, written by Dr. Reuben Abati: “The ruling class and the emergent Nigerian middle class are trying to protect their own children by sending them to private and privileged schools, which now exist from primary to university level. The children in these schools are protected from the rot in the public school system, but the gap and conflict between the classes are being widened. The children of the poor, who are

## UNAAB

### INAUGURAL LECTURE SERIES

---

going to the terrible schools, are likely to end up being poor because they may not acquire the skills they need to survive in a world that can only become more competitive. It is the society that will bear the cost because of the army of the poorly educated children trapped in empires of poverty, together with their cousins, the uneducated poor will make it impossible for the products of the privileged and private schools to enjoy the wealth and the opportunities they may have acquired. The children of the Nigerian rich in the future will have to live in houses with higher fences, stronger window braces and drive bullet proof cars; they would have to protect themselves against the 11 million plus armed robbers and social invalids who are now being created”

Mr. Vice-Chancellor, Sir, ladies and gentlemen, no words need to be added to those of Dr. Abati. In this regard, I would like to pay deserved tribute to the Academic Staff Union of Universities ASUU, the maligned union that has fought indefatigably over the years for the increase of the Budget allocation to Education. May be if we had had more support in that battle the story would have been different today. Ladies and Gentlemen, all is not lost. This country has a wealth of human resources that, if given the opportunity can flourish and compete on equal footing with those of

## UNAAB

### INAUGURAL LECTURE SERIES

---

any other country. In the words of Albatch (2004) the developing world has helped the North to maintain its already overwhelming lead in science and scholarship. In this respect, conditions must improve so as to transform the brain drain into a brain gain. Many of our best brains are now contributing to the development of already developed countries. If conditions were to improve many would choose to return. After all, there is no where like home. Additionally, knowledge is being produced throughout the world and this is becoming very accessible through the use of IT and the internet. This, no doubt, will help to develop and maintain a lively intellectual community. Much new knowledge is an international public good and the benefits extend beyond the borders of the country in which it is produced. Since UNAAB and most universities in Nigeria are now connected to the web and scholars and students have access to internationally published information, this cannot but bring benefits. The battle for higher budget allocation should continue and ASUU should not be the only body to fight for it.

Mr. Vice-Chancellor Sir, these are some of my concerns about the state of education in Nigeria today, especially as the veritable engine to transform agriculture, food production and better nutrition for our people. The travails of this

## UNAAB

### INAUGURAL LECTURE SERIES

---

Community Nutritionist will continue as long as it is possible with the prayer that others coming behind will report happier data and sing a sweeter song. It is only left for me to acknowledge the people that have helped me on this long way to the top.

#### **8.0 ACKNOWLEDGMENTS**

It is almost impossible to thank all the people that contribute in one form or the other to the career of an academician. I must, however, mention a few. First my late parents Natan and Ethel Bernstein, who brainwashed me from early childhood on the virtues of education. I am indeed indebted to them. My uncle Isaac Glembocki for his faith in my capabilities. My sisters Rosa and Beti for introducing me to the habit of reading for pleasure, I remain a compulsive reader. My brother Bernardo, a childhood companion. To my parents in law, late Chief and Mrs. Isaac O. Oguntona for welcoming me to the family with open arms. The gratitude is extended to my sisters and brothers in law. I thank the Nigerwives, my sisters in this our adopted country.

I cannot but remember with gratitude the role played by my teachers in Argentina. Good memories are stamped in my brain. I would also like to pay tribute to late Dr. F. U. Rosbaco, my first boss, who worked tirelessly on the

