



Socio-Demographic Characterisation and Food Security Analysis of Family Farmers in Jigawa State, Nigeria

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ABSTRACT

The study examined the nexus between socio-demographic characteristics and food security status of family farmers in Jigawa State, Nigeria. Using a representative sample of 266 farm families, data were collected with the aid of questionnaire and analyzed using descriptive statistics, independent sample t-test, food security index and binary logistic regression. Estimates from the independent sample t-test of quantitative socio-demographic variables show significant difference in the selected variables, except, farm size and family own production among food secure and food insecure families. Age categorization of family members depicts marked differential in the food need across different age groups, except for the aged (60 years and above). Based on food security threshold of 2,730kcal/day/person, 58% of the families were food insecure with food consumption deficit of 39% below the food security line. Results of the binary logistic analysis show that food security increased significantly and consistently with increase in per capita income and attainment of post-primary education. Conversely, increased proportion of infants (5 years or less), children aged 6-17 years and adults aged 17-59 years significantly diminished the likelihood of farm families' food security. The policy implications of these findings are that, food security at the farm family level can be achieved through a sustained support and investment in education to enhance the capacity of the youthful categories to increase the demographic dividends such as productive labour force associated with large family size. In addition, there is need to increase the income frontier of family farmers through economic diversification to augment the overt reliance on families own food production.

Keywords: Family farming, Food security, Socio-demographic Characterisation, Smallholder farms.

INTRODUCTION

The pursuit of food security is a current fundamental objective and an expected outcome of development policies in Nigeria (Uma *et al.*, 2014; Metu *et al.*, 2016). A number of studies affirmed that Nigeria is faced with the challenges of food insecurity and demographic vulnerability (FAO, 2013; Population Institute, 2015; Ogundari, 2017). For instance, the Global Hunger and the Global Food Security Indices in 2017 ranked Nigeria among countries with serious hunger and greatest demographic vulnerability respectively (von Grebmer *et al.*, 2017; The Economist, 2017).

The array of available literature established a nexus between socio-demographic factors and food (in)security, especially among small-scale family farmers, across diverse cultures and regions (MDGs, 2013; Metu *et al.*, 2016; Magana-Lemus *et al.*, 2016; Ogundari, 2017).

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Demographic factors are significant indicators in food security analysis because, the quantity and quality of food availability is greatly influenced by these factors (Barret, 2010; UNDP, 2012) and understanding the interplay of socio-demographic variables and food security can contribute to the development of preventive measures that alleviate the consequences of food insecurity. Therefore, in-depth analysis and understanding of the socio-demographic determinants of food security at the family level is crucial in designing appropriate interventions that will ensure food security (Tefera and Tefera, 2014). This study is aimed at investigating the inherent effect of socio-demographic characteristics on food security status of family farmers.

Contextual Issues

Family farming encompasses all family-based agricultural activities that have direct niche with several areas of rural development. In principle, it is a means of organizing agriculture, forestry, fisheries, pastoralism and aquaculture that is managed and operated by a family that is predominantly reliant on family labour (FAO, 2014). Globally, smallholder family farming accounts for about 67% of smallholder farms (FAO, 2014; Chirițescu and Kruzslíka, 2015). In spite of the dominance of family farming in agricultural production and support to the livelihoods of billions worldwide, about 75% of extreme poverty and food security related challenges are endemic in the rural areas where this segment resides (Barrett, 2010; MacGillivray, 2015; Sibhatu and Qaim, 2017). It is believed that, even the hungry in the urban areas of many countries are likely to be recent migrants from rural areas that were forced to move because of lack of livelihood opportunities. Thus, any measure that is aimed at improving the fortune of family agriculture is in no doubt, the closest proxy to reducing pervasive poverty and hunger (MacGillivray, 2015).

