

# Bases of Household Food Safety in Adamawa State, Nigeria Using Logistic Regression Model

<sup>1</sup>Siya Timothy Kwabuggi, and <sup>2</sup>Kumur John Haganawiga

<sup>1,2</sup>Department of Statistics, Adamawa State Polytechnic, Yola, Nigeria

**Abstract:- This research work aimed at providing proof in regards to the bases of household food safety between rural households in Adamawa State. Data were obtained through the use of structured questionnaires in 300 randomly selected houses. The data acquired were subjected to a statistical analysis using Logistic Regression model to perpend the bases of food safety between the households observed. Variables involved were Gender, Household Size, Marital Status, Off-Farm Income, Credit Access, Age, Education Level, Fertilizer Application, and Labour. The results revealed that, the likelihood of a food safety household depends on various factors with logistic regression coefficient and standard error such as sex (0.8643, 0.4910), household size (-0.3228,0.1415), marital status (-0.9174,0.4995), Off-farm Income (0.0054,0.0001) and Educational Level (0.0048,0.4995) which depicts statistical significant influence on household food safety. Therefore the research recommends that soft loans should be given to low income household head by government to help them cultivate their own crops and retail it. This is a good idea so as to encourage them make extra income that is desirable in the household.**

**Keywords:- Food Safety, Probability, Adamawa.**

## I. INTRODUCTION

Food safety is a perception that is used to reflect methodically almost how and why underfeeding arises, and what can be done to address and avoid it. Basically it is a good ideology that can be related to apprehending the universal goal of food as human right.<sup>[8][9]</sup>

In the mid-1970's, deliberations about food safety mainly absorbed on the need to yield more food and to allocate it better. Deliberations prioritised the total obtainability of food calories at the nationwide and global level as the prime means to address underfeeding.<sup>[4]</sup>

Overtime, the food safety perception has been widened significantly to cover a wide range of issues that can have an effect on underfeeding extending across the whole food system and-in some applications-including recognition of the important social and cultural that food plays.<sup>[4]</sup>

Nowadays, food safety perception is generally agreed to incorporate four main components which includes; availability, access, utilisation, and stability; although some see stability as a separate cross cutting factor. For a state of

food security to exist, all these components must be sufficiently present.<sup>[2][3][4][6]</sup>

Food safety can be calculated by kilogram calorie to intake per person per day, obtainable on a household allocation.<sup>[5][10]</sup> generally, the purpose of food safety gauges and measurements is to all of the essential components of food safety in terms of food accessibility, and adequacy. While availability and adequacy are easier to estimate and, therefore, more popular, accessibility remains largely elusive.<sup>[1]</sup> The features influencing household food accessibility are often context-specific.<sup>[7]</sup> Therefore this research work seeks to determine the prime bases of food safety and also to fit an appropriate model for the bases of food safety under the study area.

### ➤ *Research questions*

What are the bases of households' food security status under study area?

## II. METHODOLOGY

### ➤ *Area of Study*

Adamawa State Nigeria.

### ➤ *Population*

The population of the study covered twenty one (21) local government areas of Adamawa State.

### ➤ *Sample and Sampling Strategy*

A Simple Random Sampling Technique was used to select 300 households under the study area.

### ➤ *Data Source*

Data were obtained through a structure questionnaire.

### ➤ *Variables Measured*

The variables used in this research work were dichotomous dependent variable Y and the independent variables which were offences Gender, Household Size, Marital Status, Off-Farm Income, Credit Access, Age, Education Level, Fertilizer Application and Labour.

### ➤ *Data Analysis*

The collected data were investigated via logistic regression model.

The Model;

$$P_i \sim \text{logit}^{-1}(X_i' \beta)$$

Where:  $P_i$  = the probability that an individual is being food secure given  $X_i$

$X_i$  = a vector of explanatory variables

$\beta$  = regression vector parameters to be estimated.

The above model can be written as;

$$\text{Probability (food safety)} = \ln \left( \frac{\text{foodsafety}}{1 - \text{foodsafety}} \right)$$

$$= \beta_0 + \beta_1 SHH + \beta_2 HS + \beta_3 MSHH + \beta_4 OFA + \beta_5 CA +$$

In this study the explanatory variables used in the model included:

$X_1$  = Sex of Household Head (SHH)

$X_2$  = Household size (HS)

$X_3$  = Marital Status of household Head (MSHH)

$X_4$  = Off-farm income activity (OFA)

$X_5$  = Credit Access (CA)

$X_6$  = Age of Household Head (AHH) in years

$X_7$  = Education level of Household Head (ELHH)

$X_8$  = Fertilizer Application (FA)

$X_9$  = Labour (L)

### III. RESULTS AND DISCUSSION

#### A. Results

Variables	Coefficient	Standard Error
Sex of Household Head (GHH)	0.8643**	0.4910
Household Size(HS)	-0.3228***	0.1415
Marital Status Household Head (MSHH)	-0.9174*	0.4995
Off-Farm Income(OFI)	0.0050***	0.0001
Credit Access(CA)	-0.0005**	0.0002
Age of Household Head (HH)	-0.0141	0.0227
Educational Level of Household Head(ELHH)	0.0048***	0.0499
Fertilizer Application(FA)	0.7345	0.5697
Labour(L)	0.3421	0.2309
N=300		
Probability>F=0.000		
Pseudo $R^2$ =0.1860		
Log Likelihood=-130.2974		

