ASSESSMENT OF THE CONTRIBUTIONS OF NATIONAL SPECIAL PROGRAM FOR FOOD SECURITY (NSPFS) TO FOOD SECURITY IN KWARA-STATE, NIGERIA

Jubril Olayinka Animashaun*
M.O. Adewumi**

NIGERIA had over the years embarked on several agric-food intervention strategies either as a sole financier or jointly in partnership with other development agencies with the ultimate aim of the attainment of food and nutritional security. However, recent estimates of the number of food insecure mouths in the country and the staggering amount of foreign exchange in favor of food importation indicate that the country may not be food self sufficient. This calls for assessing the contributions of intervention strategies employed in the agricultural sector for food security.

Purpose: *This study examined the contributions of the National Special Program for Food Security (NSPFS) to beneficiary food security by making use of the Household Dietary Diversity (HDD) score.*

Design/Methodology/Approach: *The study was conducted in Kwara State and respondents comprised of crop farmer beneficiaries and non-beneficiaries, drawn probabilistically from the three NSPFS project sites in the study area. The Poisson model was used to analyze the study's objective.*

Findings: *Findings reveal a significant difference between the HDD of the beneficiary and non-beneficiary farming households (p=0.01). Identified significant variables responsible for the variation in HDD included NSPFS participation (p=0.01), household size (p=0.078) and household annual income (P=0.013).*

Research Limitations: *The use of the HDD as a measure of food security has limitations. Season and the fesivities may predispose respondents to consuming more at a particular time which may not reflect the spread of consumption over the entire year. In order to reduce this limitation associated with the use of dietary diversity as a food security measurement, the questionnaire was administered to the respondents' households before the start of the planting season and when no festivals and socio-cultural celebrations were going on.*

Practical Implications: *Given the global commitment to food security, this study recommends the intensification of the NSPFS project to cover more sites and include more beneficiaries. Furthermore, it suggests that appropriate logistics and support be provided that will facilitate the assessment of the project's incentives by beneficiaries.*

Originality/Value: *This study is an original contribution.*

Key Words: *Dietary Diversity, Food Security, NSPFS, Kwara State.*

* *Assistant Lecturer, Department of Agric Econs & Farm Management., PMB 1515, Univeristy of Ilorin, Ilorin, Nigeria.*

** *Reader, Department of Agric Econs & Farm Management., PMB 1515, Univeristy of Ilorin, Ilorin, Nigeria.*

Introduction

At the dawn of the third millennium, the international community committed itself to a declaration called the Millennium Development Goals (MDGs). Three out of all the declared MDGs; the first goal (MDG1), which focuses on reversing extreme poverty and hunger by reducing by half the share of the world's population that is hungry or living in extreme poverty by 2015 the fourth goal, which is the reduction of child mortality and the fifth goal relating to reduction in maternal mortality; are all related to agriculture and food security. As of 2010, numerous countries concentrated mainly in Sub-Saharan Africa, Asia, and the Pacific have made little or insignificant progress towards the MDGs and some have actually seen their situation deteriorating (FAO, 2011d).

Meanwhile, before the Millennium declaration, Nigeria had adopted a series of agricultural revival strategies and programmes targeted at different activities in the agricultural sector, ranging from finance, pricing, infrastructure, institutions, marketing to storage with the aim of increasing agricultural productivity, raising rural farm incomes and reducing food security. Majority of these programmes were locally financed while some are with support in the form of counterpart funding and/or technical support from various international donor agencies like the Food and Agricultural Organisation FAO, United States Agency for International Development (USAID), and the World Bank.

The National Special Programme for Food Security (NSPFS), for instance, is one of such efforts and it had a budget of USD 45.2 million. This figure according to the then president was a relatively large food security programme that had been executed by any country in collaboration with the FAO (Obasanjo, 2005). The NSPFS had its origin in 1994 when the Food and Agricultural Organization (FAO) of the United Nations initiated a review of the Organizations priorities, programmes and strategies, and concluded that improving food security should be reaffirmed as its top priority, and the urgent need for its programmes to focus more sharply on increasing food production, improving stability of supplies and generating rural employment, thus contributing to more accessible supplies (SPFS, 2003). In relation to this, the Director-General of FAO proposed that the organization should launch a Special Programme for Food Security (SPFS), focused on the 86 Low-Income Food-Deficit Countries (LIFDCs) (SPFS, 2003). These are countries least able to meet their food needs with imports. This approach was endorsed in the 1996 World Food Summit, with a Plan of Action in the following areas: ensuring enabling conditions; improving access to food; producing food; increasing the role of trade; dealing adequately with disaster; and investing in food security (FMARD/FAO, 2001).

