



Sudan University of Science and Technology

College of Post-graduate Studies



**Assessment of Factors Influencing Food Security and Livelihood
of Rural Women Headed Household in Sennar State -- Sudan**

تقييم العوامل التي تؤثر على الأمن الغذائي وسبل العيش للأسر التي تديرها النساء الريفيات في ولاية
سنار - السودان

Thesis Submitted for the Fulfillment of the Requirements for Ph.D. degree in
Agricultural Extension and Rural Development

By

FATIMA MOHAMMED ALI DAFALLA

M.Sc. Agricultural Extension and Rural Development
Khartoum University- Sep. 2004

Supervisor

Prof. Awad Allah Mohammed Saeed

Co-supervisor

Dr. Suad Ibrahim Elobied Abdalla

September .2022

DEDICATION

This thesis is dedicated to the soul of my parents, my dear husband, my brothers,
and the soul of Professor Awad Allah Mohammed Saeed

ACKNOWLEDGEMENT

First, thanks and praise to God

I am very much indebted to my supervisor and mentor, the late Professor Awad Allah Mohammad Saeed . I am also grateful to Dr. Suad Ibrahim for her technical support during the development of this thesis. My thanks also to my sisters, brothers, and colleagues at the Faculty of Agriculture Abu Naama

ABSTRACT

This study seeks to assess the factors influencing food security and livelihood of rural women headed household in the Sennar state, Sudan the household survey was undertaken in four villages two for them from west sennar and other from east sennar. Sample size of four villages is equal and similar. Sample of 30 households was taken from each village by using stratified random sampling techniques. Thus, the total sample size was 120 rural households headed by women. The main data gathering tool for this study was interview questionnaires and observation, The study adopted the Household Food Insecurity Access scale (HFIAS) to determine the food security status of households in study area and the results show that, about 27.5% of the sampled households were food secure, and 40.8%, 22.5% and 9.2% suffer from moderate food insecurity medium and severe, respectively. The correlation results showed that there is a clear significant correlation between the level of food security and household size, education, employment status, access to land and livestock. No significant correlation between level of food security and age, marital status and deaths in childbirths. On the other hand, the correlation results showed that there is no significant correlation between the income diversification and age of household head, access to transports, electricity, and access to market. There is clear significant between income diversification and education of household head, marital status, household size, employment status, access to credit, access to household assets and access to land. The study recommends that encouraging girls to complete the basic stages of education and provision of adequate infrastructure which include electricity, water drinking and access to market to the rural communities to enable income diversification of rural households

مستخلص

تسعى هذه الدراسة إلى تقييم العوامل التي تؤثر على الأمن الغذائي وسبل العيش للأسر التي ترأسها النساء الريفيات في ولاية سنار، السودان. تم إجراء المسح الأسري في أربع قرى، اثنتان لهن من غرب سنار وأخرى من شرق سنار. حجم العينة لأربع قرى متساوية ومتشابهة. تم أخذ عينة من ٣٠ أسرة من كل قرية باستخدام طرق أخذ العينات العشوائية الطبقية. وبذلك بلغ حجم العينة الإجمالي ١٢٠ أسرة ريفية ترأسها امرأة. كانت أداة جمع البيانات الرئيسية لهذه الدراسة هي الاستبيان بالمقابلة، واعتمدت الدراسة مقياس الوصول إلى انعدام الأمن الغذائي الأسري (HFIAS) لتحديد حالة الأمن الغذائي للأسر في منطقة الدراسة وأظهرت النتائج أن حوالي ٢٧,٥٪ من الأسر التي شملتها العينة كانت آمنة غذائياً و ٤٠,٨٪، ٢٢,٥٪ و ٩,٢٪ يعانون من انعدام الأمن الغذائي بشكل معتدل ومتوسط وشديد على التوالي. أظهرت نتائج الارتباط وجود علاقة ارتباطية واضحة بين مستوى الأمن الغذائي وحجم الأسرة، والتعليم، والوضع الوظيفي، والوصول إلى الأرض والثروة الحيوانية. عدم وجود علاقة ارتباط ذات دلالة إحصائية بين مستوى الأمن الغذائي والعمر والحالة الاجتماعية والوفيات في المواليد. من ناحية أخرى، أظهرت نتائج الارتباط عدم وجود علاقة ارتباط ذات دلالة إحصائية بين تنوع الدخل وعمر رب الأسرة والوصول إلى وسائل النقل والكهرباء والوصول إلى السوق. هناك دلالة واضحة بين تنوع الدخل وتعليم رب الأسرة، والحالة الاجتماعية، وحجم الأسرة، والوضع الوظيفي، والحصول على الائتمان، والوصول إلى أصول الأسرة والحصول على الأرض. وأوصت الدراسة بتشجيع الفتيات على اكمال المراحل الأساسية من التعليم وتوفير البنية التحتية الملائمة والتي تشمل الكهرباء ومياه الشرب والوصول إلى الأسواق للمجتمعات الريفية لتمكين تنوع الدخل للأسر الريفية.