Jigawa State as an agrarian state has 628,010 farm families and is ranked 8th most populous state in Nigeria (NBS, 2013). The state is the 10th largest non-oil and gas producing economy and about 90% derived their livelihood in the agriculture sector (Jigawa State Agriculture Policy, 2016). The State has the highest total fertility rate of 8.5 child births/woman as well as high incidence of food poverty (71.1%) (MDGs, 2013; NBS, 2015; NBS, 2016). According to ACF (2016), regions that have such demographic vulnerabilities, and are dependent on agriculture are prone to food insecurity. The underlining predispositions of the State form the basis for critical profiling of the demographic characteristics of farming families in relation to their food security status.

METHODOLOGY

The study was conducted in Jigawa State, Nigeria. The State is located between Latitudes 11.00° to 13.00° North and Longitudes 8.00° and 10.15° East of the Greenwich Meridian. The state is bordered by Kano and Katsina States to the West, Bauchi State to the East, Yobe State to the Northeast, and Zinder region in Republic of Niger to the North. It has an estimated population of 5,828,200 million people (NPC, 2016) of which 85% are resident in rural areas, engaging predominantly in subsistence agriculture (Jigawa State Agriculture Policy, 2016).

Sampling Procedure

Using a multi-stage sampling procedure, two local government areas were randomly selected from each of the four agricultural zones. In the second stage, the number of farming communities (106 communities) in the selected LGAs were selected and a proportionate sampling of 16 clusters of hamlets (20-30 families equivalent – USAID, 2012) was made at

15% in each LGA (1,349 families). Then, Yamane's formula of determining sample size at 5.5% margin of error and 95% confidence interval was used to select 266 households while the Bowley's proportion allocation formula was used to establish the sample size at each stratum (Table 1). Three interview schedules were done for each selected family by interviewing the family head or the most knowledgeable member (Vhurumuku, 2014) between July, 2017 and February, 2018. The study used the individual intake approach (modified into a family concept by extending the duration of assessment to 7 days' recall) (Vhurumuku, 2014; Lele *et al.*, 2016).

Yamane's formula for determining sample size is expressed as:

$$n = \frac{N}{1 + N(e^2)} \quad \dots (1)$$

Where: n = Sample Size, N= Population of the study and e = Margin of error.

Bowley's proportion allocation formula is expressed as:

$$n_i = n \frac{N_i}{N} \quad \dots (2)$$

Where: n_i = Sample size for the i^{th} stratum, n= Total sample size, N_i = Population for the the i^{th} stratum, N= Total population.

Table 1: Sampling Frame and Sample Size Selection Matrix

Zone	LGA	No. of villages	No. of village selected (15%)	No. of Faming Families (FH)	Sample
Birnin Kudu	Gwaram	14	Tashar Tsamiya	92	18
			Ganji Yamma	148	29
	Jahun	14	Takuyawa/Kwadage	95	19
			Gidan Ganji	123	24
Gumel	Taura	11	Zangoma	110	22
			Maje-Galadima	64	13
	Maigatari	15	Unguwar Togar	92	18
			Unguwar Galadima	64	13
Hadejia	Birniwa	11	Lawardi	47	9
			Kukawa	45	9
	Kaugama	16	Ubba Kofar Fada	72	14
			Bultuwa	54	11
Kazuar	Roni	8	Kagadama	130	26
			Asayaya Gari	46	9
	Sule - Tankarkar	17	Maizuwo	74	14
			Kofar Biri	93	18
Total	8	106	16	1349	266

Source: Field Survey, 2018.

Method of Data Analysis

The study deployed a number of analytical measures such descriptive statistics, food security index (FSI) and binary logistic regression to achieve the stated objectives.

Food Security Index

$$Z_i = \frac{\text{Household's daily per capita calorie availability (CA)}}{\text{Household's daily per capita calorie requirement (CR)}} \quad \dots(3)$$

Where Z_i denotes the status of i^{th} family food security ($Z \geq 1$ food secure and $Z < 1$ food insecure, i.e $1 > Z_i \geq 1$) and FAO recommended daily caloric intake for an adult aged man (30-60 years) of 2,730 kcal as a threshold for food security status (FAO, 1996) was adopted.

