

**HOUSEHOLD FOOD INSECURITY AND ITS  
ASSOCIATED FACTORS, DIETARY DIVERSITY  
AND NUTRITIONAL STATUS OF CHILDREN 6  
TO 59 MONTHS IN CENTRAL RIVER REGION  
SOUTH, GAMBIA**

**WUYEH DRAMMEH**

**UNIVERSITI SAINS MALAYSIA**

**2020**

**HOUSEHOLD FOOD INSECURITY AND ITS  
ASSOCIATED FACTORS, DIETARY DIVERSITY  
AND NUTRITIONAL STATUS OF CHILDREN 6  
TO 59 MONTHS IN CENTRAL RIVER REGION  
SOUTH, GAMBIA**

by

**WUYEH DRAMMEH**

**Thesis submitted in fulfilment of the requirements**

**for the degree of**

**Master of Science**

**May 2020**

## ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and the most merciful.

I am thankful to the Almighty God for the health, protection, and guidance I have enjoyed during this period of study. The journey has not been an easy one; however, with His permission, it has been smooth and possible. It is said, “a journey of thousand miles begins with a step.” The accomplishment of this study was made possible with the helps of several people. I would like to sincerely recognise those who have in one way or the other contributed to the realisation of this study. First and foremost, my definite respect goes to my supervisors, Associate Professor Dr. Rohana Abdul Jalil (main supervisor), Dr. Noor Aman Hamid (Co-supervisor), and Mr. Baba Njie (field supervisor) for their unlimited advice and parental guidance. Your mentorship approach will never be forgotten. I must confess that your readiness to assist, immeasurable patience, valuable encouragement, moral support and above all your humanity made this dream a reality. I ask Almighty God to reward you for every single knowledge which I have acquired from you. I am equally indeed grateful to my Sponsor, Islamic Development Bank (IDB), for awarding me a master programme scholarship. My special thanks goes to my immediate family, especially my mother Nyominding Barrow, my late father Sambou Drammeh, my brother Fakebba Drammeh, my wife (Mama Njie), my children and nephews. Big thanks also goes to all the community health nurses in Central River Region who assisted me during the data collection. Thanks also goes to my friend Dr. Mohamad Zarudin Bin Mat Said, Doctor of Public Health candidate, who was always ready to help me in data analysis. I will not forget the following people Mr. Lamin BS Jarjue ( NMCP) and Mr. Fabary Bass, National Nutrition Agency (NaNA) ) and Mr. Lamin Sawo, for their valuable assistance during the course of my data collection.

## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENT .....</b>	<b>ii</b>
<b>TABLE OF CONTENTS.....</b>	<b>iii</b>
<b>LIST OF FIGURES.....</b>	<b>ix</b>
<b>LIST OF TABLES.....</b>	<b>x</b>
<b>LIST OF SYMBOLS.....</b>	<b>xi</b>
<b>LIST OF ABBREVIATIONS.....</b>	<b>xii</b>
<b>ABSTRAK.....</b>	<b>xv</b>
<b>ABSTRACT .....</b>	<b>xviii</b>
<b>CHAPTER 1 INTRODUCTION .....</b>	<b>1</b>
1.1 Background.....	1
1.1.1 Burden of food insecurity .....	3
1.1.2 The Gambia perspective .....	7
1.2 Problem statement .....	9
1.3 Rationale/Justification for the Study .....	12
1.4 Research questions .....	13
1.5 Objectives of the study .....	14
1.5.1 General objective .....	14
1.5.2 Specific objectives .....	14
1.6 Research hypothesis .....	15
1.6.1 Null hypothesis .....	15
1.6.2 Alternative hypothesis .....	15
1.7 Conceptual framework .....	16
1.8 Operational definition.....	17
<b>CHAPTER 2 LITERATURE REVIEW .....</b>	<b>21</b>
2.1 Definition and concepts of household food insecurity .....	21

2.1.1	Definition of food security.....	21
2.1.2	Concept of household food insecurity .....	24
2.1.3	Food availability .....	26
2.1.4	Food access .....	27
2.1.5	Food utilisation .....	28
2.1.6	Food stability .....	29
2.2	Measurement of household food insecurity.....	30
2.2.1	Household insecurity access scale (HFIAS).....	32
2.2.2	Household dietary diversity score (HDDS).....	33
2.2.3	Measuring food utilisation .....	34
2.3	Level of food security.....	35
2.3.1	Food security at the global level (Macro-level).....	35
2.3.2	Food security at the national level (Macro level) .....	35
2.3.3	Food security at the community level (Meso level).....	36
2.3.4	Food security at the household level (Micro-level) .....	36
2.4	Types of food insecurity .....	37
2.4.1	Chronic food insecurity.....	38
2.4.2	Transitory food insecurity.....	38
2.5	Global prevalence of household food insecurity .....	39
2.5.1	Prevalence of food insecurity in underdeveloped countries .....	41
2.5.2	Prevalence of food insecurity in developing and developed countries.....	43
2.5.3	Prevalence of food insecurity in Sub-Saharan Africa.....	45
2.6	Determinants of household food insecurity .....	47
2.6.1	Age of the head of the household .....	49
2.6.2	Household size .....	50
2.6.3	Gender of the household head.....	51
2.6.4	Marital status.....	52

2.6.5	Number of dependents .....	53
2.6.6	Educational level.....	54
2.6.7	Occupation .....	55
2.6.8	Household assets .....	56
2.6.9	Income and poverty.....	58
2.6.10	Food price .....	59
2.6.11	Health issues .....	60
2.7	Food assistance programme.....	62
2.7.1	Microcredit programme .....	64
2.8	Market accessibility .....	65
2.9	Breastfeeding and infant feeding.....	67
2.10	Overview of malnutrition .....	70
2.11	Household food insecurity and association with child malnutrition .....	72
2.11.1	Consequences of household food insecurity on child health and nutritional status.....	75
<b>CHAPTER 3 METHODOLOGY .....</b>		<b>77</b>
3.1	Introduction .....	77
3.2	Study design. ....	77
3.3	Study duration .....	77
3.4	Study location.....	77
3.5	Reference population.....	79
3.6	Source population .....	79
3.7	Target population.....	79
3.8	Sampling frame .....	79
3.9	Study subjects.....	79
3.9.1	Inclusion criteria .....	80
3.9.2	Exclusion criteria .....	80
3.10	Sampling method.....	81

