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ASSESSMENT OF NUTRITIONAL STATUS AMONG FARMING HOUSEHOLDS IN KABBA/BUNU L.G.A KOGI STATE, NIGERIA

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ABSTRACT
Assessment of Nutritional status among farming household were investigated in Kabba/Bunu Local Government Area of Kogi State, Nigeria. A two – stage sampling procedure was used to select 150 farming households from the study area using Purposive selection and random sampling. Personal interviews, structured questionnaire and anthropometric indices such as height. weight.

INTRODUCTION
Dorland's medical dictionary defines malnutrition as a general medical condition caused by an improper or inadequate diet and nutrition. A number of different nutrition disorders may arise depending on which nutrients are under or overabundant in diet. The World Health Organization (2018) cities hunger as the gravest single threat to the world's public health. Malnutrition, in the form of iodine deficiency is the most common cause of preventable mental impairment, reducing the world's intelligent quotient (IQ) by an estimated billion points (Blossner, 2019). Malnutrition is a cumulative or average situation, and not the work of a single day's food intake (or the lack thereof)

Malnutrition causes a great deal of human suffering, and it is a violation of a child's human right. Approximately 27% of children under 5 in developing world are malnourished, and in these developing countries malnutrition claims about half of the 10 million deaths each year of children under 5 (FAO, 2015). People who survived a malnourished childhood are less physically and intellectually productive and suffer from more chronic illness. The costs to the

arm circumference and skin fold diameter were used to measure indicators like underweight, stunting and wasting responses in children. Descriptive statistics was used to determine the socio economic characteristics and level of prevalence of malnutrition among farming households. The logit models was employed to examine the determinants of malnutrition and factors affecting level of malnutrition in the study area. The result showed that socio-economic characteristics such as age of child, sex of child, educational level of household heads and their spouses; and access to toilet facility were significant on underweight, stunting and wasting. The result on the anthropometric measurement showed that daily calorie intake and access to clean water were significant on the children underweight in the study area indicating 35% underweight, 30% wasting and 35% normal. About 66% of the farming households had access to well water, 21% had access to bore-hole, implying a negative effect on underweight. Majority of farming households do not have access to safe water and are susceptible to illnesses like diarrhea, ascariasis (Roundworm), Dracunculiasis (Guinea worm), Schistosomiasis and Trachoma. The results also showed that no child was stunted; this is because the stunting effect of malnutrition is visible only at the advanced stage. Calorie intake was significant on all the malnutrition indices, as a key determinant of malnutrition in the study area. Staple food intake which was measured in calories showed that about 48% of the Farming households consume cereals, tubers and legume foods which contains 4 calories per gram compared to fatty foods which contains 7 calories per gram. The study concludes that malnutrition indices is prevalent in the study area and the cummulative effect of malnutrition among rural farming households may reduce their farm Productivity. Policies targeted at providing basic amenities, farming household access to food and sanitary facilities were recommended.

Keywords: Nutritional status, underweight, stunting, wasting, farming households, illnesses, anthropometric measurement, calorie, Logit Model.

society are enormous; eradicating malnutrition remains a tremendous public policy challenge (Skoufias 2018)

Ziegler, (2018) stated that mortality due to malnutrition accounted for 58% of the total mortality in 2016. In the world, approximately 62 million people all causes of death combined die each year. One in 12 people worldwide are malnourished. In 2006, more than 36 millions died of hunger or diseases due to deficiencies of micronutrient. The World Health Organization, (2015) estimated that one-third of the world is well fed, one-third is under-fed and one-third is starving. Malnutrition is by far the biggest contributor to child mortality. The lancet, a British medical journal reported that malnutrition in the first in the first two years is irreversible and iodine-deficiency is the most common cause of preventable mental impairment worldwide. Children who are malnourished not only tend have to increased morbidity and mortality but are also more prone to suffer from delayed mental development, poor school performance and reduced intellectual achievement (Pelletier and Frongillo, 2015).