Based on Z_i the shortfall/surplus index, P was calculated:

$$P_i = \frac{1}{M} \sum_{i=1}^N GK_i \quad \dots (4)$$

Where P_i denotes the shortfall or surplus index for the i^{th} family, $GK = \frac{X_{ki} - I}{I}$ which is the deficiency or surplus faced by i^{th} family, X_{ki} = Average daily caloric available to the i^{th} family, M = number of families that are food secure (surplus index) or food insecure (short fall index), I = food security line (2,730 kcal/capita/day).

The Head count ratio (H) is given as $= \frac{M}{N}$, where N = total population under study.

Logit Regression Model

Empirical evidence of socio-demographic determinants of the status of food security was generated through binary logit regression (IBM SPSS[®] Statistics Version 23). The model has wide application in food security analysis in many countries Babatunde et al. (2007) in Nigeria; Coleman-Jensen *et al.* (2011) in America; Bogale (2012) in Ethiopia; Felker-Kantor and Wood (2012) in Brazil; Aidoo et al. (2013) in Ghana; Ahmed et al. (2017) in Parkistan; and Cordero-Ahiman et al. (2017) in Mexico.

The binomial or binary logistic probability model is expressed implicitly thus;

$$P_i \left(Y = \frac{1}{X_i} \right) = f(Z_i) = \frac{1}{1 + e^{-(\omega_0 + \omega_i X_i + \epsilon_i)}} \quad \dots (5)$$

Where; P_i = probability that a family is food secure in the face of exogenous variables (X_i) and $1 > Z_i \geq 1$, e = base of natural logarithm, X_i = a vector of explanatory variable, ω_0 and ω_i = the regression parameters to be estimated, and ϵ_i = Random error terms.

The model prediction success, Hosmer-Lemeshow test and the pseudo R^2 squared were used to describe the overall goodness of fit of the binary logistic model (Hosmer and Lemeshow, 2000) and the marginal effects ($\text{Exp}\beta$) was used for interpretation (Ahmed et al., 2017). The model was written in terms of the odds and log of odds: P_i (food secure) to the probability of not being food secure ($1 - P_i$).

$$e^{Z_i} = \frac{P_i}{1 - P_i} \quad \dots (6)$$

$$\ln \left(\frac{P_i}{1 - P_i} \right) = Z_i \quad \dots (7)$$

$$Z_i = \alpha + \sum_{i=0}^n \omega_i X_i + \epsilon_i \quad \dots (8)$$

Where Z_i denotes the presence or absence of food security i.e 1 or zero. According to Coleman-Jensen *et al.* (2011), the measure of food security in binary manner yields results that have more policy implications. To overcome the problem of heteroscedasticity associated

with the use of linear probability model, the relationship is model in such a way that 'y' is unobservable variable;

By the introduction of a dichotomous response variable, Y_i^* ,

$$Y_i^* = \begin{cases} 1 & \text{if } Y^* \geq 1 \xrightarrow{\text{yields}} \text{food secure } (\geq 2730\text{Kcal}) \\ 0 & \text{if } Y^* < 1 \xrightarrow{\text{yields}} \text{food insecure } (< 2730\text{Kcal}) \end{cases} \quad \dots(9)$$

Where 1 = food secure and 0 = food insecure

Solving for the probability that $Y = 1$ renders Equation 5 thus;

$$\left(\frac{P_i}{1-P_i} \right) = e^{Z_i} \quad \dots(10)$$

Then,

$$P_i = \frac{e^{Z_i}}{1+e^{Z_i}} \quad \dots (11)$$

Explicitly,

$$\text{Logit} \left(\frac{P_i}{1-P_i} \right) = Z_i = \omega_0 + \omega_1\chi_1 + \omega_2\chi_2 + \omega_3\chi_3 + \dots \omega_8\chi_8 \quad \dots(12)$$

Where; Z_i = Food security status (0 = food insecure, 1 = food secure), $\omega_0 - \omega_1$ = are the parameters to be estimated, χ_1 = gender (1 = male, 0 = female), χ_2 = the age (years), χ_3 = marital status, χ_4 = Family size by age, χ_5 = Educational status, χ_6 = Family Farm Size (ha), χ_7 = Family annual income (N), χ_8 = Quantity of own crop production (kg).