3.11	Sample size calculation .....	84
3.12	Research tools and materials .....	88
3.12.1	Questionnaire .....	88
3.12.2	Section A: Socioeconomic and demographic characteristics .....	88
3.12.3	Section B: Household Food Insecurity Scale (Access).....	89
3.12.4	Section C: Household Dietary Diversity Score (HDDS).....	92
3.12.5	Section D: Nutritional status assessment of children.....	93
3.12.5(a)	Anthropometric measurement .....	93
3.12.5(b)	Weight (child) .....	94
3.12.5(c)	Height .....	95
3.12.5(d)	Length / height-for-age.....	96
3.12.5(e)	Weight-for-age.....	96
3.12.5(f)	Weight-for-length/height .....	96
3.12.5(g)	Mid upper arm circumference (MUAC) .....	97
3.13	Data collection.....	98
3.13.1	Pre-test .....	98
3.14	Statistical analysis .....	99
3.14.1	Data cleaning and exploration .....	99
3.14.2	Descriptive Statistics.....	100
3.14.3	Simple Logistic Regression (SLgR) .....	100
3.14.4	Multivariable analysis (Multiple Logistic Regressions).....	101
3.14.5	Variables selection .....	101
3.14.6	Checking the assumptions (The goodness fit of the model).....	101
3.15	Flow chart of the study .....	102
3.16	Ethical Approval.....	105
	<b>CHAPTER 4 RESULT .....</b>	<b>106</b>
4.1	Introduction .....	106

4.2	Characteristics of the households .....	106
4.3	Household food insecurity status.....	115
4.3.1	The proportion of the household’s food insecurity status.....	116
4.4	Nutritional status of the children .....	116
4.5	Association of between household food insecurity and nutritional status of children .....	118
4.6	Status of household dietary diversity.....	120
4.7	Association between household food insecurity and household dietary diversity .....	121
4.8	The association between household food insecurity with socio-economic and demographic factors .....	122
4.8.1	Simple Logistics Regression.....	122
4.8.2	Multiple logistic regression.....	125
	<b>CHAPTER 5 DISCUSSION .....</b>	<b>128</b>
5.1	Introduction .....	128
5.2	Household food insecurity status.....	129
5.3	Determinants of household food insecurity .....	136
5.4	Strength and limitation of the study .....	141
	<b>CHAPTER 6 CONCLUSION AND RECOMMENDATION .....</b>	<b>144</b>
6.1	Introduction .....	144
6.2	Conclusion.....	144
6.3	Recommendation .....	145
	REFERENCES.....	148
	APPENDICES	
	APPENDIX A: Questionnaire	
	APPENDIX B: Ethical approval letter (USM)	
	APPENDIX C: Participant information sheets (USM)	
	APPENDIX D: Ethical approval letter (MRC), Gambia	



APPENDIX E: Participant information sheets (MRC), Gambia

LIST OF PUBLICATIONS

## LIST OF FIGURES

	<b>Page</b>
Figure 1.1: Conceptual framework of the study .....	16
Figure 2.1: Dimensions of food and nutrition security at the micro-level .....	26
Figure 2.2: Conceptual model of household food insecurity .....	48
Figure 2.3: UNICEF conceptual framework of malnutrition .....	74
Figure 3.1: Map of The Gambia .....	78
Figure 3.2: Flow chart of the sampling method .....	83
Figure 3.3: Salter scale .....	94
Figure 3.4: Horizontal length scale .....	94
Figure 3.5: Flow chart of the study.....	104
Figure 4.1: Receiver Operating Characteristics (ROC).....	127

## LIST OF TABLES

	<b>Page</b>
Table 2.1: Summary of the definition of food security by organisations.....	23
Table 3.1: Proportion of household sample size allocation.....	82
Table 3.2: Sample size calculation of factors associated with food insecurity .....	87
Table 3.3: Response of HFIAS questionnaire .....	91
Table 3.4: Summary of HFIAS interpretation.....	91
Table 3.5: Cut-off points for household dietary diversity score.....	93
Table 3.6: Z- score and its interpretation of the nutritional status of children .....	95
Table 4.1: Characteristics of the households .....	107
Table 4.2: Characteristics of the children.....	109
Table 4.3 : Other household characteristics .....	110
Table 4.4: The financial status and households facilities.....	111
Table 4.5: Household ownership and assets.....	112
Table 4.6: Food access of households .....	113
Table 4.7: Previous participation of financial and food assistance programme.....	114
Table 4.8: Percentage of households that experienced specific food insecurity conditions .....	115
Table 4.9: Household food insecurity status .....	116
Table 4.10: Nutritional status of children.....	118
Table 4.11: Association of household food insecurity status with child nutritional status .....	119
Table 4.12: Consumption of individual food group.....	120
Table 4.13: Dietary diversity status of households .....	121
Table 4.14: Association of household food security status with dietary diversity....	121
Table 4.15: Univariate logistic regression analysis.....	123
Table 4.16: Multiple logistic regression analysis.....	126

## LIST OF SYMBOLS

$>$	More than
$<$	Less than
$=$	Equal to
$\geq$	More than or equal to
$\leq$	Less than or equal to
$\alpha$	Alpha
$\beta$	Beta
$\Delta$	Precision / Delta
$\%$	Percentage
$H_0$	Null hypothesis
$H_A$	Alternative hypothesis

## LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
AOR	Adjusted Odds Ratio
ARI	Acute Respiratory Infection
ASF	Animal Source Food
BMI	Body Mass Index
BReST	Building Resilience through Social Transfers for Nutrition Security
C.I	Confident Interval
CCHIP	Community Child Hunger Identification Project
CFSVAS	Comprehensive Food Security Vulnerability Analysis Survey
CHN	Community Health Nurse
COR	Crude Odds Ratio
CRR	Central River Region
DD	Dietary Diversity
DHS	Demographic Health Survey
EBF	Exclusive Breast Feeding
FANTA	Food AND Nutrition Technical Assistance
FAO	Food and Agricultural Organisation
FCS	Food Consumption Score
GBoS	Gambia Bureau of Statistics
GDP	Gross Domestic Product
GMD	Gambian Dalasis
HAZ	Height for Age Z Score
HCES	Household Consumption and Expenditure Survey

HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
HFIP	Household Food Insecurity Access prevalence
HFSSM	Household Food Security Survey Model
HH	Household Head
HIV	Human Immunodeficiency Virus
IWC	Infant Welfare Card
LSRO	Life Science Research Office
MCNHRP	Maternal AND Child Nutrition and Health Results Project
MLR	Multiple Logistic Regression
MOH	Ministry of Health
MRC	Medical Research Council
MUAC	Mid Upper Arm Circumference
NaNA	National Nutrition Agency
NFS	Nutrition and Food Security
OR	Odds Ratio
RHD	Regional Health Directorate
RUTF	Ready -to- Use Therapeutic Food
SBCC	Socio-Behavioural Change Communication
SD	Standard Deviation
SDG	Sustainable Development Goals
SLR	Simple Logistic Regression
SMC	Seasonal Malaria Chemoprevention
SNAP	Supplementary Nutrition Assistance programme
SPSS	Statistical Package for the Social Sciences

