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Food Insecurity and Coping Strategies among Rural Households in Niger State, Nigeria

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Abstract
The study aimed to assess food insecurity and coping strategies adopted by rural households in Niger State, Nigeria. The research adopts a sample size of 104 rural household heads from three Local Government Areas drawn from three agricultural zones of the State. Food insecurity index was used to determine the food insecurity status of the rural households, while universal coping strategy index was used to determine the different strategies adopted by the rural households faced with problem of food insecurity. Food insecurity index result revealed that 48% of the rural household heads in Niger State, Nigeria were food insecure, while 52% were food secure with a per capita household consumption of 2,243 kcal and per capita requirement of 2,474 kcal, indicating that the State was facing food insecurity issues. Rural households in Niger State, Nigeria adopted seven coping strategies in order to cope with food shortage, which included eating less preferred food, reducing food consumption portion, children eating first, purchasing food on credit or borrowing food, leasing of assets, relying on help from relatives and friends and skipping meals. The study recommend that government should put forward policies in agriculture and employment aimed at reducing or eliminating poverty, which will subsequently increase the level of food secure households in Niger, Nigeria.

Keywords: Per Capita, Coping Strategy, Poverty, Food Shortage, Kcals
JEL Classification: H31

1. Introduction

The state of food insecurity in the world indicated that over 688 million individuals were in dire need of food by end of 2016 from 150 countries identified with severe food insecurity issues (Food and Organization [FAO], 2017). An estimated 48% of these individuals were located in the African continent. Sub Saharan Africa (SSA) accounted for the highest percentage of people with food insecurity problem with 92%, while Northern Africa accounted for only 8% of the share of hungry people in the region. Asian continent accounted for second largest continent with people suffering from serious food insecurity with about 45%, while less than 1% each were accounted by North America and Europe of

the world population suffering from chronic malnutrition as indicated in appendix 4 (FAO, 2017).

Food insecurity according FAO (2015), is a situation in which people lack nutritious food intake necessary for vitality and supplements for full-scale starvation. Food insecurity can be chronic or transitory, which is highly dependent on duration of the hunger or the span. Chronic food insecurity, sometimes refered to as perpetual hunger, resulted into starvation vulnerability (Ingawa, 2002; Godfray et al., 2010). Chronic hunger has a direct relationship with the level of poverty among the society, especially among rural communities located in developing countries of the World that were seriously affected by conflicts and food insecurity challenges (Blattman & Miguel, 2010).

Some identified causes of food insecurity include unpredictable rise in global food price, shift in global food harvests to biofuel among the major food exporting countries, persistent government neglect the area of agriculture particularly in infrastructural facilities and lack of investment in most of the developing countries, continuous conflict in some part of the world and the approaching danger of climate changes and its antagonistic impact on food production (FAO, 2012). This issue has long been observed and hence the introduction of the Millennium Development Goals (MDGs) with the ultimate aim of halving or reducing the number of under-nutrition individuals in the world by the end of 2015 (FAO, 2012).

As of now only 63 nations have met the MDGs target by the end of 2015. Regions such as Latin America and the Caribbean gained hugely in meeting the target, however only humble advance in Sub-Saharan Africa and Western Asia was achieved mostly due to calamities and conflicts, which keep on trapping people into hunger (FAO, IFAD & WFP, 2014)

Nigeria has an estimated 25.5% of it total population (170 million) classified as having serious food insecurity according FAO (2016); World Bank (2015). Abubakar (1997) observed that one of the typical indicators of food insecurity in Nigeria was poverty. According to Brock (2013) over 62% of the Nigerian population was trapped in extreme poverty and 80% were located in rural areas. Agriculture serves as a main source of employment among the rural households, which is characterized by low productivity due to traditional mode of farming and low government interventions in the area of agriculture (Omanukwue, 2005).

With an estimated 180 million population in the country, nearly accounting for 47% of West African population, food insecurity issues will continue to be a predicament in the country. With population increase, the demand for food in the society also increases, but then the ability to produce food of nutritious quality also diminishes due to weight from the growing population in form of climate changes and other vices (FAO, 2015).

