Effect of Income Diversification Strategies on food Insecurity Status of Farming Households in Africa: Result of Analysis from Nigeria

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ABSRACT—This study links food insecurity status of farming households in the study area to their income diversification strategies. Data for the study were collected from 400 farming households in Osun State of the southwestern Nigeria. Households were classified into four categories based on how they obtain a living. Descriptive statistics, Cost of Calorie Function (COC) and Analysis of Variance (ANOVA) were used to analyze the data. Income diversification strategies of the households involved – combinations of crop production with livestock enterprises; crop production with off farm activities; off farm activities with livestock enterprises and crop production only; at 60.0%, 10.0%, 8.0%, and 22.0% of households respectively. Income diversification strategies have significant influence on food insecurity at $x^2 < 0.001$. Households that depend more on off farm income ranked the best, having the highest surplus index of 0.71 and the least shortfall index of 0.21 which indicate that the food secure households exceed the calorie requirement by 71% while the food insecure households fell short of the recommended calorie intake by 21%. The head count ratio shows that 82% of individuals in this group are food secure while 18% are food insecure. Households that rely solely on crop production ranked the least. A shortfall index of 0.41 and a surplus index of 0.62 indicate that food insecure households in this group fell short of the recommended calorie intake by 41% while food secure households exceed the calorie requirement by 62%. Head count ratio reveals that 79% of the individuals are food secure while 21% are food insecure. Results have shown that food insecurity among farming households in the study area was influenced by Income diversification strategies.

Keywords— **Diversification, Food, Insecurity.**

I. INTRODUCTION

In the last decade, attention has been focused on means of eliminating food insecurity and hunger world- wide. The 1992 International Conference on Nutrition and the 1996 World Food Summit both emphasized the critical need to decrease food insecurity and hunger globally. With the increase emphasis on relieving food crisis and reducing the severe consequences of famine and malnutrition on the poor, there is increase need for researching food problems in Africa. Most of the countries with the most extreme depth of hunger (more than 300 Kilocalories per person per day) are located in Africa (FAO 2000) [1]. Nigeria is the most populous country in Africa. The issue of food insecurity is of high importance to Nigeria because average Calorie and protein intake is only at the threshold of adequacy. Estimates show that at least 41% of the population is food-insecure; with 16 percent being severely undernourished (Olayemi 1996) [2]. The daily per capital calorie supply as a proportion of requirement was 90 percent in 1988-90 and 85 percent in 1992-96 (FOS 1999) [3]. Also, trends in poverty reveal that the incidence of poverty increased sharply both between 1980 and 1985 and between 1992 and 1996. The figures were 27.2%, 46.3%, 42.7% and 65.6% for 1980, 1985, 1992 and 1996 respectively. The figure for 1996 was translated to 67.1 million. In the same year, consumption of own produce (COP) was almost of the same magnitude as food cash expenditure in the rural; 33.9% and 33.88% respectively. The overall national average household income in 1996 prices indicate a very significant downward trend, moving from ₦ 13,454.00 in 1980 to just ₦6252.00 in 1996, over 50% reduction. The average household in the rural areas earned ₦5590.00 (FAO, 2000) [1]. At the

world food summit in 1996, Nigeria along with 184 other countries made a commitment to reduce the number of chronically undernourished people by half by the year 2015 (FAO, 2002)[4]. Therefore, in order to formulate effective policies for reaching this goal, a thorough understanding of the causes of food insecurity is needed. Also, the process of identifying the food insecure as target groups and achieving a better understanding of the determinants of food insecurity as policy instruments for development planners is crucial for designing effective food security programmes. This paper examines the effect of income diversification strategies on food insecurity status of farming households in the study area.

II. CONCEPTUAL FRAMEWORK

In order to generate food insecurity indices, the cost-of-calorie (COC) method proposed by Greer and Thorbecke (1986) [5] was used in this study for its simplicity and ease of computation. In this procedure a cost-of-calorie (COC) function of the following forms was estimated.

$$\ln X = a + bC \dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where:

X = food expenditure (=N=)
C = calorie consumption (kcal)

The calorie contents of the recommended daily nutrients level (L) were used to derive the food insecurity line Z:

$$Z = e^{(a + bL)} \dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Based on Z, several food security measures were calculated with the shortfall index given as P:

$$P = \frac{1}{M}\sum_{1}^{m}$$

$$G_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Headcount ratio (H) is given as:

$$H = \frac{M}{N} \dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

$$G_i = (Z - X_i)/Z \dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

Where Z gives the cost of buying the minimum calorie intake (L)