USM	Universiti Sains Malaysia
UNDP	United Nation Development Programme
UNICEF	United Nation International Children's Fund
USDA	United State Department of Agriculture
VHS	Village Health Services
WAZ	Weight for Age Z Score
WFP	World Food Programme
WHZ	Weight for Height Z Score
WHO	World Health Organisation

**KETIDAKJAMINAN DAPATAN MAKANAN SERTA FAKTOR-  
FAKTOR YANG BERKAITAN, KEPELBAGAIAN DIETARI DAN STATUS  
PEMAKANAN KANAK KANAK BERUSIA 6 HINGGA 59 BULAN DI  
DAERAH SELATAN SUNGAI TENGAH, GAMBIA**

**ABSTRAK**

Ketidakjaminan dapatan makanan merupakan satu cabaran kesihatan awam sejagat. Ketidakjaminan dapatan makanan isi rumah merupakan faktor risiko malpemakanan, yang telah menyumbang hampir 300,000 kematian setiap tahun. Sama ada secara langsung atau pun tidak, akibat ketidakcukupan makanan serta kualiti diet yang teruk, ianya juga bertanggungjawab terhadap melebihi separuh dari semua kematian dalam kalangan kanak-kanak di Sub-Sahara Afrika, termasuk negara Gambia. Ketidakjaminan dapatan makanan adalah cabaran utama di Gambia, terutamanya di Daerah Selatan Sungai Tengah. Namun begitu, sangat sedikit yang diketahui berkenaan dengan faktor-faktor penyebab permasalahan ini. Objektif kajian ini adalah untuk menilai ketidakjaminan dapatan makanan (kemasukan makanan) serta faktor-faktor yang berkait, kepelbagaian makanan isi rumah dan status pemakanan kanak-kanak berusia 6 hingga 59 bulan di Daerah Selatan Sungai Tengah, Gambia. Sebuah kajian keratan rentas telah dijalankan ke atas isirumah (n=334) yang mempunyai kanak-kanak berusia 6 hingga 59 bulan. Wanita, yang juga merupakan proksi kepada isirumah terpilih, telah ditemubual kerana mereka bertanggungjawab terhadap perolehan serta penyediaan makanan untuk ahli setiap individu dalam isi rumah. Semua isirumah dipilih melalui teknik persampelan rawak. Soalselidik Skala Ketidakjaminan Dapatan Kemasukan Makanan (HFIAS) dan Skor Kepelbagaian Dietari Isirumah (HDDS) telah digunakan untuk mengukur ketidakjaminan dapatan makanan dan kepelbagaian dietari isirumah. Status pemakanan kanak-kanak telah



dinilai melalui pengukuran antropometrik. Berat, tinggi/panjang dan ukur lilit lengan atas juga direkodkan. Berat dan tinggi/panjang telah dikira melalui *WHO Anthro Calculator* manakala status pemakanan dikenalpasti menggunakan rujukan WHO (2006). Analisis Regresi Logistik Berganda telah dilakukan untuk mengenalpasti faktor-faktor yang berkait dengan ketidakjaminan dapatan makanan (kemasukan makanan) isirumah. Hasil dapatan menunjukkan prevalens ketidakjaminan dapatan makanan di lokasi kajian adalah 80.5%. Manakala 65.0% kanaka-kanak adalah terbantut, 32.7% kekurangan berat badan dan 17.1% mengalami kesusutan. Malnutrisi teruk dan sederhana adalah masing masing sebanyak 1.8% dan 6.3%. Dari segi status kepelbagaian dietari, 60.2% mempunyai kepelbagaian diversiti yang rendah, 25.4% berstatus sederhana dan 14.4% mempunyai status yang sangat tinggi. Kesusutan berkait rapat dengan ketidakjaminan dapatan isi rumah ( $X^2$ ,  $p= 0.030$ ), tetapi tidak untuk terbantut dan kekurangan berat badan. Kepelbagaian dietary adalah berkait secara signifikan dengan ketidakjaminan dapatan makanan ( $X^2$ ,  $p= 0.003$ ). Berdasarkan kepada analisis regresi logistik berganda, status pekerjaan wanita (AOR = 4.23, 95% CI: 1.21, 14.86,  $p = 0.024$ ), status pekerjaan suami (AOR = 4.60, 95% CI: 2.00, 10.57,  $p = 0.001$ ) dan kurangnya kemasukan pasaran (AOR = 2.09, 95% CI: 1.09, 3.99,  $p = 0.025$ ) merupakan faktor-faktor yang berkait dengan ketidakjaminan dapatan makanan (kemasukan makanan) di lokasi kajian. Kesimpulannya, ketidakjaminan dapatan makanan adalah prevalen, status pekerjaan tanpa mengambilkira wanita atau suami dan kemasukan pasaran adalah merupakan faktor-faktor peramal kepada ketidakjaminan dapatan makanan. Ketidakjaminan dapatan makanan adalah berkait rapat dengan kepelbagaian dietari yang teruk dan malpemakanan, terutamanya kesusutan dalam kalangan kanak-kanak yang berusia di bawah 5 tahun. Oleh yang demikian, program-program dalam meningkatkan peluang pekerjaan perlu diperkasakan, terutamanya

dalam kalangan wanita untuk meningkatkan taraf ketidakjaminan dapatan makanan isrumah yang lebih baik dan seterusnya meminimalkan kadar malnutrisi di kedaerahan ini.

**HOUSEHOLD FOOD INSECURITY AND ITS ASSOCIATED  
FACTORS, DIETARY DIVERSITY AND NUTRITIONAL STATUS OF  
CHILDREN 6 TO 59 MONTHS IN CENTRAL RIVER REGION SOUTH,  
GAMBIA**

**ABSTRACT**

Food insecurity is a global public health challenge. Household food insecurity is the leading risk factor of malnutrition, claiming approximately 300,000 deaths each year. Whether directly or indirectly, due to inadequate food consumption and poor diet quality, it is also accountable for over half of all deaths among children in Sub-Saharan Africa, including The Gambia. Food insecurity is a major challenge in The Gambia, especially in the Central River Region South. However, little is known about its determinant factors. The objective of this study was to assess the household food insecurity (food access) and its associated factors, household dietary diversity, and nutritional status of children aged 6 to 59 months in Central River Region South, The Gambia. A cross-sectional study was conducted among the households (n= 334) consisted of children aged 6 to 59 months. Women, as a proxy to the selected households, were interviewed as they were responsible for food acquisition and preparation of meals for their family members. The households were selected through a random sampling technique. Household Food Insecurity Access Scale (HFIAS) and Household Dietary Diversity Score (HDDS) questionnaire were used to measure household food security and dietary diversity status, respectively. The children's nutritional status was assessed through anthropometric measurements. Weight, height/length, and mid-upper arm circumference were recorded. Weight and