## UNAAB

### INAUGURAL LECTURE SERIES

---

genetic improvement of maize in Argentina. Many people assisted me during my stay at the Sutton Bonington campus of the University of Nottingham. These include, Doctors R. Neale and G. Norton. I thank them. I would also like to mention my M. Sc. supervisor at Loughborough University, Dr. E. Hamley who was a real inspiration and late Dr. N. Norgan, a renowned name in body composition studies who taught me classic Human Nutrition at Loughborough and who sadly passed away not long ago. I also thank Prof. I. O. Akinyele and the staff of the Department of Human Nutrition, University of Ibadan, who contributed to the success of my programme there. I am grateful to my colleagues and past students at the University of Maiduguri. I did have a rewarding experience working there. I thank the Vice-Chancellor of OOU, Prof. O. Osilesi, for granting me a place to spend a sabbatical year in the Department of Home and Hotel Management during 2006/07 academic year. I also thank the past Provost of the College of Agricultural Sciences, Ayetoro campus, Prof. S.F Adedoyin and all the staff of the College for a fruitful experience while there.

I must thank the authorities of UNAAB, for having given me the opportunity to work here. I thank the past Vice-Chancellors; Professors N.O. Adedipe, J.A. Okojie, I.F. Adu and I. Adamson for their support and not least the present



## UNAAB

### INAUGURAL LECTURE SERIES

---

Vice-Chancellor Prof. O. O. Balogun for giving me the opportunity to present my lecture today and for having brought a breeze of fresh air to the University. I must acknowledge late Prof. I. A. Akinbode the first Dean of COLAMRUCS for the great foundation of hard work and dedication he instilled in us at the inception of the College. I am also grateful to Prof. P. A. Okuneye under whose leadership I served briefly as a Deputy Dean of the College. Many thanks also go to my friend, Prof. (Mrs) A. A. Addo, my colleague while in the Department of Home Sc. and Mgt. She is now retired and enjoying the fruits of her labour. We both worked hard for the creation of the Department of Nutrition and Dietetics, which has become a reality today.

To my present Dean and present Chairman of CODAD, Prof. S.O. Awonorin, I say thank you for your support. Many thanks to my HOD, Dr. (Mrs) I. O. Olayiwola and colleagues in the Department of Nutrition and Dietetics and Home Science and Management for being a big family. This gratitude is also extended to all the staff of the College, especially to my sisters and brothers in the Department of Food Science and Technology and also my in laws at COLANIM. I thank my students, past and present, for keeping me on my toes and for having been a constant source of

inspiration.

Finally, I come to thank my nuclear family. First, my children: Anna Lola, Morayo and Jonathan, for making me such a proud mother. My first grandchild, Joaquin for cheering these last two years. I must thank my husband of 33 years, Prof. Tunde Oguntona, I thank you for 33 years of companionship, of shared interests and commitments, for 33 years of love and respect. I thank you for your unflagging belief in my capabilities, for your encouragement and guidance; I thank you for always being there for me. I consider my self a very fortunate person to have shared these years with a person of such integrity and devotion to his profession. Thank you. Thank you all for listening and God bless you all.

## **9.0 REFERENCES**

**Abati, R.** (2008) Dynasties of Poverty: The Education Challenge. Cross Roads. The Guardian. May 4, 2008.

**Addo, A. A.** (1983) Ascorbic Acid content of food commonly consumed in the Northern States of Nigeria. Nigeria Food Journal 1: 129 – 133.

**Ajayi, O.A.** and **Korede, O.** (1991) Protein and vitamin B6 content of foods consumed by Nigerian adolescents. Food

Chemistry, 39: 229 – 235.

**Akindaunsi, A. A. and Oboh, G.** (1999) Effect of some post-harvest treatments on the bioavailability of zinc of some vegetables. *Rivista Italiana delle Sostanze-Grasse*. 76: 285 – 287.

**Altbach, P. G.** (2004) Globalization and the University: Myths and Realities in an Unequal World. *Tertiary Education & Mgt.* 1: 1 – 20.

**Ashworth, A.** (1998) Effects of intrauterine growth retardation on Mortality and Morbidity in Infants and Young Children. *European J. Clin. Nutr.* 52: S34 -42.