The most vulnerable group in malnutrition is children between the ages of 1 – 5 years. Children suffer the effects of starvation more quickly than adults. Young children have high nutritional requirements in part because they are growing so fast. Diets used in Africa to complement breast milk are low quality-lacking variety, low energy and nutrient density and as a result multiple nutrient deficiencies are common. Young children are also very susceptible to infection because their immune systems fail to protect them adequately. Foods and liquids are often contaminated with bacteria and are thus key sources of infections. In the developing world, an estimated 230 million (39%) children under the age of five are chronically malnourished and about 54% of deaths among children younger than 5 are associated with malnutrition. UNICEF, 2015). In the Sub-Saharan Africa, the prevalence of malnutrition among the group of under-fives is estimated at 41%. (UNICEF, 2017)

Problem Statement

According to Food and Agriculture Organization (2015), "Hunger and malnutrition are the underlying cause of more than half of all child deaths, killing nearly 6 million children each year- a figure that is roughly equivalent to the entire pre-school

population of Japan. Relatively few of these children die of starvation. The vast majority are killed by neonatal disorders and a handful of treatable infectious diseases, including diarrhea, pneumonia, malaria and measles particularly in the Sub Saharan Africa (SSA). Most would not have died if, their bodies and immune system had not been weakened by hunger and malnutrition moderately to severely underweight; the risk of death is five to eight times higher.

The human rights council of the united Nations, 2018 also confirms that about "6 million children still die every year from hunger related illnesses before their fifth birthday". On the average 62 million people die each year of whom probably 36 million (58%) directly or indirectly as a result of nutritional deficiencies, infections, epidemics or diseases which attacked the body when its resistance and immunity have been weakened by undernourishment and hunger (Ziegler, 2017).

Malnutrition is a major cause of child mortality, which tends to reduce labor availability for farm work. This in turn may lead to low farm output causing higher food prices. The yearly loss of about 6 million children may reduce the number of farmers in our villages, since majority of the rural dwellers in Nigeria are poor and uneducated about their nutritional status.

In Nigeria, child mortality rates and malnutrition remain high in spite of the government's commitment to create an enabling environment for the provision of quality healthcare and reduction of mortality and malnutrition levels. Under five mortality rates remain above 100 per 1000 live births while infant mortality rates are well above 60 per 1000 (WHO, 2018). The prevalence of these problems is most critical in rural areas, drought stricken areas, and among poor households (CBS et al., 2014).

Nutrition deficiencies contribute to high rates of disability, illnesses and death. They also affect the long term physical growth and development of children, and may lead to high levels of chronic illness and disability in adult life. (Mariana, et. al., 2016). In addition, high rates of malnutrition may jeopardize future economic growth by reducing the intellectual and physical potential of the entire population. Therefore this study will provide answers to the following research questions:

1. what are the socio-economic characteristics of the sampled households?

2. what is the level of malnutrition among sampled households?
3. what are the determinants of malnutrition among farming households?
4. what factors affect the level of malnutrition among farming households in the study area?

Objective of the Study

The general objective of the study is to assess the nutritional status among farming households in Kabba/Bunu LGA of Kogi state, Nigeria. The specific objectives are to:

i. determine the socio – economic characteristics of farming households,
ii. determine the level of malnutrition among farming households,
iii. analyze the determinants of malnutrition among farming households,
iv. estimate the factors affecting level of malnutrition in the study area.

Justification for the Study

It is generally believed that malnutrition of children may lead to poor intellect, growth and development of these children who grow into adulthood. These adults population usually in the rural areas are predominantly farmers. The cumulative effects of malnutrition in these adult may affect their farm outputs which may lead to poor farm Productivity resulting in food shortage and soaring prices of agricultural products. Good progress in reducing the share of hungry people in the developing world had been achieved down from almost 20% in 1990-92 to less than 18% in 1995-97 and just above 16% in 2013-2017. The estimate showed that rising food prices have thrown that progress into reverse, with the proportion of undernourished people moving back towards 17% (FAO, 2018).The general consensus of the reviewed studies showed that under nutrition remains a major public health problem worldwide, malnutrition is more prevalent among pre-school children between the ages of 0 and 5 in the rural areas. The researchers used the following socio-economic factors as their determinants: women's education, calorie-intake, health care services; access to safe water and sanitation. They concluded that improved access to nutrient rich food among children,

improved maternal education and good health care services can help to reduce the rate of malnutrition in the developing countries.