height/length were calculated using the WHO Anthro Calculator, and nutritional status was determined based on WHO (2006) reference. Multiple logistic regression analysis was conducted to identify factors associated with household food insecurity (food access). The finding showed that the prevalence of household food insecurity was 80.5% in the study area. Whereas 65.0% of children were stunted, 32.7% underweight, and 17.1% were wasting. Moderate and severe acute malnutrition was 1.8% and 6.3%, respectively. In terms of dietary diversity status, 60.2% were at low diversified, 25.4% of them were medium diversified, and 14.4% were highly diversified. Wasting was associated with household food insecurity ( $X^2$ ,  $p=0.030$ ), but not for stunting and underweight. Household dietary diversity was also significantly associated with household food insecurity ( $X^2$ ,  $p=0.003$ ). Based on multiple logistic regression analysis, women employment status (AOR = 4.23, 95% CI: 1.21, 14.86,  $p= 0.024$ ), husband's employment status (AOR = 4.60, 95% CI: 2.00, 10.57,  $p= 0.001$ ) and lack of market access (AOR = 2.09, 95% CI: 1.09, 3.99,  $p = 0.025$ ) were the factors associated with household food insecurity (food access) in the study area. In conclusion, household food insecurity was prevalent, and employment status regardless of either the women or their husbands and market access were the predictors of household food insecurity. Household food insecurity was associated with poor dietary diversity and malnutrition, in particular, wasting among children aged below five. Therefore, programmes to improve job opportunities should be strengthened, in particular among women to improve household food insecurity, therefore, would reduce child malnutrition in this region.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Household food insecurity is increasingly known to be a global health problem, especially in Sub-Saharan Africa (Frelat *et al.*, 2016). The Sustainable Development Goals (SDGs) have emphasised the urgent need to tackle food insecurity in achieving human rights by the year 2030 (Pérez-Escamilla, 2017). The first goal of SDG is to end ‘poverty in all its forms everywhere.’ The second is to ‘end hunger, achieve food security, improved nutrition, and promote sustainable agriculture’; both goals have been clearly stated as the frontline of the SDGs (Pérez-Escamilla, 2017). During the World Food Summit in 1996, the Food and Agricultural Organisation (FAO) defined food security as follows: At the individual, household, national, regional and global levels is achieved, when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1996).

The above definition is widely used because it incorporates three pillars of food security; availability, access and utilisation to acquire food socially, culturally in acceptable ways to ensure food access. “At all times” indicates the fourth pillar, which is stability over time regardless of weather, season, or regional conflicts (Mbwana *et al.*, 2016). Based on the definition of food security, to tackle food insecurity means food

should always be available and accessible to all individuals across the life course (Agbadi et al., 2017).

Food availability is achieved when sufficient quantities of food are consistently available to all individuals within a country. Food can be supplied through household production, other domestic output, commercial imports, or food assistance. Food accessibility is ensured when households and all individuals within them have adequate resources to obtain appropriate foods for a nutritious diet. Food access depends on income available to the household, the distribution of income within the household, and the price of food. The access component of food insecurity comprises of four core domains (anxiety, quality, quantity and socially unacceptable ways) about household food supply, insufficient quality of food, and inadequate food intake by household members (Coates, 2013). Food utilisation is the proper biological use of food, require nutrient intake that provides adequate energy and essential nutrients. Effective food utilisation depends mainly on knowledge within the household on food storage and processing techniques (Coates, 2013; Pieters et al., 2013a). Due to many driving forces such as poverty, population growth, availability of arable lands, water resources, climate change, adverse weather, price instability, food availability, accessibility and loss. The combined effect of these factors has undeniably impacted global food production and security (Chinnakali et al., 2014).

In general, food insecurity denotes the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways (Coates et al., 2007a). Food insecurity leads to lack of access to sufficient amounts of safe and nutritious food for healthy growth and development due to unavailability of food, insufficient purchasing power,

inappropriate distribution, or inadequate use of food at the household level (FAO, 2016).

The determinants of food insecurity include social factors, income, and environmental calamities. These determinants affected households particularly in Sub-Saharan Africa to experience food insecurity, uncertainty in access to nutritionally adequate and safe food, and limited or uncertain ability to obtain acceptable food in socially acceptable ways (Daneshi-Maskooni *et al.*, 2013). The socio-economic status (SES) in a household is among the major contributing factors to the household food insecurity in Sub-Saharan Africa. Being low of SES leads to the consumption of both an inadequate quantity and low-quality foods, limited dietary diversity leads to a low-quality diet with poor nutrient content (Daneshi-Maskooni *et al.*, 2013). At the household level, food insecurity is related to low socioeconomic status. Other factors include poverty, education, household size, employment status, age, the gender of the head of the household, and food price. Understanding the characteristics and determinants of household food insecurity is crucial to develop policies that would address challenges associated with household hunger and food insecurity (Ihab *et al.*, 2015a).

### **1.1.1 Burden of food insecurity**

Prolong shortage of food can cause hunger and starvation (Tantu *et al.*, 2017). Globally, more than 820 million people in the world are still hungry and underscore the immense challenge in achieving Zero Hunger target by year 2030. In short, one in nine people currently faces hunger especially in Africa (FAO, 2019). Moderate level of food insecurity is defined as uncertain access to quality and/or quantity food, although not so

extreme to cause undernourishment, however it can increase the risk of divergent form of malnutrition including overweight and obesity (FAO, 2019). People who are moderately food insecure may not necessarily suffer from hunger. However, they lack of regular access to nutritious and sufficient food, putting them at a higher risk of various forms of malnutrition and poor health. In Sub-Saharan Africa, food insecurity and hunger have been a persistent problem compare to other continents (Bwalya, 2013). The United Nations Development Programme (UNDP) reported that one in four households in Sub-Saharan Africa could not access adequate food. About 240 million people or one in every four-person, lack sufficient food for a healthy and active life (Browne, 2012).

In developed countries such as the United States of America, 20% of households were food insecure (Coleman-Jensen *et al.*, 2011). In Paris metropolitan area, 6.3% of households were food insecure, 3.9% and 2.4% of households were low and very low food insecurity in 2011, respectively (Salvador Castell *et al.*, 2015a). In Denmark, 6.0% and 2.4 % of the household had low and very low food insecurity (Lund *et al.*, 2017). In Canada, 63.0% of households were food insecure (Huet *et al.*, 2012; Rosol *et al.*, 2011). Data from the World Food Programme showed that about 2 billion people were food insecure; Asia and Africa's region were mostly affected. However, the majority is living in Sub-Saharan Africa (FAO,2019).