Currently the level of poverty in Niger, Nigeria has taken a different level, especially with current recession that the country found itself. More and more households are finding it difficult to feed their households. Inflation and high level of unemployment is also impacting negatively on the food security status of households. Children and women are at the receiving end. This high level of food insecurity status necessitated this study. Therefore, the objective of this study was to determine the status of food insecurity among

rural households in Niger State, Nigeria and to identify the coping strategies adopted by rural households classified as food insecure.

Previous studies on food insecurity in Niger State, Nigeria were focused only on determining the effect of food insecurity, without determining the status of food insecurity among households. Therefore this study further determined the level of food insecurity among the rural households, since poverty was always considered to be high in such locations. The study also disaggregated the level of food insecurity among the regions of the state. In most cases, once a household is faced with food insecurity, then a coping strategy needs to be employed to manage the situation. Therefore the study also adopted the reduced CSI index to identify the strategies employed by households that were classified food insecure in the study area.

2. Literature Review

Theoretically, one of the best theories that explain food insecurity situation faced by households is Malthus theory of population (1776-1834). The theory highlighted the possible perils associated with overpopulation in a society. According to him, unless measures were put in place human population will soon exceed food production, thereby resulting in starvation and hunger. The theory has its assumptions based on irrational behaviour of human being in the process of reproduction (Weeks).

Empirically, there are various studies carried out on food security/insecurity and coping strategies adaptation in Nigeria. Most recent ones include the work of Olayiwola, Tashikalma and Giroh (2017); Obayelu, Vaughan & Afolabi (2016); Agada and Igboke (2014). Others include Idrisa, Gwary and Shehu (2008); Olayemi (2012). The most prominent tools used in measuring food insecurity of household include; Household income and expenditure (HIES), Dietary diversity score, Food insecurity index (FSI) and Coping strategy index (CSI).

Olayiwola *et al.* (2017) investigated food security and coping strategies among households in Oluyole, Oyo, Nigeria. The study used the descriptive analysis, CSI and food security index (FSI). Its result revealed that 42.3% of the household were food insecure and the most frequently coping strategies adopted by the household included selling of livestock, reducing money and purchasing on credit and sometimes skipping meals. Also, Quaye (2008) studied food security and coping strategies in Ghana and related problems. The study employed the CSI and dietary diversity score. Frequent coping strategies adopted by households included migration, depending on assistance from family and friends, selling of assets and livestock to feed, consumption reduction, eating less preferred meals and eating less meals. Similarly, Ehebhamen et al. (2017) investigated food security and coping strategies adaptation in Edo, Nigeria and the study use the CSI and FSI. Result indicated that 52.3% of the households were food insecure and that coping strategies adopted included eating less preferred food, reducing meals, purchasing and borrowing food on credit, depending on family and friends.

However, Agada and Igboke (2014) investigated food security and coping strategies among three ethnic groups in North central region of Nigeria and employed the FSI and CSI. Results of the study revealed that household considered food insecure relied on limiting

food portion and eating less preferred food to cope with food insecure situation. Shariff and Linkhor (2008) studied food insecurity and coping strategies in poor rural households in Malaysia. The study used the descriptive analysis and CSI. The results indicated that coping strategies adopted by food secure households included selling assets, while food insecure households employed the use of borrowing money to purchase food and reducing expenditure on children in the household. Finally, Ivanda, Igboke and Olatunji (2015) researched on food security situation among Tiv farming households of Benue, Nigeria. They used the FSI and CSI. The results showed that 57.1% of the household were food secure, while coping strategies used by the households including mixed cropping, early harvesting and using high yield agricultural inputs.

The above literature shows that there is no information concerning food security situation in Niger State, Nigeria and the current coping strategies used among rural households in the State. Thus, there is need to carry out the study in order to bridge the existing gap in knowledge.