\*\*\*Significance at 1%, \*\*Significance at 5%, \*Significance at 10%

Table 1:- Factors that determine household food safety in Adamawa State

#### Model 1

$$\text{Prob (food safety)} = \ln \left( \frac{\text{foodsafety}}{1 - \text{foodsafety}} \right) = 0.8302 + 0.8643GHH - 0.3228HS - 0.9174MSHH$$

$$+ 0.0050OFI - 0.0005CA - 0.0141AHH - 0.0481ELHH - 0.7345FA + 0.3421L$$

#### B. Discussion

The above results were abridged as follows; the first variable which is Sex of household head (male = 1; female = 0) was found to be positive and statistically significant at 5% ( $p < 0.05$ ). The emphasis of sex assessment is on male. The above results from table 3.1 depict that a male-headed household has a higher probability of being food secure as compared to a female-headed household. This means that the likelihood of food safety increases if a household is headed by male as related to a household headed by a female.

Household size result showed negative association between household size and food safety but significant at 1% level of significance. This indicates that an increase in household size decreases the chance of a household being food secure. This is because an increase in household size tends to increase the amount of food consumed in a household. However, this applies only when the added member does not donate less than what he/she consume.

Marital status reveals statistically significant at 10% level of significance. This depicts that the chance of food safety will decrease if married person headed the household compared to an unmarried household head. This is because married couples have higher household sizes than those of unmarried households' heads.

Off-Farm income revealed positive variable and also significant at 1% level of significance. An increase in off-farm income increases household food safety because generally more food can be produced or purchased. Off-Farm income is the most significant factor for household food security, with regards to food availability.

Age variable is insignificant in explaining household food safety. The coefficient has a negative sign indicating that as age increases then it leads to a decrease in the chance of a household being food secure.

Education variable has significant effect on the food safety status of households. The positive sign indicates that the chance of a household being food safety decreases with an increase in educational achievement. Furthermore these depict the higher the educational level by the household head, the higher food safety in the house.

Fertilizer Application: This variable is insignificant; but has a positive coefficient sign indicating that fertilizer yield a positive outcome on household food safety.

Labour force result revealed insignificant; but has a positive coefficient sign which indicates that the labour force has a positive outcome on household food safety. This indicates that increases in house members who can work are most likely to subsidize to the intake of food in the household.

#### IV. CONCLUSION AND RECOMMENDATIONS

##### A. Conclusion

The research work aimed at determine the prime bases of food safety in the rural areas in Adamawa State. The suggestion of the results depicts that the chance of a food safety household depends on various factors such as gender, household size, and marital status, Off-farm Income and Educational Level. Off-Farm Income is the most statistically significant factor of household food safety, over the availability of obtaining adequate food.

##### B. Recommendations

The research recommends that soft loans should be given to low income household head by government to help them cultivate their own crops and retail it. This is a good idea so as to encouragement them make extra income that is desirable in the household.

#### REFERENCES

- [1]. Barrett, C. B. (11 February 2010). "Measuring Food Insecurity". *Science*. 327 (5967): 825–828. Bibcode:2010Sci...327..825B. doi:10.1126/science.1182768. PMID 20150491.
- [2]. FAO. An Introduction to the Basic Concepts of Food Security,(2008) Available at: [www.foodsec.org/docs/concepts\\_guide.pdf](http://www.foodsec.org/docs/concepts_guide.pdf).(accessed : 1<sup>st</sup> February 2018).
- [3]. Gibson, M. Food Security-Acommentary: What is it and Why Is It So Complicated? *Foods* 1,18-27(2012).
- [4]. Maxwell, S. The Evolution of Thinking about Food Security. In *Food security in Sub-Saharan Africa* 13-31 (Practical Action Publishing, 2001). doi:10.3362/9781780440170.002.
- [5]. Perez-Escamilla, Rafael; Segall-Correa, Ana Maria (2008). "Food Insecurity measurement and indicators". *Revista de Nutrição*. 21 (5): 15–26. doi:10.1590/s1415-52732008000500003.
- [6]. Simon,G.A. Food Security, (2012) Available at: <http://www.fao.org/fileadmin/templates/ERP/uni/F4D.pdf>.(Accessed: 1<sup>st</sup> February 2018).
- [7]. Swindale, A; Bilinsky, P. (2006). "Development of a universally applicable household food insecurity measurement tool: process, current status, and outstanding issues". *The Journal of Nutrition*. 136(5): 1449S-1452S. doi:10.1093/jn/136.5.1449s. PMID 16614442. Archived from the original on 31 July 2013. Retrieved 31 July 2013.
- [8]. UN. Fact sheet 34-The Right To Adequate food. (United Nations, 2010).
- [9]. UN Universal declaration of human rights. (1948)
- [10]. Webb, P; Coates, J.; Frongillo, E. A.; Rogers, B. L.; Swindale, A.; Bilinsky, P. (2006). "Measuring household food insecurity: why it's so important and yet so difficult to do". *The Journal of Nutrition*. 136 (5): 1404S–1408S. doi:10.1093/jn/136.5.1404S. PMID 16614437. Archived from the original on 2013-07-31.