Deprivation of food access, low income, and climate change, such as drought and flood, causes poverty and hunger (FAO, 2010; FAO, 2019). Over the last two decades, hunger, malnutrition, and chronic food insecurity have continued to be discussed as a global problem that is not due to food-deficit but lack of access and redistribution at the household level (Clark, 2009) .The most common form of food



insecurity occurs when food is unavailable for consumption due to inadequate resources and, consequently, results in the physical and psychological outcomes of hunger (Abbasi *et al.*, 2016). The most recent press release by the World Health Organisation (WHO) reported that the right investment in nutrition intervention programmes could save the lives of 3.7 million people by 2025 (WHO, 2019).

Food insecurity remains a public health threat; it is widespread in developing countries, as millions of people continue to suffer from food scarcity and death due to food insecurity (Kotir, 2011). Whereas variety and a balanced diet are essential to reduce the rate of malnutrition, food insecurity jeopardises dietary intakes (Nnakwe and Onyemaobi, 2013). Due to the high nutrient demands for growth, children are most vulnerable (Rah *et al.*, 2010). Poor nutritional status among children leads to low school admission, absenteeism, early dropout, and low academic achievement, which resulted in lack of productivity during adulthood (Aguayo *et al.*, 2016). The presence of food insecurity at the household level implies a high level of vulnerability to broad consequences, including psychosocial dysfunction among household members, especially children, socioeconomic predicaments, and poor overall health status (Aguayo *et al.*, 2016).

Malnutrition is the most severe consequence of food insecurity. Over the past decade, approximately 27.4% of the population in Africa was classified as severely food insecure in year 2016, which was almost four times as high as other regions. Alarming, food insecurity is on the rise, specifically in Sub-Saharan Africa. From 2014 to 2016, food insecurity increased by about 3.0% (FAO, 2017). In the year 2008, the global deaths of children under five were 8.8 million, with 93.0% of them occurring in the developing countries of Africa and Asia. Most of these deaths occurred in Sub-

Saharan Africa (Walton and Allen, 2011). In year 2012, Africa registered the highest prevalence of underweight children and infant/child mortality in the world (FAO, 2012a), with 60.0% of those under age five deaths occurring in Sub-Saharan African countries (Kandala *et al.*, 2011) as Sub-Saharan Africa suffered from food insecurity (FAO, 2019). The prevalence of stunting in linear growth of children under five years has decreased during the past two decades, but it is higher in South Asia and Sub-Saharan Africa than elsewhere, and globally affected at least 165 million children in 2011; while wasting affected at least 52 million children (Black *et al.*, 2013). In the conflict-affected countries in Sub-Saharan Africa, for instance, the number of undernourished people increased by 23.4 million between year 2015 and 2018 – a significantly sharp increase compared to their counterparts which was not exposed to conflicts (FAO, 2019). Undernutrition, and micronutrient deficiencies of vitamin A and zinc along with suboptimum breastfeeding are factors that cause of 3.1 million annual child mortality (FAO,2019). Studies conducted in this region demonstrated a clear connection between household food insecurity and malnutrition among children, such as stunting, underweight, and wasting (Ford, 2013; Sorsdahl *et al.*, 2011). In East Africa, 14.4% of children under five were malnourished, 10.7 % in Southern Africa, 12.8% in Central Africa, and 20.1% in West Africa (Akombi *et al.*, 2017c).

The association between food insecurity and dietary intake has been established in the literatures (Rashid *et al.*, 2011; Rosas *et al.*, 2009). As stated in the definition of food security, accessing and consuming the proper dietary needs for human functioning is important for human health (Swindale and Bilinsky, 2006). Usually, food-insecure households consume inadequate nutrients due to household low-income (Rosas *et al.*, 2009). Adequate dietary diversity has been known to create nutrient adequacy among individuals (Kiboi *et al.*, 2017). A diverse diet is a proxy to nutrient adequacy since no

one food item can meet the nutritional requirement of a person (Kennedy *et al.*, 2011). Dietary diversity widely described as the number of different foods items or food groups that are consumed over a specific reference period (Zainal Badari *et al.*, 2012). As alluded by Zainal-Badari *et al.*(2012), the intake of an adequate nutrient essential for better nutrition as usually connected with food variety and diet quality of individuals. Micronutrient malnutrition is considered a public health threat in developing countries due to the intake of monotonous diets, mainly starchy based that is lacking in diversity (Desta *et al.*, 2019). Pregnant women and children were deemed vulnerable to malnutrition because they have high nutrient demand (Kennedy *et al.*, 2011). Therefore, different types of foods in their diet are recognised as important in ensuring adequate nutrient intake.

### **1.1.2 The Gambia perspective**

The Gambia is the smallest country in West Africa, with a population of about 2 million people (GBoS,2013). Gambia was ranked 172nd out of the 188 countries in the 2015 UNDP Human Development Index, and 48.0% of the population living below the poverty line of USD1.25 per day (Trommlerová *et al.*, 2015). This number expected to rise due to substantial increase in food prices and inflation. This phenomenon could lead to food insecurity and malnutrition among children in The Gambia, especially rural areas.

In The Gambia, food availability, and nutritional status in rural areas are poor. As a result, Gambia is still fighting hard to achieve SDG's first and second goals to achieve food security for all her population . However, this is effort is far from attaining due to continuing poverty, which leads to food insecurity and hunger. A large proportion

of children in the Gambia experiencing substantial growth faltering, and women were at high risk of several micronutrient deficiencies such as iron (Prentice *et al.*, 2013). Currently, the food availability situation in The Gambia is alarming. This was attributed mainly to poverty, weak agriculture sector infrastructural development, which affects the agricultural sector's notable small-scale subsistence farming (MOA, 2013). This practice has restricted farmers from having access to resources, which, coupled with high food prices variations and climate shocks, such as floods in some parts of the country. Almost 50% of the population in The Gambia lives in rural areas where agriculture served as a source of food for their livelihood; however, many people were at risk of being unable to obtain adequate food due to poor harvest experienced by farmers in the past years (MOA, 2013).

In The Gambia, both food availability and nutritional status among households usually worsened during the rainy season, and this period is described as "hungry season," when food stocks from the previous harvest season are depleted (Dominguez-Salas *et al.*, 2013). From January 2014 to date, the Gambia has been experiencing an increased price of cereals grains (millet 28.0%, maize 44.0%, and sorghum 50.0%, rice at the local level 33.0% and imported rice 49.0%) and other basic foodstuffs. In March 2015, almost 20.0% of individuals were food insecure, whereas, in January 2015, 28.0% of people were food insecure. From June to August 2015, food unavailability continued to affect 35.0% of people during the minimum crisis (phase 1), 30.0% under pressure crisis (phase 2), and 15.0% severe crisis (phase 3) (GRCS, 2016).

## 1.2 Problem statement

Africa is considered as the most food-insecure continent in the world, and more than 40% of undernourished people live in this region (Le Mouël and Forslund, 2017). Over the years, most countries in Africa are faced with food insecurity. Globally, about 2 billion people are malnourished, and most of these people are abode in South Asia, and Sub-Saharan Africa (FAO,2019). Food insecurity and poverty are critical and remain as underlining problems facing the majority of Gambians today due to poverty.