The NSPFS project has as its main objective of the improvement of national and household food security as well as the reduction of rural poverty in an economically and environmental sustainable way. The NSPFS has potential implications for increased agricultural productivity, farm income, higher wage earnings improved health and nutrition and immediate implications for individual health and well-being of the program beneficiaries.

However, despite the lofty objectives and the financial commitments of several agricultural intervention programs in Nigeria of which the NSPFS is one, Nigeria cannot be said to be a food sufficient country with respect to national food supply. This is evidenced by the nation's astronomical increase in the food import bill. Available data on the value of food importation into the country shows that Nigeria spent a whopping sum of N98 trillion on food importation in three years, between 2007 and 2010 (Azubuike, 2012), which, on per capita basis, translates to N210,753 per person per annum. This, therefore, calls for an appraisal of the contributions of agricultural intervention programs and projects executed in the country with a bid to draw conclusion based on what is working and to identify gaps and challenges that need to be fulfilled in a bid to the actualization of a food self sufficient nation. This study acknowledges that drawing empirical conclusion from the vast arrays of agri-food intervention projects executed in the country may be too ambitious; it, therefore, limits itself to one intervention program which is the NSPFS and uses it as a case study.

Furthermore, the consumption of a diverse diet is associated with a plethora of benefits such as higher birth weights and reduced instances of child stunting (Swindale and Bilinsky, 2006). Harvest Plus

(2009) recommends that in order to help meeting micro-nutrient requirements, households should increase the variety of food consumed including a wide array of vegetables, fruits and protein. While a significant empirical analysis have assessed the performance of the NSPFS in Nigeria; Tafida and Danwanka, (2008); Ayoade, (2010); Daudu and Ajayi, (2009); no study is known to the author in the study area on the empirical validation of the contribution of the NSPFS to food security with particular reference to the quality of the food in the study area. In view of this, the current study undertakes the validation of household food security from the perspective of household dietary diversity. Specifically the study measured dietary diversity through a Dietary Diversity Score (DDS) representing the number of different food groups consumed over a given period of time (Swindale and Bilinsky, 2006; Torheim et al, 2004; Hoddinott and Yohannes, 2002; Roche, Creed-Kanashiro, Tuesta, and Kuhnein, 2008).

Literature Review

Theoretically, household food security can be validated using counts of diverse food eaten. Food and food group diversity count measures have been developed and validated as a proxy for household consumption or individual intake of dietary energy (Dewey, et al., 2005). To achieve this, respondents are asked the number or counts of different foods or food groups they (and/or their household) have consumed over a pre-determined time period – varying from 1 to 30 days. In their multi-country study, Hoddinott and Yohannes (2002) find a consistent positive relationship between household level food group diversity and the consumption of energy; as such, they conclude that household-level food group diversity is a promising proxy indicator of household food security (Hoddinott 1999). Gonder, 2011 uses household data from Bukidnon, Philippines to develop a Production Diversity Score (PDS) that is used to examine the impact of farm biodiversity on an individual's Dietary Diversity Score (DDS) and the likelihood that individuals are meeting their micronutrient needs. Other validation studies – also done at the household level – include Lorenzana and Sanjur (1999) and Lorenzana and Mercado (2002).

The key models normally used to analyze counted data include the Poisson Regression Model (PRM), the Negative Binomial Regression Model (NBRM), the Zero Inflated Poisson (ZIP), and the Zero Inflated Negative Binomial (ZINB). Poisson regression model is normally the first step for most count data analyses (Areal *et al.*, 2008). The model makes an assumption that the dependent variable ***y*** given vector of predictor variables ***x*** has a Poisson distribution. The probability density function of ***y*** given ***x*** is completely determined by the conditional mean,

λ (x) a" E (y/x) ..... (1)

$f(yi/xi) = e^{-\lambda(x)}\gamma_i (x)^{y/[?]} (1+y_i)$ ..... (2)

where, $\lambda_i = \exp(\alpha X^i \beta)$ yi=0,1,…..i ..... (3)

It can be shown that the expected number of events, yi, (number of diverse food group eaten in the household) per period is given as (Wooldridge, 2002; Greene, 2008):

$E(yi/xi) = var[yi/xi] = \lambda_i = \exp(\alpha + X^i\beta)$ ..... (4)

i = 1, 2,…, n.