**Barker, D.J.P.** (1995) Foetal origin of coronary heart disease. *British Medical Journal*, 311: 171-189.

**Canet, C and N'Diaye, C.** (1996) Street Foods in Africa. *Food Nutr. Agric.* 17/18: 4 – 13.

**Castenmiller, J.J.M. and West, C. E.** (1998) Bioavailability and bioconversion of carotenoid. *Ann. Rev. Nutr.* 18: 19 – 25.

UNAAB

INAUGURAL LECTURE SERIES

---

**Caterson, I.** (1998). Overweight and obesity. In: Essentials of Human Nutrition. Mann and Truswell eds. Oxford University Press. Oxford.

**Cleaver, K.** (2007). Nutrition, Food Security and Agriculture – an IFAD view. SCN News 34: 13 - 14

**Darroch, J.E., Singh, S. and Frost, J.J.** (2002) Differences in teenage pregnancy rates among five developed countries: the role of sexual activity and contraceptive use. Family Planning Perspectives 34: 56 – 59

**Delgado, C. L. and Rearden, T. A.** (1987) Problèmes pour les politiques alimentaires posées par la modification des habitudes alimentaires dans la santé. Proceedings of a Conference on the Dynamics of Cereal Consumption and Production Patterns in West Africa. IDRC: Dakar, Senegal.

**DHS** (1999) Demographic and Health Survey. National Population Commission, USAID, ORC MACRO, Maryland

**DHS** (2003) Demographic and Health Survey. National Population Commission, USAID, ORC MACRO, Maryland

**Efiong, E.J. and Banjoko, M.O.** (1975) The obstetric

## UNAAB

### INAUGURAL LECTURE SERIES

---

performance of Nigerian Primagravidae age 16 and under. *British Journal of Obstetrics and Gynaecology*. 82: 228-233.

**Eka, E.U. and Holbs, D.** (1987) Effect of cooking on the nutrient status of Danwaka.. *Nigerian Journal of Nutritional Sciences*, 12: 817 – 825.

**FAO/WHO/UNU** (1985) Energy and Protein Requirements. Technical Report Series No 724. Geneva. WHO.

**FAO** (1989) Report of a Food and Agricultural Organization Expert Consultation on Street Foods. Food and Nutrition Paper No 46. FAO. Rome.

**FAO** (1997) Street Foods. In: Human Nutrition in Developing Countries. Part V. Chapter 40. Food and Nutrition Library. Version 3.1

**FAO** (2006) World Food Day. Press Release. Food and Agriculture Organization. Rome

**Frisancho, A. R., Matos, J., Leonard, W.R. and Yarooh, L.A.** (1985) Developmental and nutritional determinants of pregnancy outcome as it affects infant growth, development

UNAAB

INAUGURAL LECTURE SERIES

---

and health. Am. J. Physical Anthropology, 66: 247 – 261.

**Frison, E.A., Smith, I.F., Johns, T., Cherfas, J. and Eyzaguirre, P.B.** (2006) Agricultural biodiversity, nutrition and health. Making a difference to hunger and nutrition in the developing world. Food and Nutrition Bulletin, 27: 167 – 179.

**Gibson, R. S. and Feguson, E. L.** (1999) An interactive 24-hr recall for assessing the adequacy of iron and zinc intakes in developing countries. Washington, D.C. ILSI Press.

**IFPRI** (2004) International Food Policy Research Institute. Accelerating malnutrition reduction in Bangladesh: The potential role of DFID-Bangladesh to add value. A Nutrition Intervention Scoping Study. Report of an IFPRI led team. Washington, DC

**Ismail, S.** (1999) Assessing Nutritional vulnerability in Older People in Developing Countries. SCN News 19: 18 – 23.

**JAMB** (2008). Applications and admissions statistics.  
<http://www.jambng.com>

**Jibril, M.** (2005) The Knowledge Economy and the Size and Shape of the Nigerian Higher Education System In: Perspectives and Reflections on Nigerian Higher Education. M. Jibril Editor. Spectrum Books Ltd. Ibadan

**Keshinro, O.O., Ogundipe, A.O., Scott-Emuakpor, M.M. and Egebe, P.** (1992) Effect of preparatory procedures on selected nutrient contents of some tropical maize products. J of Cereal Sc. 16: 31 -33.