RESULTS AND DISCUSSION

Food Security Profiling

Using 2,730kcal/person/day as food security threshold, it was found that 57.9% of the population was food insecure while 42.1% were classified food secure (Table 2). This result shows a mean food security index (Z) of 0.61 for the food insecure families, implying that, farm families in this category were subsisting below food security line by 39%. This finding shows semblance to other researches in Nigeria and other African countries (Babatunde *et al.*, 2007; Aidoo *et al.*, 2013; Ogundari, 2017). By implication, attempts to bring the food insecure families out of food poverty will require additional supply of 1,062.46 kcal/day/person. Further analysis revealed significant difference (1%) in the disposition of families attributes with regards to food security status, especially with the age of the family head, family size, annual income, daily calorie requirements and availabilities. The quantity of own food production (grain equivalent) as a measure of food availability was however not significantly different between the food secure and food insecure families. This implies that own production alone is not sufficient to guarantee food security even at the rural level.

The result further showed food insecurity incidence ($\alpha = 0$) of 0.579, indicating that 57.9% of the farm families were food insecure. The depth ($\alpha = 1$) and severity ($\alpha = 2$) of food insecurity were 0.389 and 0.197 respectively. This implies that food insecure families need 38.90% of the daily calorie requirement to be brought to the recommended food security line of 2,730Kcal. Conversely, the severity of food insecurity showed that 19.7% were severely food insecure.

Table 2: Summary Statistics of Food Security Indices of Family Farmers in the State (N = 266)

Food Security Indices	Food Secure FH	Food insecure FH	Total	Mean	t-test
Recommended Calorie Requirement (I), 2730 Kcal	2730	2730		2730	
Frequency of Family Heads (M)	112	154	266		
Percentage of Family Heads	42.11	57.89	100		
Male headed Families	100	147	247		
Female headed Families	7	12	19		
Age of Family Head	41.67	48.08		44.88	4.65***
Family Size (adjusted to adult equivalent)	8.00(3.00)	14.00 (7.00)		12.00(6.00)	8.12***
Family Farm Size (ha)	4.08 (3.04)	4.55 (2.87)		4.57(2.84)	1.25
Family own production (grain equiv. kg)	2798.11 (2916.52)	3944.77 (6366.49)		3371.44 (4641.51)	1.73
Per Capita Annual Income (₦)	57353.48 (67444.80)	36175.93 (34451.00)		45109.71 (50947.90)	-3.34***
Mean Food Security Index (Z)	1.40 (0.32)	0.61 (0.21)		1.05 (0.27)	
Family daily calorie availability (Kcal)	31126.47 (10119.32)	22087.44 (11267.62)		26606.95 (10193.47)	-6.71***
Family daily/capita calorie availability (Kcal)	3832.17 (872.95)	1667.54 (582.55)		2749.86 (737.75)	-24.14***
Family daily calorie requirement (Kcal)	23034.38 (8545.30)	38432.73 (18676.00)		30733.56 (13610.65)	8.13***
Shortfall or Surplus Index (P)	0.404 (0.32)	0.389 (0.21)		0.397 (0.27)	
Head Count Ratio/incidence, $(H = \frac{M}{N})$	0.421	0.579	1.00		
Food insecurity Gap/depth ($\alpha = 1$)		0.389			
Severity of Food insecurity ($\alpha = 2$)		0.197			

Source: Field Survey, 2018.

*** represents significance level at 1%.

Values in parenthesis are standard deviations.