The merits of Poisson regression are outlined by Winkelmann and Zimmermann (1995) as:

- it takes into account the nonnegative and discrete nature of the data;
- the assumption of equality of the variance and conditional mean accounts for the inherent heteroscedasticity and skewed distribution of nonnegative data; and
- the log-linear model allows for treatment of zeros.

Empirically, parameters of PRM are easier to estimate using maximum likelihood techniques. The Poisson regression model has some limitations in empirical work. In particular, the restrictions imposed by the model on the conditional moments of the dependent variable, in most cases, violate its application

given that the observed data often display over-dispersion (Wooldridge, 2002; Greene, 2008). Over-dispersion refers to excess variation when the systematic structure of the model is correct (Berk and MacDonald, 2007). Over-dispersion in PRM results from the violation of the assumptions that the poison process results from the deterministic function of the predictor variables and that event constituting each count are independent and occur randomly over time which ignores the influence of past occurrences over the present circumstances (Winkelmann and Zimmermann, 1995; Berk and MacDonald, 2007).

Methodology

This study was conducted in Kwara state of Nigeria. Kwara State is located in the North-Central geographical zone of Nigeria within latitudes $7^0 45^1$N and $9^0 30^1$N and longitudes $2^0 30^1$E and $6^0 25^1$E. The 3 NSPFS project geographically distributed in Kwara central, Kwara South, and Kwar North senatorial zones in Nigeria (Kwara ADP, 2006). A two-stage sampling procedure was employed in this study. The first stage involved random selection of beneficiary respondents in each of the three programme sites using the NSPFS beneficiaries listing provided by the NSPFS project heads in each of the project site. The second stage involved the random selection of non-beneficiary respondents in each of the project sites using the household listing provided by the community head in each village where the programme site is situated.

Questionnaires were administered on 75 beneficiaries and on 75 non-beneficiaries giving a total of 150 respondents in the study. This method was chosen to facilitate comparison of outcome variables of interest result between beneficiaries and non-beneficiaries in the study area.

Primary data were used for this study. The data were collected through the use of structured questionnaire that was revised for appropriateness by experts in the field. Secondary data used for the study were sourced from journal publications, internet, and FAO publications.

Analytical Techniques and Model Estimation

Analytical tools were employed to address the stated objectives which include descriptive and inferential statistics, and the Poisson regression model.

Households' dietary diversity was measured by summing the number of foods or food groups prepared and consumed by the household over a reference period of 24 hours. Following (Swindale and Bilinsky, 2006), using the set of 12 food groups which captures all possible food groups household consumed was developed using the FAO food composition table for Africa. (Swindale and Bilinsky, 2006).The following set of 12 food groups was used to calculate the HDDS; Cereals, Fish and seafood, Root and tubers, Pulses/legumes/nuts,Vegetables, Milk and milk products, Fruits J., Oil/fats and oil palm, Meat and poultry offal, Sugar/honey, Eggs, and miscellaneous.

Estimation of variations in respondents Dietary Diversity Score was done with the poisson regression model due to the count nature of the dependent variable. Count data are non-normal and not continuous therefore, a linear regression may not be appropriate mode of estimation (Okello *et al.,* 2010; Gonder, 2011). The Poisson Maximum Likelihood Estimator requires that the data be Poisson distributed with density function of Probability Mass Function (PRM) as given by (Greene, 2008; Wooldridge, 2002; and Greene, 1993):

$$F(y;x) = \frac{\lambda^k e^{-\lambda}}{x!} \quad \text{.....(5)}$$

Where;

- e =2.71828; $x!$ is the factorial of x.
- $\lambda i = \exp(\alpha + X\square\beta)$ and yi= 0,1,..., i is the number/count food eaten by the household X = a vector of predictor variables.