The reviewed studies revealed that there was no linkage between malnutrition indices such as: underweight, wasting and stunting, and agriculture. Similarly there seems to be no linkage between the explanatory variable used in determining the extent of malnutrition and farming households. The current study fill this gap by creating a link between malnutrition and farming.

Conceptual Framework

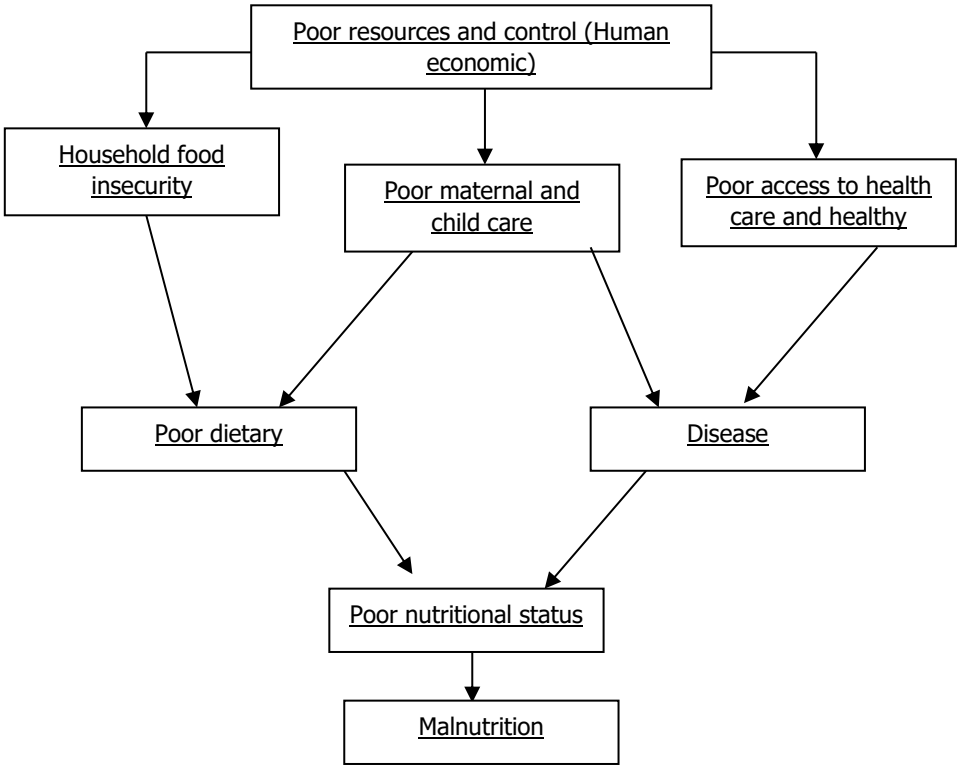
The conceptual models and empirical evidence will help to place this theoretical discussion in context and suggest which variables belong in the estimated equation and what estimating procedures are appropriate.

The access that a household has to food depends on whether the household has enough income to purchase food at prevailing prices or has sufficient land and other resources to grow its own food. Factors other than income and prices can also affect household calorie availability, mostly by influencing preferences. These factors include household demography structure (such as presence of small children or the elderly and gender of the household head), educational levels of household members, and location (including differences among regions as well as between urban and rural areas). Household income and kind of food available can also vary by season (Sarmistha, 2019). In addition to factors that affects the household access to food, which can affect an individual's own dietary intake, a child's nutritional status will also be affected by the hygiene condition of the household, ease of access to and quality of health care, and mother's care giving practices. This survey was meant to primarily collect expenditure and demographic information on the proximal determinants of nutritional status, such as individual dietary intake, genetic or biological factors that determine growth such as child's height.

This study used household level variable to represent the effect of these potential determinants at the individual level, while understanding that intra-household mechanisms mediate the effect of these factors on child nutrition. Factors

affecting household access to food, which may also affect the child's access to food, are detailed above in the discussion of calorie availability model. Material education attainment is used as a proxy of caring practices. Use of prenatal care is included as a proxy for preventive health care use, and availability of a latrine, source of water, and in house crowding (denoted by number of rooms per place of abode) were used to capture the environmental conditions of the household. The chart below exemplifies the concept of this research work.