3. Methodology

3.1 Data and Sample

The study used primary data, and well structured questionnaire to gather information among 104 household heads as sample. A stratified sampling technique was adopted and three local government areas were drawn from the three agricultural zones, one each from each zone, depending on population of households in each local government area, a household sample was drawn to make a total of 104 households. The reason for this method is to identify the extent of food insecurity among the three agricultural zones. Descriptive statistics, food insecurity index and coping strategy index were used to determine household food insecurity level as well as the coping strategies adopted by rural households in Niger State, Nigeria.

3.2 Food Insecurity Index

Given the model of multidimensional poverty index developed by Foster-Greer Thorbecke, Christiansen and Boisvert (2000) which revealed an indicator that incorporate three chronical dimension cumulatively, which also considered vulnerability and uncertainty of being food secure. The index identified the different dimensions of n of food secure, with a threshold yj identifying where a household ith is deprive from achieving certain dimension j, inline with Xij (value of dimension j for household ith) which is less than the threshold or equal to the threshold.

$$Fis_i = \sum a_j \ P_j \ (\frac{X_{ij}}{y_j}) \quad \ldots 1$$

Where a_j indicates the vital importance attached to future, in such way vulnerability can be discounted to current situation of shortage in food, while present time of food insecurity and vulnerability in term of food might have the same impacts.

At aggregative level, the index is given as follows:

$$Fis_i = \frac{1}{n} \sum a_j \ P_j \ (\frac{X_{ij}}{y_j}) \quad \ldots 2$$

Where X_{ij} measure the daily per capita food intake converted into calorie per household, y_i measures the per capita food intake requirement as recommended by FAO (2,470 kcal).

Household consumption is converted into grams and each food item calorie is multiplied with the grams to obtain kcals in line with common food item consumed in Nigeria provided by Oguntona and Akinyele (1995) in appendix 3 and adopted by various scholars like Babatunde et al. (2007). Household's composition (infants, under 18 years and adults) was average using Kuwornu et al. (2013) in appendix 1 and Stefan and Pramila table of adult equivalent conversion table in appendix 2. The index is further simplifies as below:

$$\prod = \frac{\beta_i}{\xi} \qquad \text{……}3$$

Where $\prod$ is the food security index ranging between one and zero. A food secure household will achieve (1) and above value, while a food insecure household will fall below (1), β_i represents per capita daily food intake consume in household ith, while ξ is the per capita daily food intake requirement for the household.

3.3 Household Coping Strategy Index

One of the quickest and easiest ways to determine food insecurity situation in a location is through coping strategy index (Food and Nutrition technical Assistance [Fanta], 2003). Coping strategy index (CSI) measures household inability to meet up or access enough food for dietary requirement. Under normal circumstance a household hardly wait for food to get exhausted before adopting measures or adjusting consumption, especially when the problem is iminent (Christiaensen & Boisvert, 2000). According to Maxwell and Caldwell (2008) CSI is defined as dietary intake behavior pattern adjustment adopted by household faced with serious food insecurity situation by counting the frequency of occurring of the behavior with its severity. According to Fanta (2006) CSI measures the number of frequency and severity of behavior employed by households during food shortage.

Coping strategy is classified into two main types, modest food adjustment and sometime reversible over time, which include eating less preferred food and reducing the amount of food portion and a more severe behavior and difficult to reverse overtime including sales of productive assets (Watts, 1993). Corbett (1988); Devereux (1993) observed that the more food insecurity deteriorated, the likelihood of using coping strategies that are considered extremely severe and less reversible, which subsequently result in permanent food insecure position.

The index adopts direct questions developed to measure household frequent eating pattern, thereby relating it to the coping behavior answers to determine food security scale in the household or location. The CSI has three main basic points namely answer to the common question should be based on the correct list of coping behavior in a particular location, frequency of adaptation and identified as the severity of each coping behavior (Fanta, 2006).