Following Wooldridge (2002) and Greene (2008) the expected number of the events, yi per period is given as:

$E(yi/xi)=var[yi/xi]=ë=\exp(\alpha+X\beta)$ ..... (6)

for i = 1,2,….,m

Based on Equation (6), the implicit functional form of the model estimated to examine the determinants of dietary diversity is specified as;

$Y=\alpha+\beta X_1+\beta X_2+\beta X_3+\beta X_4+\beta X_5+e$ ..... (7)

Where;

Y= *count of diverse Food group eaten in Household in the past 24hours*; X_1= NSPFS Participation; X_2=Household size; X_3=annual household income; X_4=education attainment of Household head Spouse; X_5 =Output in kg/kcal; e= error term; z#= constant; α = parameter coefficients to be estimated

In order to reduce the limitations associated with the use of dietary diversity as a food security measurement, the questionnaire was administered to the respondents' households before the start of the planting season and when no festivals and socio-cultural celebration were going on.

Result and Discussions

Socio-Demographic Distribution of Respondents

The socio-demographic distribution of the respondents with respect to sex, marital distribution, spouses' marital distribution of the respondents is presented in Table 1.

Table 1: Socio-Demographic Distribution of Respondents

Socio-Demographic Indicators	Beneficiary Households		Non-beneficiary Households		All Households	
	Freq	%	Freq	%	Freq	%
Sex						
Male	65	86.7	58	77.3	123	82
Female	10	13.3	17	22.7	27	18
2 sample t-test (pr=0.9)						
Marital status						
Single	1	1.3	0	0	1	0.7
Married	74	98.7	75	100	149	99.3
2 sample t-test (pr=0.84)						
Age						
30-40	23	30.7	28	37.3	51	34.1
41-50	24	31.3	23	30.8	47	31.3
51-60	22	29.2	19	23.7	41	27.3
>60	6	8.2	5	6.6	11	7.4
(t= -0.3805, p=0.704)						
Spouse's Educational Attainment						
No formal	25	33.33	30	40	55	36.66
Quranic	12	16	12	16	24	16
Adult	3	4	0	0	3	2
Primary	11	14.67	10	13.3	21	14
Secondary	18	24	18	24	36	24
Tertiary	6	8	5	6.7	11	7.34
(t=0.4370, p=0.6627)						

Source: Field Survey, 2012.

As revealed in Table 1, male (86%) appeared to be more involved in the NSPFS crop farming than the women (13%) in the study area. The result of the T-test indicates no significant difference between the mean age of the two sampled respondents (p=0.7). Majority of the respondents (99%) are married and there exists little or no difference between the beneficiary (98%) and non-beneficiary (100%) respondents in the study area (Table 3). Since farming activities required labour which could be supplied by family labour, farming households are, therefore, more likely to be married and have a big family so as to supply labour for farming activities. The result of the T-test indicates zero significant difference between the highest education attained by the two sampled respondents group (p=0.663). Spouse's education is hypothesized to have an influence on the types of food combination prepared and eaten by the households and thereby, contributing to food and nutritional security.

Socio-Economic Distribution of Respondents

The result of the distribution of respondents according to farm size in hectares of farmland cultivated, experience in years, and household size is presented in Table 2.

Table 2: Distribution of Respondents According to Experience, Farm Size and Household Size

Socio-Economic Indicators	Beneficiary Households		Non-beneficiary Households		All Households	
	Freq	%	Freq	%	Freq	%
Farming Experience						
1-15	12	16	17	22.67	29	19.33
16-30	46	61.33	44	58.67	90	60
31-45	17	22.67	14	18.66	31	20.67
Std deviation 11.18						
T-test=0.189; p=0.85						
Farm Size (ha)						
1.0-5.0	8	10.66	22	29.33	30	20
5.1-9.0	33	44	34	45.33	67	44.66
9.1-13.0	27	36	14	18.67	41	27.34
13.1-17.0	7	9.34	5	6.67	12	8
Standard error0.422						
(t=2.4780, p= 0.0143)						
Household Size						
3-5	17	22.66	27	36.1	44	29.33
6-8	32	42.66	34	45.3	66	44
9-11	13	17.34	13	17.3	26	17.67
12-14	14	18.64	1	1.3	15	10
(t= 4.2341, p= 0.001)						

Source: Field Survey, 2012.