L = Recommended daily energy levels (2250kcal)
G_i = Food expenditure deficiency for household i
M = the number of food insecure in the sample
N = Sample size

The shortfall index (P) measures the extent to which poor households are food insecure. The index is a reflection of the food insecurity situation in a society. In implementing food security policies and programmes the value of the index could be monitored over time and compared among the different groups of the population. Food secure households are defined as those with a minimum intake of 2250 kilocalories, recommended by the FAO/WHO (1973) [6]. The nutrient composition of commonly eaten foods in Nigeria (Oguntona and Akinyele 1995) [7] was used to estimate the calorie intake of households

III. RESULTS AND DISCUSSION

A. Income Diversification Strategies of Respondents

Households were classified into four categories based on how they obtain a living. Four income diversification strategies were identified among the households namely;

- Crop production only
- Crop production with off farm activities
- Crop production with livestock enterprises
- Off farm activities with livestock enterprises

Majority of the households (60%) derive their livelihood through a combination of crop production and livestock enterprises. Crops that are grown include food/cash crops and plantation/orchard. About 10% of the households

derive their livelihood through a combination of crop production and off farm activities. About 8% combine off farm activities with livestock enterprises, while 22% rely on crop production only.

B. Household food insecurity by income diversification strategies

Households that derive their livelihood mainly through off farm activities with some livestock enterprises ranked best. This set of households had the highest surplus index of 0.71 and the least shortfall index of 0.21. Food secure households exceed the calorie requirement by 71%; the food insecure households fell short of the recommended calorie intake by 21%. The head count ratio shows that 82% of individuals in this group are food secure; 18% are food insecure. Households that rely solely on crop production ranked the least. A shortfall index of 0.41 and a surplus index of 0.62 indicate that food insecure households in this group fell short of the recommended calorie intake by 41% while food secure households exceed the calorie requirement by 62%. Head count ratio reveals that 79% of the individuals are food insecure while 21% are food secure. Households that derive their livelihood through a combination of crop production and off farm activities ranked second. This group has a shortfall index of 0.37 and a surplus index of 0.29. Food insecure households in this group fell short of the recommended calorie intake by 37%; food secure households exceed the calorie requirement by 29%. Head count ratio reveals that 61% of the individuals are food insecure; 39% are food secure. Households that derive their livelihood through a combination of crop production and livestock enterprises ranked third. This group has a shortfall index of 0.38 and a surplus index of 0.64. Food insecure households in this group fell short of the recommended calorie intake by 38%; food secure households exceed the calorie requirement by 64%. Head

count ratio reveals that 73% of the individuals are food insecure; 27% are food secure.

Table 1: Household food insecurity by income diversification strategies

Livelihood category	Rank	Household (%)	Household Food Status (%)	Shortfall/ surplus index	Head count ratio	Food security index (mean)	(stdev)
A			Insecure 16	-0.21	0.18	0.79	0.26
	1st	8	Secure 84	0.71	0.82	1.71	0.49
B			Insecure 57	-0.37	0.61	0.63	0.26
	2nd	10	Secure 42	0.29	0.39	1.29	0.30
C			Insecure 61	-0.38	0.73	0.66	0.26
	3rd	22	Secure 38	0.64	0.27	1.55	0.67
D			Insecure 69	-0.41	0.79	0.59	0.25
	4th	60	Secure 31	0.62	0.21	1.62	1.12

Off-farm activities with Livestock enterprises=A
Annual crop production with off farm activities=B
Annual crop production with livestock enterprises=C
Annual crop production only=D

Further more, result shows that the chi-square test is significant at 1% level (table 2), which means that food insecurity is significantly and statistically related to income diversification strategies.

Table 2: Test Statistics

	Strategies	Food Insecurity Status
Chi-Square	260.686	237.760
df	3	10
Asymp. Sig	0.000	0.000

IV. CONCLUSION

Income diversification strategies have an important influence on food insecurity. Households produced crops and gathered wild

fruits, vegetables and sold farm labour to supplement cash income and to reduce household food insecurity. Households that combined enterprises were better off and able to meet their capital expenditure. Livestock were sold in times of emergencies such as sickness and also for children education. Annual food and cash crops were used to meet daily food and cash requirements. Promising routes out of extreme food insecurity include adding enterprises to a farm, or diversifying into non-farm or wage employment.

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