**Larsson, B. Svardsudd, K., Welin, L., Wilhelmsen, L., Bjornthorp, P. and Tibblin, G.** (1984) Abdominal adipose tissue distribution, obesity and risk of cardiovascular disease and death: 13-year follow up of participants in the study of men born in 1913. Clinical Research, 288: 1401 -1404

**Maletnlema, I.N.** (2002) A Tanzanian perspective on the nutrition transition and its implication for health. Public Health Nutr. 5: 163 -168.

**Mason, J.** (1994) Maternal and Child Nutrition. SCN News. 11: 1 -2

**Mason, J., Rivers, J. and Helwig, C.** (2005) Recent trends in malnutrition in developing regions: vitamin A deficiencies, anemia, iodine deficiency and child underweight. Food

UNAAB

INAUGURAL LECTURE SERIES

---

and Nutr. Bull. 26: 57 – 162.

**Maziya-Dixon, B., Akinyele, I. O., Oguntona, E. B., Nokoe, S., Sanusi, R.A. and Harris, E.** (2004) Nigeria Food Consumption and Nutrition Survey 2001-2003. Summary. IITA. Ibadan.

**Mc Cornick, M.C., Shapiro, S. and Starfield, B.** (1984) High risk young mothers: Infant Mortality and Morbidity in four areas of the United States. Am. J. Public Hlth. 74: 18 – 23.

**MI and UNICEF** (2004) Vitamin and Mineral deficiency: A Global Challenge Assessment. Ottawa, Canada. The Micronutrient Initiative

**Moore, S.E., Cole, T.J., Poskitt, E.M.E. et al.,** (1997) Season of birth predicts mortality in rural Gambia. Nature, 388: 434 – 439.

**Müller, A.** (2007) Sustainable Livelihoods for Food Security and Good Nutrition: the Role of Food and Agriculture. SCN News, 34: 7 – 12.

**Nicole, B.M.** (1959) The caloric requirements of Nigerian peasant farmers. British J. of Nutrition 13: 393 – 306.



**Norton, R.** (1994) Maternal Nutrition during pregnancy as it affects infant growth, development and health. SCN News 11: 10 -14.

**Oguntona, C.R.B.** (1999) Effects of Food Intake on the outcome of adolescent pregnancy in two Local Government Areas of Ogun State. Ph D thesis. University of Ibadan, Ibadan.

**Oguntona, C.R.B., Oguntona, T.E., Williams, L. S. and Bui, K.** (1987) The food and nutrient intake of adolescents in Borno, Nigeria. Nutr. Reports Intern. 36: 981 – 987.

**Oguntona, C.R.B. and Kanye, O.** (1995) Contribution of Street Foods to the Nutrient Intake by Nigerian Adolescents. Nutrition and Health, 10: 165 -171.

**Oguntona, C.R.B. and Kanyi, V. O.** (1997) Nutrient Intake of Adolescents in Nigeria: Contribution from Manufactured Foods. Nig. J. Nutr. Scs 18: 7 - 10

**Oguntona, C.R.B., Addo, A.A. and Kuku Y.O.** (1998) Dietary Survey of Rural Elderly in Nigeria. Journal of the Nutr. for the Elderly, 18: 1 – 14.

**Oguntona, C.R.B. and Jaiyesimi, O.O.** (1998) Contribution of Street Foods to Food and Nutrient Intake of Urban Workers in Abeokuta. *Ind. J. Nutr & Dietet.* 35: 262 – 267

**Oguntona, C.R.B., Razaq, M.A. and Akintola, T. T.** (1998b) Pattern of dietary intake and consumption of Street Foods among Nigerian students. *Nutrition and Health*, 12: 247 – 256.