The study reveals that the respondents' average farming experience is 24 years (Table 2). The t-test indicates a zero significant difference in the farming experience of the respondents' categories (p=0.8). As revealed in Table 2, respondents' average farm size is 9.18ha. The t-test indicates a significant difference in the average hectares cultivated by the two respondents' group. According to the study, the average household size for the respondents is 8 members. The t-test statistics indicates that household size is significant (p=0.01) between the two groups of respondents. Household size may be important implication on food security. A relatively larger household size may indicate an increase in the number of mouths to feed which could affect the quality of food that would be

eaten in the households. Since a diverse diet often comes with higher cost involvement, it follows that for a relatively poor household, quality of the diet might in most cases be sacrificed at the extent of the quantity that would be sufficient for the members of the households.

Distribution of Average Annual Farm Income of Respondents' Households

The result of the distribution of the average annual farming income size is presented in Table 3.

Table 3: Distribution of Annual and Mean Farm Income of Households

Average Annual Farm Income/Household (N)	Beneficiary Households		Non-beneficiary Households		All Households	
	Freq	%	Freq	%	Freq	%
45,000-104,999	2	2.67	16	21.4	18	9.4
105,000-164,999	13	17.3	28	37.3	41	27.4
165,000-224,999	23	30.7	18	24	41	26.8
225,000-284,999	16	21.33	4	5.4	20	12.7
285,000-344,999	10	13.3	5	6.6	15	10.1
345,000-404,999	6	8	0	0	6	4
405,000-464,999	2	2.6	4	5.3	6	4.1
465,000-524,999	3	4	0	0	3	2.1
Mean Annual Farm Income (N264,102/ USD1,760) Standard error (N23,258) (t= 4.8965 p=0.01)						

Source: Field survey, 2012.

The result of the distribution of the average annual farm income of respondent as presented in Table 3 indicates that the modal income (N165,000-224,999) for the beneficiary respondents is relatively higher than the non-beneficiary respondents (N105,000-164,999). In addition to this, the mean annual farming income of the respondent to be N264,102 (USD 1760), of which only 14.7% of the non-beneficiary respondents earned above this amount when compared to the 32% of the beneficiary respondents. Equally if the income earned by respondents in this study is compared with respect to the federal government recommended minimum wage of N18,000 (USD 120) for workers, the proportion of respondents who earn more than the recommended minimum wage is higher (49.3%) for the beneficiary respondent when compared to the non-beneficiary (8.7%). The result of the t-test confirm a significant difference between the average farm income of the two respondent group (p=0.01). It could, therefore, be inferred from our study that NSPFS beneficiaries earn more income from farming activities when compared to the non beneficiary respondents in the study area. This could have translated from improved productivity and associated with the gains of participating in the program in the study area. Since a diverse diet often comes with higher cost involvement, it follows that for a relatively higher income earning households may be able to afford more diverse diet and, therefore, may be more food secured.

Household Dietary Diversity Distribution

The result of the distribution of food diversity scores for the respondents is presented in Table 4.

Table 4: Distribution of Household Dietary Diversity Estimates

Food diversity Count	NSPFS Beneficiary Households	Non-Beneficiary Households
Lowest food score	5	2
Highest food score	9	9
Mean food score	7.2	5.74
Standard deviation	1.23	1.74
(t= 6.00, p=0.01)		

Source: Field Survey, 2012.

The food diversity score for this study represents the number of different food types consumed by the households within the last 24 hours of administering the questionnaire and it was based on the 11 food groups defined by Swindale and Bilinsky, (2006). According to the table (Table 4), the lowest food diversity score, reported for the beneficiary household was 5 food groups and the highest was 9, while for the non-beneficiary it was 2 for the lowest and 9 for the highest. On the average, 7 foods diverse was reportedly eaten by the beneficiary household within the last 24 hours that the questionnaires were administered and for the non-beneficiary it was 5 food groups. The number of food groups eaten within households is a function of certain socio-economic variables and food diversity as been identified as a proxy for measuring how well food secured households are. Based on these findings, it could be observed that beneficiary households consumed an average of 7 food groups which was about an additional 2 food groups consumed above the non beneficiaries with an average of 5.

Determinants of Respondents' Household Dietary Diversity

The result of the determinants of households' dietary diversity is presented in Table 5.