FH = Family Head

Socio-demographic Characteristics of the Respondents

Table 3 shows significant difference between the food secure and insecure families, implying that male-headed families are more prone to food insecurity than female-headed families. The male headed families' dominance (92.9%) is supposedly due to the cultural and religious inclinations of the region that limit the role of women, socially and even in agricultural activities (Matemilola and Elegbede, 2017). This result shows marked similarities to the findings of FAO (2016) Nigeria and Theriault, et al. (2017) who affirmed that extended farm families headed by a patriarch takes pre-eminence in West Africa.

There is also a significant difference in the mean age of the food secure and food insecure, indicating that food insecurity exacerbates with age, especially above the average age of 45.4 years. This shows that the proportion of food secure increases progressively as the productive years' increases (20-50 years). Furthermore, it is shown that 91% of the family heads were married of which 53.3% were polygamous. *Ceteris paribus*, high proportion of married respondents implies joint efforts of both spouses in ensuring food security. Nevertheless, the socio-religious background of the study area barely supports this assertion, suggesting that farm families whose heads are married tend to be worse off than unmarried heads and polygamy or polygyny in this regard tends to impair food security (Yelwa, 2014).

Result of educational attainment showed significant difference in the proportion of food secure (61.6%) and food insecure (37.0%) categories that had formal education. This implies that education enhances food security and families with limited schooling are more prone to food insecurity (Burchi and De Muro, 2007). The average family size for the food secure (8.4) and food insecure (14.1) families showed significant difference, indicating that large family size correlates negatively with food security (Tefera and Tefera, 2014; Ahmed *et al.* (2017).

Table 3: Socio-demographic Characterization of Farming Families

Variables	Food secure (N=112)		Food insecure (N=154)		Pooled (N=266)		t-test
	No	%	No	%	No	%	
Gender							
Male	100	89.29	147	95.45	247	92.86	
Female	12	10.71	7	4.545	19	7.14	
Age (Years)							
≤20	1	0.89	1	0.65	2	0.75	
21-30	20	17.86	11	7.14	31	11.65	
31-40	32	28.57	25	16.23	57	21.43	
41-50	40	35.71	54	35.06	94	35.34	4.65***
51-60	13	11.61	43	27.92	56	21.05	
>60	5	4.46	20	12.99	25	9.40	
Mean	41.67		48.08		45.38		
Marital Status							
Single	6	5.36	7	4.55	13	4.89	
Monogamous	56	50.00	57	37.01	113	42.48	90.
Polygamous	42	37.50	87	56.49	129	48.50	
Divorced/widowed	8	7.14	3	1.95	11	4.14	
Education							
None	7	6.25	14	9.091	21	7.89	
Quranic	36	32.14	83	53.9	119	44.74	
Primary	15	13.39	20	12.99	35	13.16	
Secondary	37	33.04	25	16.23	62	23.31	
Tertiary	17	15.18	12	7.792	29	10.90	
Family Size (No.)							
≤5	21	18.75	7	4.54	28	10.53	
6-10	66	58.93	51	33.12	117	43.98	
11—15	22	19.64	46	29.87	68	25.56	
16-20	3	2.68	22	14.29	25	9.398	8.12***
≥21	0	0	28	18.18	28	10.53	
Mean	8.44		14.08		11.70		
Farm Size (Ha)							
≤2	24	22.43	26	17.81	50	19.76	
2.1 – 5	59	55.14	76	52.05	135	53.36	
5.1 – 8	20	18.69	33	22.60	53	20.95	
8.1 – 11	2	1.87	9	6.16	11	4.35	1.25
≥11.1	2	1.87	2	1.37	4	1.58	
Total	107	100	146	100	253	100	
Mean	4.08		4.54		4.57		

Source: Field Survey, 2018.