LIST OF CONTENTS

DEDICATION.....	I
ACKNOWLEDGEMENT.....	II
ABSTRACT.....	III
ABSTRACT IN ARABIC	V
LIST OF CONTENTS.....	VI
LIST OF TBLES.....	XIII
CHAPTER ONE – INTRODUCTION	1
1.1. BACKGROUND STATEMENT	1
1.2. PROBLEM STATEMENT.....	4
1.3. IMPORTANCE OF RESEARCH.....	5
1.4. OBJECTIVES OF THE STUDY.....	5
1-5- RESEARCH QUESTION.....	5
1.6. Hypothesis.....	6
1.7. Organization of study.....	6
CHAPTER TWO- LITERATURE REVIEW.....	7
2.1. Definition of Food Security.....	7
2.1.1. Food access.....	8
2.1.2. Food availability.....	9
2.1.3. Food Utilization and Stability.....	9
2.2. Food Insecurity.....	10

2.2.1. Chronic food insecurity.....	11
2.2.2. Transitory food insecurity.....	11
2. 3 Women’s Role in Food and Nutritional Security.....	12
2.4. Women and Food Insecurity.....	14
2.4.1. Availability.....	15
2.4.2. Access.....	16
2.4.3. Utilization.....	17
2.5. The concept of sustainable livelihoods.....	17
2.5.1. Livelihood Assets.....	20
2.5.1.1. Human assets.....	20
2.5.1.2. Physical assets.....	20
2.5.1.3. Social assets.....	21
2.5.1.4. Financial assets.....	21
2.5.1.5. Natural assets.....	21
2.5.1.6. Political assets.....	21
2.5.2. Livelihood activities.....	22
2.6. The Vulnerability Context.....	23
2.7. Food Security and livelihoods in Sudan.....	25
2.8. Food Security Factors in Sudan.....	25

2.9. Overview of livelihoods in Sudan.....	27
2.10. Factors Hindering Women Access to Livelihood Security.....	27
2.10.1. Access to land.....	28
2.10.2. Access to Credit.....	30
2.10.3. Access to Extension Services.....	32
2.10.4. Access to Education and Training.....	34
2.10.5. Access to Information and Communication Technologies.....	35
2.10.6. Access to market.....	36
2.10.7. Access to Water.....	37
2.10.8. Access to transport.....	38
2.10.9. Access to Energy.....	39
2.10.10. Women and Informal Employment.....	41
2.10.11. Sanitation, Hygiene.....	42
2.10.12. Nutrition and labour productivity.....	43
2.11. The Role of the NGOs to Promote livelihood security.....	44
CHAPTER THREE METHODOLOGY.....	47
3.1. Introductions	47
3.2. Area of study	47
3. 2.1 Geographical Location.....	47
3. 2.2. Administrative Structure.....	47