4. Results

4.1 Household Heads Socio-economic Profile

Socio-economics profiling of the household heads is presented in Table 4.1 below. Results from Table 4.1 indicate that the average household head is 47 years, while classification of age brackets indicates that 43% of the household head age is 41 years – 50 years which

represents the highest age classification, about 14% are within the age brackets of 31 years – 40 years, 13% are within 21 years – 30 years of age, while only 3% are within 18 years – 20 years of age. In term of gender, Table 4.1 shows that 97% are male-headed household's heads and only 3% are female-headed household heads. Marital status also from Table 4.1 shows that 97% are married; about 2% are widowed, while only 1% are divorced. Average household size from Table 4.1 shows that, there is a minimum of 13 individuals from each household. In term of classification, Table 4.1 shows that 46% of the household head have a family size of 11 – 20 individuals; about 41% have family size of 1 – 10 individuals, while 15% have a family size of 21 – above.

In terms of farming activities of the study area, Table 4.1 shows that there is an average of 19 years farming experience among the rural household, an estimated 24% are within 1 - 10 farming experience, 63% are within 11 – 20 years farming experience while 13% have 21 – Above years farming experience. Household average farm size is estimated at 2 ha, farmsize classification from Table 4.1 shows that 88% have 1 – 5 ha of farm size, while 12% have 6 – 10 ha of farm size.

On land ownership structure, Table 4.1 indicates that 94% acquired their land through family by way of inheritance, 3% acquired their land through outright purchase while 3% also acquired their land by means of renting. An estimated 75% of the rural household farmers indicated that they have not established any contact with extension service agents, about 19% establish a contact of one in a month, while 6% had established contact of two times a month with extension service agents.

In terms of economic profiling of household heads, Table 4.1 shows that the average income among household heads is ₦43, 000. In terms of income classification, about 81% of the rural household heads were within N10, 000 – N100, 000, this represents majority of the rural household heads in the study area. This suggests that majority of the household heads were faced with high level of poverty since per capita income was less ₦2, 000 daily. About 13% were within the income classification of ₦101, 000 – ₦200, 000, while only 6% are within the income classification of ₦201, 000 – Above. From Table 4.1 household monthly expenditure on food items shows that, averagely each household has N55, 500 spent on food items. Classification further revealed that 91% representing majority of the households were with ₦10, 000 – ₦100, 000 monthly expenditure classification, about 5% were within ₦101, 000 – ₦200, 000 while 4% were within N201, 000 – Above.

Table. 4.1 Socio-economic Characteristics of Household Heads

Variables	Frequency	Percentage	Means
Household Age			47
18 - 20 Years	3	3	
21 - 30 Years	13	13	
31 - 40 Years	15	14	
41 - 50 Years	45	43	
51 - Above Years	28	27	

Household Head Gender			
Female	3	3	
Male	101	97	
Household Marital Status			
Single	0	0	
Married	101	97	
Widowed	2	2	
Divorced	1	1	
Level of Education			
Adult Education	32	31	
Primary	54	52	
Secondary	15	14	
Tertiary	3	3	
Farming Experience			19
1 - 10 Years	25	24	
11 - 20 Years	65	63	
21 – Above	14	13	
Household Size			13
1 - 10 Individuals	41	39	
11 -20 Individuals	48	46	
21 – Above	15	14	
Farm Size			
1 - 5 ha	92	88	
6 - 10 ha	12	12	
11 – Above	0	0	
Land Ownership			
Inheritance	98	94	
Purchased	3	3	
Rent	3	3	

Variables	Frequency	Percentage	Means
Extension Visitation			
None	78	75	
One a month	20	19	
Twice a month	6	6	
Credit Source			
Yes	11	11	
No	93	89	
Household Head Income			N43, 000
N10, 000 - N100, 000	84	81	
N101, 000 - N200, 000	14	13	
201, 000 – Above	6	6	

Variables	Frequency	Percentage	Means
Household Head Expenditure			N55, 500
N10, 000 - N100, 000	95	91	
N101, 000 - N200, 000	5	5	
N201, 000 – Above	4	4	