Determinants of Nutritional Status



Source: Author' compilation, 2021

Measurement of Malnutrition

In this study, Anthropometric indices were used to measure malnutrition. Anthropometric indicators : wasting, underweight and stunting; mid – upper arm circumference and skin fold thickness. This study used indices such as: wasting, underweight and stunting. Wasting is a low weight-for-height with a Z- score below -2 or standard deviation unit reference mean, reflecting acute malnutrition

and severe conditions such as starvation or severe illness of a child. Stunting indicates very low-height-for-age, reflecting long term deficit of good nutrition and increased infection. Underweight is a low weight-for-age with a Z-score below-2, indicating a history of poor health or nutritional insult to the child including recurrent illnesses or starvation. A child with a Z-score below -2 is said to be malnourished. Data analysis was carried out using descriptive statistics such as: means, frequency, percentages and standard deviation; anthropometric indices, and Logit Model, EPI-INFO software version 6.03, SPSS version 10 and STATA version 9. The anthropometric measurement results (Z-scores) were each regressed against all indicated explanatory variables or factors affecting malnutrition.

Determinants of Malnutrition and Empirical Logit Model Specification

The Logit model assumes that the underlying stimulus (Ai) is a random variable which predicts the probability of malnutrition indicators

$$Bi = \frac{e^{Ai}}{1+e^{Ai}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Conceptually, the behavioural model used to examine the factors affecting level of malnutrition is as given below

$$Yi = (Qi) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$Ai = a^{o} + \text{Ɛ}bj\ Xji \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where Yi = the observed response for the ith observation i.e the binary variable Yi = l for malnourished child, Yi = 0 for non-malnourished child

Ai = an underlying stimulus index for the ith observation (there exist a critical threshold)

{Ai*} for each farming household, If Ai < Ai*, the faming household is observed to be non malnourished and if Ai ≥ Ai*, the faming household is observed to be malnourished.

P = functional relationship between the field observation (Yi) and the stimulus index (Ai) which determines the probability of malnourished households

A= 1, 2 …….. m are observations or variables for the malnutrition model, m = sample size

Xji = jth explanatory variables for the ith observation and j = 1,2, 3 ……. N

Bj = unknown parameter

J = 0,1,2, …….. n where n is the total number of explanatory variables

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Logit Model Exemplified

The dependent variable is measured by dichotomous variable. Farming household with children having symptoms of malnutrition and indicators like underweight, stunting and wasting are grouped as malnourished while farming household without evidences of malnutrition were non-malnourished. The definition and measurement of variables and sampled characteristics are as presented in the model below. The variables included in the logit model are age of child, Height of child, weight of child, sex of child, calorie intake of child, household head education level mother's education level, access to safe water, access to toilet facility, access to clinic, access to quality food and number of times food is available per day.

ei = random disturbance

The model is explicitly expressed as

$Y = a^0 + a_1 X_1 + a_2X_2 + a_3X_3 + a_4X_4+a_5X_5+a_6X_6+a_7X_7+a_8X_8+a_9X_9+ a_{10}X_{10}+a_{11}X_{11}+a_{12}X_{12}+e$, where

Y = malnutrition (dummy variable 1 if malnourished Yi = 0, if non – malnourished)

X_1 = age of child (1-5) years in each farming household

X_2 = Height of child (cm)/m/feet

X_3 = weight of child (kg)

X_4 = sex of child (1 if male, 0 if female)

X_5 = daily calorie intake (grams)

X_6 = Household head education (years)

X_7 = mother education (years) dummy 1 = educated, 0 if uneducated)

X_8 = Access to safe water

X_9 = Access to toilet (Dummy 1 = access, 0=No access)

X_{10} = Access to clinic (Dummy 1 if access 0, if otherwise)

X_{11}= Access to quality food (yes = 1, No = 0)