3.2.3. Population.....	48
3. 2.4. Climate.....	48
3. 2.5. Soil and Topography.....	48
3. 2.6 Water Resources.....	49
3. 2.7. Agricultural crops.....	49
3. 2.8. Roads and bridges	50
3. 2.9. Post-harvest management.....	50
3. 2.10. local markets.....	51
3. 2.11. Livestock husbandry.....	51
3. 2.12. Employment opportunities.....	52
3. 2.13. Health Sector.....	52
3.3. The Conceptual Model of the Study.....	52
3.4. Sampling Procedure and Sample Size.....	53
3.5. Target population.....	53
3.6. Data Types and Sources.....	53
3.7. Method of Data Analysis	53
3.8. Definition of Concepts.....	56
3. 8.1. Income Diversification.....	56
3. 8.2. Household size.....	56
3. 8. 3. Age of the household head.....	56

3. 8.4. level of education of household head.....	56
3. 8.5. Socio-Economic Status.....	56
3. 8. 6 Access to infrastructure.....	56
3. 8.7. level of food security.....	56
3. 8.8. Health Security.....	57
3. 8.9. Shelter and Sanitation Security.....	57
3. 8.10. Education Security.....	57
3. 8. 11. Vulnerability context.....	57
3. 8.12. Livelihood assets	57
3. 8.13. Human capital.....	57
3. 8.14. Natural capital.....	57
3. 8.15. Social capital.....	57
3. 8.16. Physical capital.....	57
3. 8.17. Financial capital.....	57
CHAPTER FOUR - RESULTS AND DISCUSSION.....	58
4.1. Demographic Characteristics of Respondent.....	58
4.1.1 Age of household head.....	58
4.1.2. Education Level.....	59
4.1.3. Marital Status.....	59
4.1.4. Family Size.....	59
4.1.5. Employment Status.....	60
4.2. Access to Land.....	60

4.3. Type of land and Crop	61
4.4. Problems Facing Agricultural production.....	62
4.5. the main purpose of engagement in cropping activities.....	62
4.6. Access to livestock.....	63
4.7. type of livestock.....	63
4.8. Purpose of engaging in livestock activities.....	64
4.9. Access to non-agricultural wage income.....	64
4.10. Type of non-agricultural activities	65
4.11. Non-agricultural wage income per month.....	65
4.12. Problem Facing at work and affected your income.....	66
4.13. Access to training.....	66
4.14. Type of training.....	67
4.15. Health condition.....	68
4.16. Access to education.....	68
4.17. Reason for difficult to get school or hospital	68
4.18. Material used for the roof and walls.....	69
4.19. Type of toilet and sanitation.....	69
4.20. Access to assets.....	70
4.21. Access to infrastructure.....	71
4.22. Membership of Co-operative group.....	72
4.23. Use any source of information.....	72
4.24. the source of the information.....	73

4.25. access to credit.....	73
4.26. kind of credit.....	74
4.27. the purpose of credit	74
4.28. The reason for haven't any form of credit	74
4.29. Necessary needs that improve the food and livelihood security....	75
4.30. Organizations working to improve food security.....	76
4.31. Type of intervention working to improve the food security.....	76
4.32. Level of food security.....	77
4.33. Household food security and demographic variables.....	77
4.33.1. Age of the household head.....	79
4.33.2. Household size.....	80
4.33.3. Marital Status of household head.....	82
4.33.4. Educational attainment.....	84
4.33.5. Employment Status.....	86
4.34. Correlation analysis.....	86
4.34.1. age of household head	87
4.34.2. Determinant of household size.....	87
4.34.3. Determinant of marital status.....	88
4.34.4. Determinant of household head education	88
4.34.5. Determinant of household head employment.....	89