Source: Field Survey, 2017

4.2 Household Food Insecurity Status

Table 4.2 indicates the percentage of households as classified food secure in Niger State, Nigeria using the food insecurity index. The result from Table 4.2 indicates that 40%, 67% and 49% of the rural households in Niger, Nigeria were food secure with index of 1.08, 1.20 and 1.22 for Lapai, Kontagora and Suleja respectively. Clearly, Suleja had the highest index of 1.22 suggesting that food secure households had the highest index when compared to Kontagora and Lapai with 1.20 and 1.08 respectively. However, Kontagora had the highest number of adult equivalent classified as food secure than either Suleja or Lapai. Overall, the index among the households in the State is estimated at 1.18 with a per capita daily calorie consumption of 2,920.15 kcals as against the per capita daily calorie requirement of 2,473.54 kcal

Total household surplus among households in the State is 0.18 (18%), indicating the extent to which these households classified as food secure exceeded the threshold of 1. Overall, adults equivalent among food secure households is estimated at 167 individuals among the 104 households considering average energy per day requirement of infant with factor equivalent of (0.3) and children of 6 -18 years with factor equivalent of (0.7) given in appendix (1) and appendix (2).

Table 4.2 Summary of Food Secure Households in Niger, Nigeria

Factor	LAPAI (n = 26)	KONTAGORA (n = 35)	SULEJA (n = 43)	POOLED (n = 104)
%	40	67	49	52
Daily consumption	96110	199436	192119	487665.00
Daily Calorie Requirement	89244	165758	158080	413082.00
Per capita Daily Consumption	2670	2977	3002	2920.15
Per capita Daily requirement	2479	2474	2470	2473.54
Food Security Index	1.08	1.20	1.22	1.18
Head Count	0.40	0.67	0.49	0.52
Shortfall (Pi)	0.00	0.00	0.00	0.00
Surplus (Ps)	0.08	0.20	0.25	0.18
Adults equivalent	36	67	64	167.00

Source: Field Survey, 2017

Table 4.3 shows the percentage of households classified as food insecure, an estimated 60%, 33% and 51% of the households in Lapai, Kontagora and Suleja respectively, with overall average of 48% of the total adult equivalent in the study area classified as food insecure. Further indication from Table 4.3 shows that Suleja and Lapai had the highest food insecure

adult equivalent of 66 and 54 respectively, however, Lapai had the highest percentage of household classified as food insecure. Food index further reveals that Lapai, Kontagora and Suleja achieved a status of 0.65, 0.64 and 0.56 respectively, indicating that all the households were below the threshold of 1. Food shortage from Lapai, Kontagora and Suleja shows 0.35 (35%), 0.36 (36%) and 0.44 (44%) respectively.

Table 4.3 Summary of Food Insecure Households in Niger, Nigeria

Factor	LAPAI (n = 26)	KONTAGORA (n = 35)	SULEJA (n = 43)	POOLED (n = 104)
%	60	33	51	48
Daily consumption	86132	52520	91476	230128.00
Daily Calorie Requirement	133434	81741	163482	378657.00
Per capita Daily Consumption	1595	1592	1386	1504.10
Per capita Daily requirement	2471	2477	2477	2474.88
Food Security Index	0.65	0.64	0.56	0.61
Head Count	0.60	0.33	0.51	0.48
Shortfall (Pi)	0.35	0.36	0.44	0.39
Surplus (Ps)	0.00	0.00	0.00	0.00
Adults equivalent	54	33	66	153.00

Source: Field Survey, 2017

On the average about 48% of the total households in the study area are food insecure with daily calorie consumption of 230,120 kcals, daily calorie requirement 378, 657, per capita daily consumption 1,504.10 kcal, per capita daily calorie requirement of 2,474.88 kcals. Average index from Table 4.3 reveals that household classified as food insecure achieve a food security status of 0.61 clearly indicating a shortage of 0.39 (39%). Total adult equivalent of household classified food insecure is 153 across the three location surveyed.

Table 4.4 shows the summary of the index of food insecurity among rural households in Niger, Nigeria. The table indicates that total overall daily calorie consumption in the study area is 717,793 kcals, total overall daily calorie requirement is 791,739 kcals, while per capita daily calorie consumption in the study area is 2,243 kcals, per capital daily calorie requirement is 2,474 kcal which is far above the daily per capita calorie consumption. This resulted in an index of 0.91, which suggests that overall Niger, State still faces a serious food security challenges among the household. In all the three locations only Kontagora is food secure because the have meet and surpass the threshold of 1 with an index of 1.02 thereby having a surplus of 0.02. Lapai has the lowest index of 0.82 among the State, suggesting that food insecurity is the highest in the State.