X_{12} = Number of times food is available daily 1 = once, 2 = twice, 3 = thrice

a^0 = intercept

e= error term

Results and Discussion

Table 1 Socio-economic characteristics of farming household

Variable	Frequency	Percentage
Household size		
>9	5	3.0
7-9	75	50.0

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4-6	55	37.0
1-3	15	10.0
Household head education level		
Uneducated	108	72.0
Educated	42	28.0
Spouse educational level		
Uneducated	120	80.0
Educated	30	20.0
Marital status		
Married	139	92.7
Divorced	4	2.7
Widowed/widower	7	4.6
Gender of children		
Male	88	58.67
Female	62	41.36
Age of children		
1	34	22.67
2	26	17.33
3	30	20.00
4	32	21.33
5	28	18.67
Household water source		
River	18	12.00
Well	100	66.70
Bore-hole	32	21.30
Household toilet status		
Bush	120	80.00
River	20	13.33
Pit latrine	10	6.67
Household food intake (24hrs recall)		
Cereals and tubers	101	67.3
Legumes	40	26.7
Vegetables	6	4.0
Fruits	3	2.0
Total	**150**	**100**

Source: Field Survey, 2021

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There result of the socio-economic characteristics of the farming households showed an average household size of 7 people, implying availability of family labor for farm work. The study results also revealed that 72% and 80% of the household head and their spouses were uneducated. This implied that majority of the rural farming households are without formal education as regards their nutritional requirements, reflecting poor knowledge about their food intake. The results also showed that about 93% of the farming households were married, 59% are males indicating majority are living as families with dominant male household heads. The results with respect to age of the children, the age ranges between 1and 5 years with a mean age of 3 years.

Level of Malnutrition Among Farming Households

Table 2: percentage Prevalence of malnutrition indices

Malnutrition indices	Number	% Prevalence
Stunting (Height for age)	None	None
Underweight (weight for age	53	34.66
Wasting (Weight for height)	45	30.00
Normal	51	35.34
Total	**150**	**100**

Source: Field Survey, 2021

Table 2 showed the results of the extent of malnutrition in the form of percentage prevalence indices such as underweight, stunting and wasting. The results revealed that a dominant proportion of the sampled children are normal, that is, not malnourished with no visible symptoms of malnutrition observed on them. The results also showed that non of the children was stunted; this is because the stunting effect of malnutrition is cumulative and could only be visible at the advanced stage of malnutrition. The results concluded that about 35% population of the children were underweight with 30% wasted.

Factors Affecting level of Nutrition and Determinants of Malnutrition Among Farming Households.

Table 3 showing regression results for underweight against each explanatory variables as indicated in the Logit model.

Explanatory variable	Coefficient	Std error	t-value	Level of significance	LR chi2 (10)	Prob Chi
Constant	-5.867***	0.325	-8.046	0.000		
Age of child	-1.039***	0.049	-0.999	0.000		

Height of child	-0.001	0.004	-0.323	0.747		
Weight of child	0.569***	0.028	20.586	0.000		
Sex of child	0.378***	0.066	5.722	0.000		
Calorie intake	0.001**	0.000	2.183	0.031	107.620***	0.000
Household head education (years)	-0.009	0.010	-0.878	0.382		
Mothers education (years)	0.010	0.009	1.119	0.265		
Access to safe water	-0.121**	0.057	-2.102	0.037		
Access to toilet	0.32	0.051	0.618	0.537		
Access to clinic	0.421**	0.0321	+12.50	0.001		
Access to quality food	-1.057**	0.059	-1.048	0.046		
No of times food available daily	-0.629*	0.546	-0.022	0.243		

Source: field survey, 2021

*, **, *** significant at 10%, 5% and 1% respectively. Pseudo – R^2 = 0.874, Log likelihood = 12.578

From the result in the table 3, the age of child, weight of child and their sex were all significant at 1% level. Age and sex of the child had negative and positive effects on underweight respectively. This implies that these factors predispose the children in the study area more to underweight. The daily calorie intake per child,

access of child to safe water, access of child to clinic and access to quality food were significant at 5% levels implying that daily calorie intake per child have positive effect on underweight. It was also observed that access to safe water, access to quality food and number of times food is available per day had negative effects on underweight. This implies that underweight in children is function of the child access to quality food in the right quantity and access to safe water. The result also showed that access to toilet, education of household head and their spouses; and the height of child were insignificant to underweight at all levels. The Chi- square value of 107.620 implies that the overall regression results is significant at 1% level. The Pseudo-R2 value obtained showed that the combined effect of all explanatory variables on the changes in the weight for age is about 87%, which is highly significant.