Farm Family Income

Income is considered a major determinant of family expenditure and food security attainment. The mean annual income of ₦ 45, 110/caput characterised the earnings of the family head and 71.8% earned ₦50,000 and below per annum (Table 4). The per capita annual earning falls far below the national minimum earning of ₦216,000 per caput/annum as well as the recalibrated poverty line of ₦450 - \$1.25 equivalent. The implication of this to food security is that majority of the families were subsisting below the minimum requirement that can guarantee food security.

Table 4: Distribution of Annual per Capita Income (Family Head) by Food Security Status (₦)

Variables	Food secure		Food insecure		Pooled		t-test
Income	Freq.	%	Freq.	%	Freq.	%	
≤50,000	70	62.50	121	78.57	191	71.80	
50,001-100,000	30	26.79	23	14.94	53	19.92	
100,001-150,000	5	4.46	8	5.19	13	4.89	
150,001-200,000	4	3.57	2	1.30	6	2.26	
≥200,001	3	2.68	0	0	3	1.13	-3.44***
Total	112	100	154	100	266	100	
Mean	57,353		36,347		45,110		

Source: Field Survey, 2018. *** represents the level of significance at 1%.

Age Group Categorisation by Food Security Status

To bring out the nuances of individual food needs, the dietary requirements of different age groups within the family was examined (Table 5). The result showed significant difference in the number of persons in all age groups, except, the aged (above 60 years). This reaffirmed the assertion that farm families with fewer number of persons fare better than those with large members. For instance, *the 47.32% of the adults (18 – 60 years) on the other hand, do not only increase the workforce, but can equally and disproportionately increase the demand for food.* This is because, families whose members are within this age category have higher dietary demand to maintain their physical and mental capacities to engage in farm activities (Ogundari, 2017). The sizeable proportion (47.64%) of the younger population (≤17 years) also has mixed social and economic implications on food security.

Table 5: Age Group Categorization of Farming Families according to Food Security Status

	Food secure		Food insecure		Pooled data		t-test
Family size (No.)	No.	%	No.	%	No.	%	
Infants (≤5 years)	192	20.32	403	18.59	595	19.11	4.48***
Children (6-17 years)	284	30.05	604	27.86	888	28.53	5.05***
Adults (18-60 years)	418	44.23	1055	48.66	1473	47.32	5.92***
Aged (>60 years)	51	5.40	106	4.89	157	5.04	1.90
Class Total	945	100	2,168	100	3,113	100	

Source: Field Survey, 2018. Multiple responses. ***represents levels of significance at 1%.

Socio-demographic Determinants of Food Security

Results in Table 6 show the effect of socio-demographic characteristics on food security based on binary logistic model. It was revealed that the proportion of infants in the families exerted negative influence on food security (-0.460). All things being equal, increasing the number of infants by one showed that such families would have the less likelihood of food insecurity with the odds ratio, $Exp(\beta)$ of 0.632. Likewise, the significance odds ratio (0.735) of children aged 6-17 years at 1% level conforms to *a priori* expectation that a high child-dependency ratio will decrease the chances of families' food security. This result indicates that the more the number of children aged 6 – 17 years by a child, the less likely are the chances of the family's food insecurity. It can be inferred that, the proportions of infants and children increased the dependency ratio and the child nursing periods can reduce the time and ability of both parents to engage in other productive activities such as farming to cater for the growing needs of the infants (Ahmed *et al.*, 2017).

The coefficient (-0.263) of the proportion of adults of working age was significant at 1% level of significance and the odds ratio of 0.990. This implies that an increase in the number of adults will exponentially lessen the likelihood of food insecurity. This could be attributed to the fact that, increased number of adults in a family do not only increase the workforce but increases equally, the demand for food. This result is corroborated by the findings of Ogundari (2017) who affirmed that families whose members are within the working age category have higher dietary demand to maintain their physical and mental capacities to engage in farm activities.