In terms of food shortage, the State has a food deficit of 0.07 (7%) which represents a good signal that, with hard work, government intervention and reduction in the number of population among households, food security can easily be achieved in the near future.

Overall, the State has an adult equivalent of 320 adults from the total households of 104, Suleja had the highest adult equivalent of 130 adults, and this was slightly followed by Kontagora, while Lapai had the least adult equivalent of 90.

Table 4.4 Summary of Food insecurity Households in Niger, Nigeria

Factor	LAPAI (n = 26)	KONTAGORA (n = 35)	SULEJA (n = 43)	POOLED (n = 104)
%				
Daily consumption	182242	251956	283595	717793
Daily Calorie Requirement	222678	247499	321562	791739
Per capita Daily Consumption	2025	2520	2182	2243
Per capita Daily requirement	2474	2475	2474	2474
Food Security Index	0.82	1.02	0.88	0.91
Head Count	1.00	1.00	1.00	1.00
Shortfall (Pi)	0.22	0.00	0.12	0.07
Surplus (Ps)	0.00	0.02	0.00	0.00
Adults equivalent	90	100	130	320

Source: Field Survey, 2017

Various studies adopted the food insecurity index including the works of Ganiyu and Omotayo (2016); Ogundari (2017); Asogwa and Umeh (2012) in different locations of Nigeria.

4.3 Coping Strategy Index (CSI)

Once a household is classified as food insecure, then coping strategy sets in. The strategies are usually employed to mitigate the food shortage. Table 4.5 shows that the study area had seven different coping strategies. Some were extremely severe and irreversible, while others were less severe and reversible. Selling assets, skipping meals and children eating first before adults all represent severe and irreversible coping strategies, while borrowing food or purchasing food on credit, reducing consumption pattern, relying on help from families and friends and eating less preferred meals all represent less severe and reversible coping strategies.

Table 4.5 shows that the most frequent coping strategies adopted by households in Niger, Nigeria were eating less preferred meals 90%. It was followed by children eating first before meals 81%, borrowing or purchasing food on credit 80%, reducing food consumption 77%, Selling assets 65%, relying on families and friends for food 48%, skipping meals 43%. Clearly the study area has a mixture of severe and less severe coping strategies adopted when households is faced with food shortage.

Table 4.5 Frequent Coping Strategies Adaptation Among Households in Niger, Nigeria

Strategies	Never		Occasional		Always		Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Borrowing	21	20.19	70	67.31	13	12.50	104	100
Selling asset	36	34.62	44	42.31	24	23.08	104	100
Skipping meals	59	56.73	27	25.96	18	17.31	104	100
Reduction in consumption	24	23.08	67	64.42	13	12.50	104	100
Reliance on help	54	51.92	36	34.62	14	13.46	104	100
Children first	20	19.23	22	21.15	62	59.62	104	100
Eating less preferred food	10	9.62	50	48.08	44	42.31	104	100

Source: Field Survey, 2017

While majority of households adopted eating less preferred foods in the study area, at the same time more people also adopted extremely severe coping strategies like children eating first before adult and the more households adopt such behavior, the higher the tendency of the households being food insecure perpetually. Furthermore, Table 4.5 indicates that moderate coping strategies accounted for 43%, while severe coping strategies accounted for 26% of coping behaviors.

5. Conclusions and Policy Recommendations

This paper determined the food insecurity index and frequent coping strategies of rural households in Niger, Nigeria. Food insecurity index reveals that 52% of the rural households in Niger, Nigeria were food secure in that, the households had achieved the threshold for food secure households of 1 and above, while 48% fell short of the threshold and as such classified as food insecure. The moment households get slightest idea of food shortage, immediately they start to take action to counter the problem. Frequent identified coping strategies in the area included eating less preferred meals, children eating first before adults in the households, borrowing food or purchasing on credit, reducing consumption pattern, selling assets, while less frequent coping strategies included relying on help from friends and relatives to eat as well as skipping meals.