**Oguntona, C.R.B. and Adekoya, A. S.** (1999) Recipe standardization of some Nigerian dishes and their nutritional composition. *West Afr. J of Foods and Nutr.* 2: 64 – 72.

**Oguntona, C.R.B., Apoyin, M and Olateju, A. M.** (1999) Sources of nutrients in the diet of Adolescent Nigerians. *Nutr. & Food Sc.* 2: 72 – 77.

**Oguntona, C.R.B. and Tella, T.O.** (1999) Street Foods and Dietary Intake of Nigerian Urban Market Women. *Int. J. of Food Scs. and Nutr.* 50: 383 – 390.

**Oguntona, C.R.B. and Kuku, O.** (2000) Anthropometric survey of the elderly in south-western Nigeria. *Annals of Human Bio.* 27: 257 – 262/

**Oguntona, C.R.B. and Akinyele, I. O.** (2002) Food and Nutrient Intake by Pregnant Nigerian Adolescents during the third trimester. *Nutrition*, 18: 673 -679.

**Oguntona, C.R.B. and Akinyele, I.O.** (2004) Weight gain and Pregnancy outcome in Nigeria Adolescents. *West Afr. J Foods and Nutr.* 7: 1 – 11.

**Oguntona, T. and Oguntona, C.R.B.** (1983) The anthropometric status of adolescents. *Annals of Borno.* 1: 201 – 204.

**Oguntona, T., Oguntona, C.R.B. and Williams, L.** (1985) Dietary Intake of Nigerian Peasants living in a semi-arid zone. *Ethiop. J Health Dev.* 2: 27 - 35

**Oguntona, T., Oguntona, C.R.B. and Williams, L.** (1988) Food and Nutrient Intake of Elderly in Borno, Nigeria. *Nutr. Research* 8: 1099 – 1108.

**Oguntona T, Oguntona, C.R.B. and Williams, L.** (1989) Survey of Food and Nutrient Intake of The Kanuri of Borno. *Savanna*, 10: 16 - 91

**Oguntona, T. and Akinyele, I. O.** (1995) The Composition of Nigerian Foods: Cooked, Raw and Processed. *Food*

Basket International. FBI. Ibadan.

**Oke, O.L.** (1968) Composition of some Nigerian leafy vegetables. J Am. Dietet. Assoc. 1097: 130 – 133.

**Ojofeitimi, E.O., Ijadunola, K.T., Jegede, V.A. and Freeman, Y. A. et al.** (2002) Nutritional status and physical activity in relation to cognitive function in a group of Elderly in Nigeria. J. of the Nutr. for the Elderly, 22: 49 - 61

**Olayiwola, I.O. and Ketiku, A.** (2006) Socio-demographic and nutritional assessment of the elderly Yoruba in Nigeria. Asia Pacific J. Clin. Nutr. 15: 95 – 101.

**Olowonyo, T. Oshin, S. and Obasanjo-Bello, I.** (2006) Some factors associated with LBW in Ogun State. Nig. Medical Practitioner, 49: 154 -157.

**Onabanjo, O.O. and Oguntona, C.R.B.** (2003) Iron, zinc, copper and phytate content of standardized Nigerian dishes. J of Food Comp. & Analysis, 16: 669 – 676.

**Onabanjo, O.O., Oguntona, C.R.B., Maziya-Dixon, B., Olayiwola, I.O. et al.,** (2008) Nutritional evaluation of four

UNAAB

INAUGURAL LECTURE SERIES

---

optimized cassava-based complementary foods. Afr. J. of Food Sc. in press.

**Osagie, A.V. and Eka, O.U.** (1988). Nutritional Quality of Plant Foods. Post Harvest Research Unit. Benin. Nigeria.

**Oyeleke, O.A.** (1988) The effect of “kanwa” in the nutrient content of okra vegetable and bean legumes in Nigeria. Nigerian J. Nutr. Scs. 9: 107 – 115.