In The Gambia, both chronic and transitory food insecurity is severe. In the year 2015, people in the country, particularly in rural areas, face food shortage, as food production in the last three decades has not been sufficient enough to make a rural population food secure (GRCS, 2016). The Central River Region, unlike other regions, mostly affected by recurrent and persistent hunger due to poor agricultural harvest. Poor agricultural harvest was due to inconsistent rains fall, infertile soil, drought, lack of farming equipment, seeds, fertilisers, and the practising of subsistence farming. Subsistence farming in the area produced little yields from the farm to feed the families, which affect their household food security as a result of low food production. This phenomenon has a high tendency to affect the food security status of households in the area (MOA,2013).

Many years ago, the rainy season pattern in The Gambia had changed from nine months to three to four months, which affect most of the crops such as cash groups (groundnut), which households depend primarily on income and livelihood. The area also has little income generation activities, vast income inequalities, and absolute poverty, are Such, there are no factories, supermarkets, standard market infrastructure,

and no gainful employment activities in which households can get employed to have access to adequate income to buy food for the family. All these factors affect their access to food.

Poverty is also prevalent in the area, which could increase household vulnerabilities to access food, which has been reported elsewhere (Tey and Radam, 2011). Poverty and food insecurity are interconnected, and poverty is known to be the primary cause of limited access to food, and its severity is high among low-income households (Saibul *et al.*, 2009; Dachner *et al.*, 2010; Saibul *et al.*, 2009). When people have less money, they cannot afford food and they become unable to work. Families in the Central River Region South spend much of their income on food. When households are confronted with food insecurity, they developed coping strategies such as skip meals or otherwise limited the amount of food consumed. These strategies bear a negative health impact on the psychological, physical, and social status of individuals in households.

The increased price of basic food items in the country affected many households to access adequate foods for the family, especially in rural areas, due to poverty and access to income is limited, this could affect the household purchasing power of foods. As reported by literature, high food prices can severely decrease the household purchasing power of food due to low economic status at the household level (Tey and Radam, 2011). The Central River Region is the second farthest region from the capital, where access to basic food items would have been affected due to transportation cost and road network, which has could inflate the price of basic food commodities in the area.

Food insecurity is not limited to insufficient food supply at the household. However, it is also a lack of purchasing power to access food at national and at the household level (Capone *et al.*, 2014). Over the years, the number of people who suffered from hunger has slowly increased. As a result, more than 820 million people in the world are still hungry today, underscoring the immense challenge of achieving the Zero Hunger target by 2030 (FAO,2019). Several factors that affect ‘access to food’ are, at times, underestimated, and this has an adverse impact on the ability to identify appropriate policies to improve access to food. This is due to the multidimensional nature of the concept of food security. Lack of appropriate tools to measure food security leads to opposing opinions about household food insecurity. Identifying household food insecurity in Central River Region was a challenge due to the lack of using suitable tools used to determine the food security status of the households. The only tool used was the Food Consumption Score, which does not directly measure food insecurity like HFIAS used in many developing countries (Saibul *et al.*, 2009; Dachner *et al.*, 2010; Saibul *et al.*, 2009). In addition, the Coping Strategies Index (CSI) developed by Maxwell was a tool that measures how did the people cope when they could not access to adequate food. The items of the questionnaire include about how the household members manage to cope with a shortfall in food for consumption and were scored to identify the degree of food insecurity. The CSI measures the frequency and severity of coping behaviours. CSI is an appropriate tool for emergencies situation when other methods are not practical or timely utilised (Maxwell *et al.*, 2001).

Food Insecurity Experience Scale (FIES) on the other hand is a newly recognised instrument to assess food insecurity experience for all countries in achieving Sustainable Development Goal in year 2030 (Saint Ville *et al.*, 2019). This indicator

provides a perspective on global food insecurity, hunger and also towards the goal of ensuring access to nutritious and sufficient food for all (Wambogo *et al.*, 2018). However, (CSI) and (FIES) has never been used in The Gambia despite its widely used in developing countries (Wambogo *et al.*, 2018).

Food insecurity is associated with poor health status, particularly among children, such as poor linear growth, poor academic achievement, and low productivity during the life course (Seligman *et al.*, 2009). Child malnutrition in The Gambia is one of the most pressing health issues many households are facing today. At the national level, 29.0% of children were stunted, 21.6 % underweight, and 1.6 % were wasted. However, the high prevalence was recorded in the Central River Region South, where the prevalence of child malnutrition was 23.0% (NaNA, 2015). Malnutrition among children is usually associated with food insecurity. However, it has not been thoroughly investigated in Central River Region South to determine its association despite the high prevalence of child malnutrition in the area.

### **1.3 Rationale/Justification for the Study**

Food insecurity is a global issue, especially in developing countries, including The Gambia, where millions of people die due to lack of access to food (Kotir, 2011). Food access includes food availability and the ability of households to acquire food. It relates to the availability of physical infrastructure to support the distribution of food and food pricing system (Luginaah *et al.*, 2009). “Disparities in food access are influenced by settlement, economic, and social factors, but also by a community’s food production, processing, distribution, consumption, and waste recovery policies and practices. Food access is not simply a health issue but also a community development



and equity issue. For this reason, access to healthy, affordable, and culturally appropriate food is a key component not only in a healthy, sustainable local food system but also in a healthy, sustainable community” (Beyene and Muche, 2010a).

Food insecurity affects developing countries but developed countries as well. However, its severity differs among countries, regions, cultures, and over time. For these reasons, many researchers investigated household food insecurity (food access) determinant at a different level both in developed and developing countries (Barrett *et al.*, 2009; Bashir and Schilizzi, 2013; Becquey *et al.*, 2010a; Dachner *et al.*, 2010). However, in The Gambia, no such study conducted looking into household food insecurity. Similarly, limited studies were conducted to assess household dietary diversity in other countries but none was carried out in Gambia.

This study directed towards targeting and informing health care providers, programme managers in the field of nutrition, authorities, and policymakers regarding the situation and challenges of food insecurity and children’s nutritional status in Central River Region South, The Gambia. Besides, to bridge the gap on the understanding of the level of the household food security (food access) and its determinant factors in rural areas of The Gambia.

#### **1.4 Research questions**

1. What is the proportion of household food insecurity in the Central River Region South, The Gambia?

2. What is the nutritional status of children in the Central River South, The Gambia?

3. Is there any association between household food insecurity with household dietary diversity status and nutritional status of children in the Central River Region South, The Gambia?