Table 5: Determinants of Households' Dietary Diversity

Predictor variables	Coefficient	Std error	Z	p>z
NSPFS participation	0.22915	0.6453	3.55	0.001*
Spouse education (any formal)	0.01488	0.01916	0.78	0.437
Household size	0.03190	0.01809	1.76	0.078***
Household annual Income	5.03e-07	2.04e-07	2.47	0.013**
Household head age	-0.003093	0.003115	-0.99	0.321
Crop output (kg/kcal)	5.11e-07	4.89e-07	1.04	0.296
Constant	1.7487	0.04816	36.30	0.000*
Dispersion=mean Log likelihood= -304.53 Prob>chi =0.0004 Pseudo R^2=0.0204 *Significant at 1% **Significant at 5% ***Significant at 10%				

Source: Field Survey, 2012.

The test for over-dispersion shows that the dispersion is equal to the mean; hence the Poisson was a sufficient model for fitting the variables. The chi square was equally significant at 0.01 and it explains that the models with the predictor variables in it and without are statistically different from one another. The Table shows that NSPFS participation, household size, and household annual income were significant and positive contributors to households' dietary diversity in the study area at p-values of 0.01, 0.1, and 0.05 respectively. This follows that participation in the NSPFS increases the chances of an additional increase in dietary diversity by 0.23 units. Additionally, increase in annual income by N60, 000 raises the chances of increase in dietary diversity by 1 unit. Also an increase in the household size by 2 units raises the chances of food diversity by 0.013 unit. Theoretically, participation in the program is expected to offer some benefits in terms of increased income and access to more improved farming techniques that would raise technical efficiency with additional benefits for food security. Household size would contribute to food security as a result of more farm lands to cultivate as a result of more working hands and diverse taste of the household members could result in more diverse food being prepared in the household.

Conclusion and Recommendations

This study examined the contribution of the NSPFS to beneficiary crop farmers' food security in Kwara state Nigeria. The study equally indicates that the beneficiary households ate more diverse food as observed than non-beneficiary households from their dietary diversity estimation (t= 5.9854, p=0.000). This food diversity signifies an improvement in their household food and nutritional security. The result shows that on the average, the beneficiary households consumed 7 different food groups within the last 24 hours of the interview when compared with the non-beneficiary households who consumed 5 food groups within the same period. Furthermore, the impact of NSPFS participation (p=0.01), household size (p=0.07) and household annual income (p=0.01) were significant and positive contributors to households' dietary diversity in the study area.

Based on the findings of this study, it can be concluded that the NSPFS has a positive impact in terms of enhanced average farm income and dietary diversity of participating households in the study area.

Based on this conclusion, the study makes the following recommendations:

First, due to the significance of the program on food security of beneficiaries, intensification of the program to cover more project sites and include more participants should be encouraged. This is expected to have a spill-over and multiplier effect on farming households as well as fast-tracking economic development as a whole.

References

Areal, F.J., Touza J., McLeod, A., Dehnen-Schmutz K., Perrings, C., Palmieri, M.G., and Spence N.J. (2008), "Integrating Drivers Influencing the Detection of Plant Pests Carried in the International Cut Flower Trade", *Journal ofEnvironmental Management*, Vol. 89, pp.300-307.

Ayoade, A.R. (2010), "Assessment of Women's Participation in National Special Program for Food Security in Oyo State", *Nigeria Educational Research,* Vol. 1, No. 5, pp.125-134 (June 2010), *http://www.interesjournals.org/ER 2010 International Research Journals.*

Azuibuike, G. (2012), "Nigeria: Food Insecurity as a Time Bomb", *http://allafrica.com/stories/201203110293.html, Accessed on September 9, 2013,*

Berk, R. and MacDonald, J. (2007), Over Dispersion and Poisson Regression "Ensemble methods for Data Analysis in the Behavioural", Social and Economic Sciences.

Daudu, S. and Ajayi, A.R. (2009), "Assessment of the Performance of the National Special Food Security Programme in Benue State", Nigeria, *Kamla-Raj 2009 J SocSci*, Vol. 21, No. 1, pp.25-32.

Dewey, K.G., Cohen, R.J., Arimond, M., and Ruel, M.T. (2005), "Developing and Validating Simple Indicators of Complementary Food Intake and Nutrient Density for Breastfed Children in Developing Countries Report"**,** *Washington, D.C.: International Food Policy Research Institute (IFPRI)*, Davis, CA: University of California at Davis.