TABLE 4 Showing Regression Results for Stunting

Explanatory variable	Coefficient	Std error	t-value	Level of significance	LR chi 2 (10)	Prob chi
Constant	9.858***	0.226	43.616	0.000		
Age of child	-0.025	0.034	-0716	0.475		
Height of child	0.001	0.003	0.184	0.854		
Weight of child	-0.009	0.019	0.477	0.634		
Sex of child	0.001	0.046	0.031	0.975		
Calorie intake	0.00***	0.000	2.136	0.034	1.769*	0.079
Household head education (years)	-0.006	0.007	-0.827	0.409		
Mothers education	0.005	0.006	0.863	0.389		
Access to safe water	-0.057	0.040	-1.428	0.155		
Access to toilet	0.050	0.036	1.413	0.160		
Access to clinic	1.215***	0.0414	1.321	0.017		
Access to quality food	-0.024*	0.454	-2.431	0.156		

No of times food available daily	-1.400*	0.320	-1.062	0.617		

Source: Field survey, 2021

*, **, *** significant at 10%, 5% and 1% levels respectively Pseudo – R^2 = 0.102, Log likelihood = - 123.56

The results for table 4 showed that calorie intake per day, access to clinic were factors significant at 10% on stunting in the study area. This implies that better medical care and daily calorie intake could determine the child level of height. The results also showed that access to quality food and the number of times a child feed per day were significant at 5% level. The implications of this outcome is that a child could become stunted due to poor quality, quantity and limited number of times food is available per day. The results also showed that though insignificant, age of child, household head education levels, access to safe water and weight of child were negatively related to stunting. The Chi-square value of 1.769 showed that the overall regression results is significant at 10% level. The Pseudo-R2 value of 0.102 revealed that the explanatory variables all combined influenced only 10.2% of the changes in stunting in the sampled children in the study area.

TABLE 5 Showing Results of Regression for Wasting

Explanatory variable Constant	Coefficient -30285***	Std Error 1-031	t-value -3.185	Level of Significance 0.002	LR Chi2 (10)	Prob Chi
Age of child	-0.351**	0.157	-2.235	0.027		
Height of child	0.031**	0.013	2.382	0.019		
Weight of child	-0.003	0.088	-0.029	0.977		
Sex of child	0.052	0.210	0.246	0.806	4.233***	
Calorie intake	0.002**	0.001	2.576	0.011		0.000
Household head education (years)	0.017	0.032	0.578	0.605		
Mothers education (years)	0.004	0.028	-0.146	0.884		
Access to safe water	0.203	0.182	-1.113	0.268		

Access to toilet	0.321**	0.162	1.978	0.050		
Access to clinic	-0.215*	0.521	-0.497	0.559		
Access to quality food	-0.417*	0.043	-0.022	0.623		
Number of times food available daily	-1.241*	0.003	-1.216	0.011		

Source: Field survey, 2021

, **, ** significant at 10%, 5% and 1% levels Pseudo R2 = 0.214, log likelihood = -164-34

From table 5,variables such as age of child, daily calorie intake, access to toilet facilities, and height of child are significant at 5% level. This implies that these factors have positive effect on the weight for height of children in the study area except the age of child which is has a negative effect. The weight of child, sex of child, education level of household heads and their spouses and access to safe water were all insignificant. This implies that sanitation in terms of access to safe water and toilet did not significantly affect malnutrition. The variables access to clinic, access to quality food and number of times food is available per day are all significant at 1% level and are negatively related to wasting. The implication is that wasting results from poor access to medical care, poor access to quality food and reduced number of times food is readily available per day. This result is similar to studies conducted by Vande et al, 2007, Ukwuani et al 2003. The F-value of 4.233 implies that the overall regression is significant at 1% level.

CONCLUSION

Malnutrition is by far the biggest contributor to child morbidity and mortality; therefore, combating malnutrition in our communities should be an issue to policy makers. Assessment of Nutritional status among people in the rural communities is to reduce child mortality because severe malnutrition may result in death, also to improve the nutritional status of the faming households thereby bringing about an increase in the living standard of the rural dwellers. In order to achieve these objectives, there is the need for the rural people to be food secured and be educated about their nutritional status. This would bring about improvement in their calorie intake as well as reduction in child mortality. The prevalence of

malnutrition among rural people is still very high, despite Nigeria's vast agricultural potential.

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