4. What are the associated factors of household food insecurity in the Central River Region South, The Gambia?

## **1.5 Objectives of the study**

### **1.5.1 General objective**

1. To study the household food insecurity and its associated factors, dietary diversity, and nutritional status of children aged 6 to 59 months in the Central River Region, The Gambia.

### **1.5.2 Specific objectives**

1. To determine the proportion of household food insecurity status in Central River Region South, The Gambia.

2. To determine the nutritional status of children aged 6-59 months and dietary diversity among households in Central River Region South, The Gambia.

3. To determine the association of household food insecurity status with dietary diversity and child nutritional status in Central River Region South, The Gambia

4. To determine the association of socioeconomic and demographic factors, food and financial assistance programme, market accessibility, with household food insecurity in Central River Region South, The Gambia.

## **1.6 Research hypothesis**

### **1.6.1 Null hypothesis**

1.  $H_0$  = There is no association between socioeconomic and demographic factors, financial and food assistance and market accessibility with household food insecurity in Central River Region South, The Gambia.

2.  $H_0$  = There is no association between household food insecurity with dietary diversity and nutritional status of children in the Central River Region South, The Gambia.

### **1.6.2 Alternative hypothesis**

1.  $H_A$  = There is an association between socioeconomic and demographic factors, financial and food assistance programme and market accessibility with household food insecurity among households in the Central River Region South, The Gambia.

2.  $H_A$  = There is an association between household food insecurity with dietary diversity and nutritional status of children in the Central River Region South, The Gambia.

## 1.7 Conceptual framework

The conceptual framework developed in this study was aimed to investigate the socioeconomic and demographic factors, market accessibility, financial and food assistance, and dietary diversity with household food insecurity, which could affect the nutritional status of children presented in Figure (1.1). However, the literature has shown that home gardening improved household dietary diversity status (Akrofi *et al.*, 2010; Cabalda *et al.*, 2011).

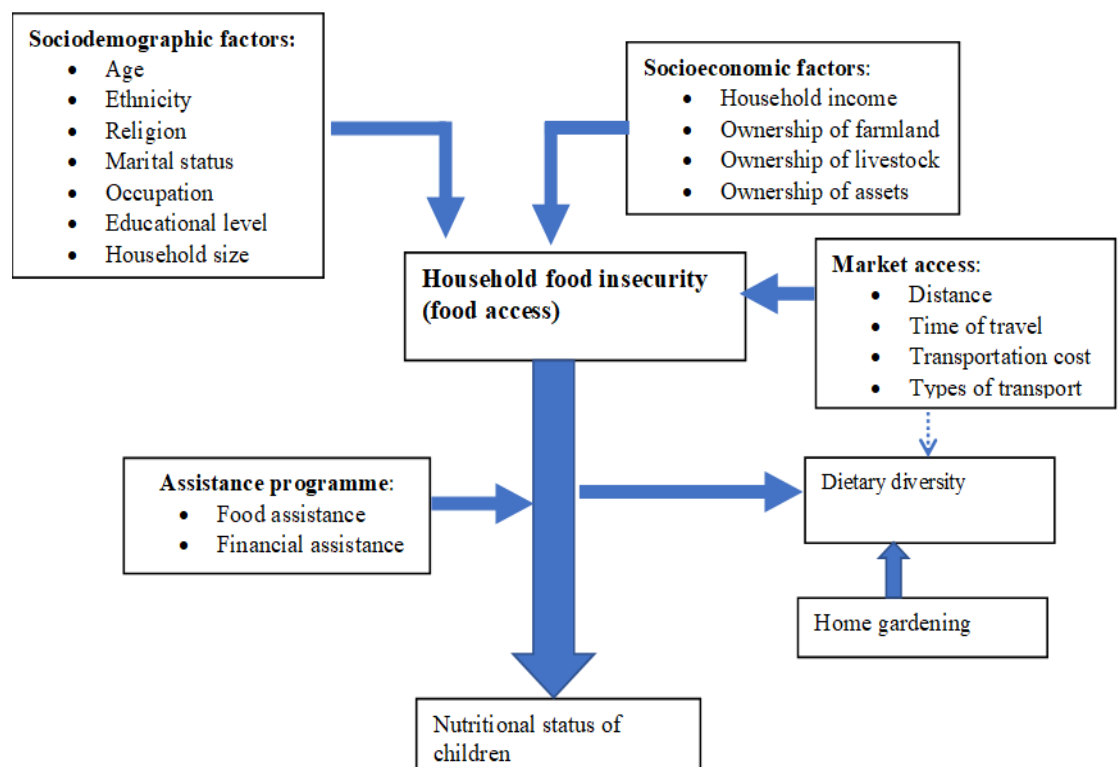


Figure 1. 1: Conceptual framework of the study



This arrow shows the link between dietary diversity with market access

## **1.8 Operational definition**

- 1. Household:** Individuals who work and eat together and share income and expenditures as one household.
- 2. Food-secure:** If members ‘rarely’, in the past four weeks, worried about not having enough food in the household, FANTA version 3 (Coates *et al.*, 2007b).
- 3. Food insecurity:** Exists when all people, at all times, lack secure access to sufficient amounts of safe and nutritious food that meets their dietary needs and food preferences for healthy and active life (Coates *et al.*, 2007b).
- 4. Mildly food-insecure:** When members of the household worried about not having enough food sometimes or often, and were unable to eat preferred foods, and ate a more monotonous diet than desired and ate some foods considered undesirable but only rarely.
- 5. Moderately food-insecure:** When household members sacrificed quality more frequently by eating a monotonous diet or undesirable foods sometimes or often and had started to cut back on quantity by reducing the size of meals or the number of meals, rarely or sometimes.
- 6. Severely food-insecure:** When individuals in the household had to cut back on meal-size or number of meals often and experienced any of the three most severe conditions (running out of food, going to bed hungry, or going a whole day and night without eating).

- 7. Stunting:** Moderate and severe; height-for-age Z-score (HAZ) between -2SD to -3 SD and  $< -3$  SD, respectively from the median of the WHO reference population (WHO,2006)
- 8. Normal for height -for- age:** Z-score (HAZ)  $\geq -2$  to  $< -1$  from the median of the WHO reference population.
- 9. Wasting:** Moderate and severe; weight-for-height between -2SD to -3 SD and  $< -3$  SD, respectively from the median of the WHO reference population (WHO,2006)
- 10. Normal for- weight-for-height :** Z-score (WHZ)  $\geq -2$  to  $< -1$  from the median of the WHO reference population.
- 11. Underweight:** weight-for-age Z-score (WAZ) between -2SD to -3 SD and  $< -3$  SD, respectively from the median of the WHO reference population (WHO,2006)
- 12. Normal for weight-for-age:** Z-score  $\geq -2$  to  $< -1$  from the median of WHO reference population.
- 13. MBI for- age:** identifies both wasting and obesity or obesity. However, it is usually not used in developing countries as obesity is not a major public health issue as compare heigh -for- age.
- 14. Moderate acute malnutrition:** Mid upper arm circumference  $\geq 11.5$  cm and  $< 12.5$  cm (WHO,2006)
- 15. Severe acute malnutrition:** from the median of the WHO reference population  $< 11.5$ cm (WHO,2006)
- 16. High dietary diversity:** When households consumed 7-12 food groups within 24 hours before the survey (Kennedy *et al.*, 2011).