FMARD/FAO (2001), "Special Programme for Food Security", *Project UTF/NIR/04/NIR.*

Food and Agriculture Organization of the United Nations (FAO) (2011d), *MDG Progress Map*, *http://www.fao.org/fileadmin/templates/es/Hunger_Portal/MDG_Progress_Map.pdf*

Gonder, E.S. (2011), "Is Subsistence Enough? Examining the Impact of Household Farm Biodiversity on Dietary Diversity in Bukidnon", Philippines, THESIS Submitted in Partial Fulfilment of the Requirements for the Degree of Master of Science in Agricultural and Consumer Economics.

Greene, W. (2008), "Functional Forms for the Negative Binomial Model for Count Data", *Economics Letters*, Vol. 99, pp.585-590.

Greene, W.M. (1993), "The Econometric Approach to Efficiency Analysis. In The Measurement of Productive Efficiency: Techniques and Applications", Harold O. Fried, Lovell, C.A.K. and Schmidt, S.S. (Eds.), Oxford: Oxford University Press, pp.68-119.

Harvest Plus (2009), "Nutrients", *http://www.harvestplus.org/content/nutrients.*

Hoddinott, J. (1999), "Choosing Outcome Indicators of Household Food Security", *(Technical Guide 7), Washington, D.C.: International Food Policy Research Institute (IFPRI).*

Hoddinott, J. and Yohannes, Y. (2002), Dietary Diversity as a Food Security Indicator, *(Discussion Paper 136), Washington, D.C.: International Food Policy Research Institute (IFPRI), http://dx.doi.org/10.1016/j.econlet.2007.10.015.*

Kwara ADP (2006), "Annual Report", Kwara ADP, Ilorin.

Lorenzana, P.A. and Mercado, C. (2002), "Measuring Household Food Security in Poor Venezuelan Households", Public Health Nutrition, Vol. 5, Special Issue 1, pp.851-857(7).

Lorenzana. P.A. and Sanjur, D. (1999), "Abbreviated Measures of Food Sufficiency Validly Estimate the Food Security Level of Poor Households: Measuring Household Food Security", *Journal of Nutrition*, Vol. 129, pp.687-692.

Obasanjo, O. (2005), "President Olusegun Obasanjo GCFR Speech at the FAO High Level Round Table on Agricultural Trade Reform and Food Security Rome", Italy, 13th April 2005.

Okello, J.J., Al-Hassan, R., and Okello, R.M. (2010), "A Framework for Analyzing the Role of ICT on Agricultural Commercialization and Household Food Security", *International Journal of ICT and Research Development*, Vol. 1, pp.38-50.

Roche, M.L., Creed-Kanashiro, H.M., Tuesta, I., and Kuhnein, H.V. (2008), "Traditional Food Diversity Predicts Dietary Quality for the Awajun in the Peruvian Amazon", *Public Health Nutrition,* Vol. 11, No. 5, pp.457-465.

SPFS (2003), Special Progarm for Food Security Nigeria's SPFS, *http://www.nigeriafirst.org/article_4461.shtml.*

Swindale, A., and Bilinsky, P. (2006), "Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide (V.2)", *Food and Nutrition Technical Assistance Project, Academy for Educational Development,* pp.1-9.

Tafida, I. and Danwanka, H.A. (2008), "Assessment of Farmers' Participation Level in National Special Progrmme for Food Security: A Case Study of Warawa Local Gvernment Area of Kano State", Continental J. Agricultural Economics, *Wilolud Online Journals,* Vol. 2, pp.69-73.

Torheim, L.E., Ouattara, F., Diarra, M.M., Thiam, F.D., Barikmo, I., Hatloy, A., and Oshaug, A. (2004), "Nutrient Adequacy and Dietary Diversity in Rural Mali: Association and Determinants", *European Journal of Clinical Nutrition*, Vol. 58, pp.594-604.

Winkelmann, R. and Zimmermann, K. (1995), "Recent Developments in Count Data Modeling: Theory and Application", *Journal of Economic Surveys,* Vol. 9, No. 1, pp.1-36.

Wooldridge, J.M. (2002), "Econometric Analysis of Cross Section and Panel Data", The MIT Press, Cambridge, Massachusetts, London, England, p.752.