On the other hand, the descriptive analysis further revealed that the average age among households in the study area was 47 years; about 97% of the household heads were male and married. The average households size was 13. An estimated 52% of the household heads had primary education certificate. Average farming experience among rural farmer is 19 years, while farm size average was 3 ha with 88% of the household having a farm size of 1 – 5 ha. In term of landownership, 94% owned their farmland through family inheritance and 75% of the household heads had not established contact with extension service agents. Average monthly household heads income was ₦43, 000 while average monthly expenditure among rural household heads was ₦55, 500.

Results from the food insecurity index and CSI represent a fair reflection of household activities in the study area. Therefore, the food insecurity index and CSI finding could be used as yardstick for determining food insecurity index and CSI in other part of the States in Nigeria especially the North central regions that share similarities with Niger, Nigeria.

The research, therefore, strongly recommend that government policies that can alleviate or eliminate poverty among rural households should be encouraged, especially in agriculture since majority of the household heads source of employment is agriculture; for instance, provision of subsidy in agricultural inputs and credit facilities to farmers at a very low interest rate to farmers. Also, household heads are strongly recommended to adopt less severe coping strategies that can easily be reversed, when faced with food insecurity situation.

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APPENDICES

Appendix 1: Recommended Daily Energy intake and Equivalent Scale

Age category (yrs)	Average energy per day	Factor equivalent
Children less than 6 yrs	741	0.3
Children (6 – 18) yrs	1,729	0.7
Adults (> 18) yrs	2,470	1.0

Source: Kuwornu et al., (2013).

Appendix 2: Adults equivalent for adjusting household size

Age category in (years)	Male	Female
0-1	0.33	0.33
1-2	0.46	0.46
2-3	0.54	0.54
3-5	0.62	0.62
5-7	0.74	0.70
7-10	0.84	0.72
10-12	0.88	0.78
12-14	0.96	0.84
14-16	1.06	0.86
16-18	1-14	0.86
18-30	1.04	0.80
30-60	1.00	0.82
>60	0.84	0.74

Source: Stefan and Pramila (1998).

Appendix 3: common food items eaten

Food items	Kcal/kg	Food items	Kcal/Kg
Staple food		*Fruits*	
Cassava Flour	3870	Plantain	770
Gari	3840	Banana	960
Soy flour	2600	Pineapple	320
Wheat Grain	3400	Apple	570
Cowpea (Beans)	5920	Coconut	580
Sweet Potato Tuber	1000	Guava	730
Maize Grain	4120	Sugarcane	360
Maize Flour	3500	Mongo	590
Sorghum Grain	3500	Pawpaw	300
Millet Grain	3500	*Meats & Animal prod*	
Groundnuts	5950	Cow Meat	2370
Vegetables		Chicken	2380
Okro	4500	Fish	2230
Tomato	880	Eggs (pieces)	1400
Pepper	3930	*Drinks*	
Onion	440	Soft drink	620
Egg plants	440	Orange Juice	400
Cucumber	270	Apple Juice	550
Pumpkin	440	Pineapple	560
Beverages		*Dairy Products*	
Cocoa	1200	Milk	4900
Tea	1200	Cheese	4000
Coffee	4100	Yoghurt	4100

Source: Oguntona and Akinyele (1985)

Appendix 4:Number of People Affected by Severe Food Insecurity in the World

Number of People Affected by Severe Food Security Challenges - 2014 to 2016

Number in millions

	2014	2015	2016
WORLD	665.9	645.1	688.5
AFRICA	289.5	298	333.2
Sub-Saharan African	*265*	*275.7*	*306.7*
ASIA	337	306.7	309.7
LATIN AMERICA/CARIBBEAN	27.7	28.1	38.3
N. AMERICA & EUROPE	15.6	17.1	13

Source: FAO (2017)