- 17. Low dietary diversity:** When households consumed 0-3 food groups within 24 hours before the survey (Kennedy *et al.*, 2011).
- 18. Medium household dietary diversity score:** When households consumed 4-6 food groups within 24 h before the survey (Kennedy *et al.*, 2011).
- 19. Adequate household dietary diversity:** When households consumed at least four or above food groups within 24 hours before the survey.
- 20. Inadequate household dietary diversity:** When households consumed less than four food groups within 24 hours before the survey.
- 21. Junior Secondary School:** This means any person who attended school from grade 7- 9 The Gambia educational system.
- 22. Senior Secondary School:** Means any person who attended school from grade 10-12 education, The Gambia educational system.
- 23. Tertiary:** Means any person who attended either College or University.
- 24. Female-headed household:** A single mother who is responsible for providing financial support and feeding of the family members.
- 25. Household income per capita:** Total household income divided by a total number of household members.
- 26. Participation of financial assistance criteria:** Pregnant women who made an early antenatal booking within the first trimester and completed three other subsequent antenatal visits.
- 27. Participation of food assistance criteria:** Any households that are affected by natural disasters and reported to the National Disaster Management Agency within fourteen days of the incident.

**28. Self-employed:** Any person who is not formally employed by the government of private sectors.



## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Definition and concepts of household food insecurity**

##### **2.1.1 Definition of food security**

The challenges of food security were first addressed in the 1948 declaration of Right, which identified the Right to Food as a vital component of an adequate standard of living (UN, 1975). The world's oil crisis from 1972-1974 has created increased public attention towards food security. Since the 1974 World Food Conference, nearly 200 definitions have proposed for food security. Food security was defined as the availability (at all times) of adequate supplies of basic foodstuffs in the world to sustain a regular increase of food consumption and to offset inconstancies in production and prices (UN, 1975). This definition came basically to draw global attention to strengthen stable supplies of food.

The World Bank later focused on hunger, undernourishment (food deficiency), and malnutrition. The term hunger comprises a wide range, which includes the short-term physical experience of uneasiness of food insecurity, which includes transitory and chronic food insecurity. Transitory food insecurity associated with a short duration of aggravated pressured based on an economic crisis or natural catastrophes while chronic food insecurity linked with continued problems of poverty and low incomes, civil wars, weather and climate variability (World Bank, 1986). Then, food security was defined by the World Bank, as access for all the people in getting enough food for an active and

healthy life (World Bank, 1986). This definition of food security has heightened the most commonly cited definition, which indicates the importance of food to individuals and their rights to food (Mechlem, 2004).

The importance of food security at the individual, household, national, regional, and global levels was recognised as a significant concern by the mid of the 1990s. In addition, an expert panel assembled in the year 1989 by the Life Science Research Office (LSRO) developed a wide definition of food insecurity, as food insecurity occurs due to lack of quality, insufficient and innocuous food or the ability to acquire acceptable food in a socially acceptable way is limited or uncertain (Wunderlich and Norwood, 2006). This explains that food insecurity identified people who usually do not get or have enough food to eat, based on the accepted cultural norm.

On the other hand, the generally accepted definition of food insecurity was developed in 1996 World Food Summit defined food security as "*Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*" (FAO., 1996). The important key in this definition was the safe and nutritious food required for an active and healthy life. This definition was again revised and developed in The State of Food Insecurity 2002 as "*a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious foods that meet their dietary needs and food preferences for a healthy life*" (FAO, 2002). Accordingly, the main domains of the household food security construct are as follows: physical availability of food, economic and physical access to food and adequate food utilisation for the body to use the nutrients in the food consumed.

Food security plays a pivotal role in influencing human development; as a result, been recognised as a universal human right (Pérez-Escamilla, 2017). However, it is not achieved by billions of individuals worldwide (Smith *et al.*, 2017). This most recent definition captured the social aspect, which indicates that food should be accessed in socially acceptable ways, which include foods purchased from shops, markets or supermarkets, and not through the unacceptable ways such as food obtained from welfare, wild foods or stealing (Barrett, 2010). Food security has been defined in many terms by different organisations (Table 2.1). In general, most definitions emphasised on "secure access at all times to sufficient food for a healthy life." As food security for every individual is the main objective, there are also important food security dimensions to be considered at the household, national and global levels.

Table 2.1: Summary of the definition of food security by organisations

<b>Organisations</b>	<b>Definitions</b>
United Nation (United Nation, 1975)	Food security was defined in the Proceedings of World Food Summit (1974) as 'availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices'
Food Agricultural Organisation (FAO, 1983)	Ensuring that all people at all times have both physical and economic access to the basic food that they need.
World Bank (World Bank, 1986)	In an influential World Bank (1986) report, Poverty and Hunger, this concept of food security is further elaborated in terms of: 'access of all people at all times to enough food for an active, healthy life.'
Food Agriculture Organization (FAO, 1996)	Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.
Food Agriculture Organization (FAO, 2002)	Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

### **2.1.2 Concept of household food insecurity**

The concept of food security was driven from the various definition of food security, as stated above. Which include the domain of household food security, that is, food should be secured, access to many people at all time (Pinstруп-Andersen, 2009). Ganapathy (2005) argued that food access was based on the adequate amount and quality of food that is available (Ganapathy *et al.*, 2005). Koc and Dahlberg conceptualised that food security does not limit to the adequacy of quantity and quality and but should include four significant domains of availability, accessibility, acceptability, and adequacy (Koc and Dahlberg, 1999). Koc and Dahlberg further argued that enough supply of food is one of the fundamental requirements of food security based on availability and access to all. Adequacy attributes to the long period of sustainability of food systems. Acceptability addresses the culture of food, which is available and accessible and should respect individuals' cultural norms.

The ideas of food security in terms of availability, accessibility, acceptability, and adequacy are essential at all levels, from individuals and the households (micro-level) to the community (Meso level) and the national and the global level (macro-level) (Pinstруп-Andersen, 2009). Today, many factors in the world increase food security (Hazell and Wood, 2007). It has proven today, the world is growing, and more foods are producing than before to feed the world's population, though not evenly distributed, and not all the foods are culturally acceptable globally. Food access varies significantly, and the most significant difference occurs among developed and developing countries. The leading cause of this inequality among these populations is income earning variance (Hazell and Wood, 2007). It could conclude that hunger is in every country in the world,