The positive coefficients of farm-family heads with secondary education (0.905), was significant at 5% level of significance and in conformity to the *a priori* expectation that education correlates positively with food security. This result is supported by the findings of Burchi and De Muro (2007) who asserted that education improves people's capacity to diversify assets and activities to increase their productivity and income. By implication, educating the family head to the status of post-primary level will exponentially increase the likelihood of food security among family farmers in Jigawa State by $Exp(\beta)$ of 2.471, assuming all other factors are kept constant. This is because education has the capacity to change the lots of food insecure families by enabling them to gain access to adequate food because of their ability to participate in food markets of their choice (Ogundari, 2017) and can enable women to make informed decision and to control their fertility by delaying sexual initiation.

Furthermore, Table 6 shows that family annual income exerts significant and positive effect (at 5% level of significance) on food security status in Jigawa State. By this, it is showed that a unit increment in the per capita income of the family members will increase significantly and consistently the likelihood of family food security by an $Exp(\beta)$ factor of 1.429, if other factors are held constant. This can be alluded to the fact that family reliance on own production alone can hardly guarantee food security, hence the need for extra income to augment the food needs of the family (Ogundari, 2017).

Table 6: Socio-demographic Determinants of Farming Family Food Security

Variables	B	Std. Error	Wald test	P-value	Exp(β)
Gender	-0.888	0.919	0.935	0.334	0.411
Age	-0.011	0.019	0.316	0.574	0.990
Married_headed FH	0.283	1.436	0.039	0.884	1.327
Single_headed FH	0.006	1.629	0.000	0.997	1.006
Infants (≤ 5 years)	-0.460***	0.129	12.694	0.000	0.632
Children (6-17 years)	-0.308***	0.092	11.155	0.001	0.735
Adults (18-59 years)	-0.263***	0.056	22.360	0.000	0.769
Aged (≥ 60 years)	-0.010	0.210	0.002	0.963	0.990
Immigrants (No.)	-0.101	0.176	0.326	0.564	0.904
Primary	-0.323	0.529	0.372	0.542	0.724
Secondary	0.905**	0.389	5.402	0.020	2.471
Tertiary	0.710*	0.431	2.707	0.100	2.034
Quranic	0.959	0.771	1.549	0.213	2.609
Farm size (Ha)	0.061	0.071	0.741	0.389	1.063
Annual Income (N)	0.357**	0.160	4.975	0.026	1.044
Own crop Produce (Kg)	0.056	0.134	0.177	0.674	1.056
Constant	-1.565	2.414	0.420	0.517	0.209
-2 Log likelihood		260.083			
Cox and Snell R ²		0.320			
Nagelkerke R ²		0.430			

Source: Field Survey, 2018. NB: -2 Log Likelihood = 260.083. * $p \leq 0.05$, ** $p \leq 0.01$ & *** $p \leq 0.001$ indicate Wald test significance at 5, 1 and 0.1% respectively. **FH** = Family Head

CONCLUSION

The socio-demographic characteristics of family farmers are crucial determinants of food security. Understanding the influence of socio-demographic characteristics on food security at family level is important approach aimed at designing appropriate interventions to ensure food security for families that have food security challenges. Using the minimum calorie requirement threshold of 2,730 Kcal/person/day, the study established that 58% of the sampled farm families in the State were food insecure and were subsisting below the minimum food security threshold by 39%. The food secure and food insecure categories differ significantly in key socio-demographic dispositions as the age of the family head, family size, annual income and families daily calorie availability and requirements. Furthermore, the study shows progressive and significant improvement in the likelihood of farm families' food security with increased per capita income and attainment of post-secondary education. On the contrary, farm families' food security deteriorates consistently and significantly with increased household size of all categories, except the aged (60 years and above) group. Although, there is significant difference in the quantity of family's own crop production between food secure and food insecure, it is not a significant determinant of food security, hence the need to increase the income frontier of the family through economic

diversification to augment the families' overt reliance on own production. Therefore, support and investment in education is recommended to enhance the capacity of the youthful categories for a smooth transition to productive labour force to increase the demographic dividends associated with large family size.

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