**Oyenuga, V.A.** (1968) Nigeria’s Food and Feeding stuffs: their chemistry and nutritive value. Ibadan University Press. Ibadan. Pp 20 – 30.

**Rahn, D.** (2003) The Land-grant University Mission. [www.bioethics.iastate.edu](http://www.bioethics.iastate.edu)

**Ravelli, A.C. Vander Meulen, J.H. Mechels, R.P. et al.,** (1998) Glucose tolerance in adults after prenatal exposure to famine. Lancet 17: 173 – 180.

**Rosengrant, M.W., Paesener, M.S. Meyer, S. and Witcover, J.** (2001) Global food projection to 2020: Emerging trends and alternative futures. International Food Policy Research Institute, Washington, DC.

UNAAB

INAUGURAL LECTURE SERIES

---

**Rosso, P.** (1985) A new chart to monitor weight gain during pregnancy. *Am. J. Clin. Nutr.* 41: 644 – 652.

**RPB** (2008) Reference Population Bureau [www.prb.org](http://www.prb.org).

**Sanni, S.A.** (2008) Nutritional and sensory qualities of iron fortified cassava gari and fufu flour. Ph D thesis. UNAAB

**Sanni, S.A., Oguntona, C.R.B. and Sanni L.O.**(1999a) Chemical and Nutritional composition of some common foods in Abeokuta, Nigeria. *Brazil Archives of Bio. Tech.* 42: 331 – 337.

**Sanni, S.A. Oguntona, C.R.B., Sanni, L.O. and Oyewole, O. B.** (1999b) Total viable bacterial and coliform counts of some common foods in Abeokuta, Nigeria. *West Afr. J. of Foods and Nutr.* 2: 51 – 60.

**SCN** (2000) 4<sup>th</sup> Report – The World Nutrition Situation. Nutrition through the life cycle. Chapter I. IFPRI, SCN. Nutrition Library 3.1

**Side, W., Mingtang, S., Shuquan, Z. et al.,** (1991) Anthropometric and dietary survey of elderly Chinese. *British J.*

UNAAB

INAUGURAL LECTURE SERIES

---

of Nutr. 66: 355 – 362.

**Scholl, T.O., Hediger, M.L., Vasilen Koff P., et al.,** (1989) Effects of early maturation on fetal growth. *Annals of Human Biolog.* 16: 335 – 345.

**Scholl, T.O. and Hediger, M.L.** (1993) A review of the epidemiology of Nutrition and Adolescent Pregnancy and its effects on the fetus. *J. of the Am. College of Nutr.* 12: 1010-1017.

**Stoltzfus, R.J., Mullany L.L. and Black, R.E.** (2004) Iron deficiency anaemia “Comparative quantification of health risks: Global and regional burden of disease attributable to selected major risk factors” WHO. World Health Organization. Geneva.

**Swinborn, B.** (2004) Undernutrition and childhood obesity together deliver potent punch worldwide. *Global Health and Environment Monitor*, 12: 2 - 34

**Taylor, A.** (2007) Spotlight. *SCN News* 34: 2 – 3.

**UCH** (2004) Medical Outpatient Clinic Records University College Hospital Ibadan

**UNMP, United Nations Millennium Project** (2005)

## UNAAB

### INAUGURAL LECTURE SERIES

---

Halving hunger. It can be done. Report of the Task Force on Hunger. London. Earthscan

**UNESCO** (2008) Nigeria profile. <http://www.unesco.org/countries>.

**UNFPA** (2005) United Nations Fund for Populations Activities. State of the World Population. New York.

**USAID** (2006). United States Agency for International Development. Maternal Anemia: A Preventable Killer. Washington, DC.

**WHO** (1998) Nutrition for Health and Development: Malnutrition Worldwide. World Health Organization. Geneva.

**WHO** (2003) [www.who.int/nut/ado.htm](http://www.who.int/nut/ado.htm)

**World Bank** (2000) Task Force on Higher Education and Society. Higher Education in Developing Countries: Peril and Promise. Washington DC