4.34.6. Determinant of monthly income.....	89
4.34.7. Determinant of Cases of malnutrition and deaths in childbirths..	90
4.35. Household income diversification and demographic variables.....	90
4.35.1. Age of the household head is expected to positively influence income	91
4.35.2. the household member's employee is expected to positively influence income diversification.....	91
4.35.3. Land access by the household is expected to positively influence income diversification.....	92
4.35.4. the education for the household head, is negatively affected income diversification.....	92
4.35.5. Access to formal and informal credit is negatively affect income diversification.....	93
4.35.6. The level of rural households' satisfaction with amenities.....	93
4.35.7. Value of total household assets.....	94

CHAPER FIVE - SUMMARY, CONCLUSION AND

RECOMMENDATIONS.....95

5.1. Summary.....95

5.2. Conclusion.....96

5.3. Recommendation.....	100
References	101
Appendix.....	114

LIST OF TABLES

3.1 The Administrative Structure of Sennar State.....	47
4.1 Age Distribution of Household Heads.....	58
4.2 distribution of respondents according to level of education.....	58
4.3: Marital Status Distribution of Respondents	59
4.4: distribution of respondents according to family size.....	59
4.5: distribution of respondents according to employment status.....	60
4.6: distribution of respondents according to access to land.....	60
4.7: distribution of respondents according to type of land and crop.....	61
4.8: distribution of respondents according to Problems Facing Agricultural production.....	62
4.9: distribution of respondents according to main purpose of cropping activities.....	62
4.10: distribution of respondents according to access to livestock.....	62
4.11: distribution of respondents according to type of livestock.....	63
4.12: distribution of respondents according to purpose of engaging in livestock activities.....	63
4.13: distribution of respondents according to access to non-agricultural income.....	64
4.14: distribution of respondents according to type of non-agricultural income.....	64

4.15: distribution of respondents according to non-agricultural wage income per month.....	65
4.16. distribution of respondents according to problem affect income	65
4.17: distribution of respondents according to access to training.....	66
4.18: distribution of respondents according to type of training.....	67
4.19: distribution of respondents according to health condition.....	67
4. 20 distributions of respondents according to complete the basic stages of education	68
4.21 distribution of respondents according to difficult to get school or hospital	68
4.22 distribution of respondents according to material used for the roof and walls.....	69
4.23 distribution of respondents according to type of sanitation and toilet.....	69
4.24 distribution of respondents according to access to assets.....	70
4.25 distribution of respondents according to access to infrastructure...	71
4.26 distribution of respondents according to membership of co-operative.....	71
4.27 distribution of respondents according to use any source of information.....	72
4.28 distribution of respondents according to source of the information	72
4.29 distribution of respondents according to access to credit.....	73
4.30 distribution of respondents according to kind of credit	73
4.31 distribution of respondents according to the purpose of credit	74
4.32 distribution of respondents according to reason for haven't any credit	74

4.33 distribution of respondents according to necessary needs.....	75
4.34 distribution of respondents according to organization working to improve food security.....	75
4.35 distribution of respondents according to type of intervention working to improve food security.....	76
4.36 distribution of respondents according to level of food security.....	76
4.37 Relationship between Age of household head and Food security.....	78
4.38 Relationship between household size and Food security.....	79
4.39 Relationship between Marital status of household and Food security.....	81
4.40 Relationship between Educational of the household head and Food security.....	83
4.41 Relationship between Employment Status and Food security.....	85
4.42 correlation model of age	87
4.43 correlation model of household size	87
4.44 correlation model of marital status	88
4.45 correlation model of household head education.....	88
4.46 correlation model of household head employment.....	89
4.47 correlation model of monthly income.....	89
4.48 correlation model of Cases of malnutrition and deaths in childbirths.....	90
4.49 Relationship between Age of the household head and income.....	90
4.50 Relationship between Household member's employee and income diversification.....	91
4.51 Relationship between; Land access by the household and income diversification.....	91

4.52 Relationship between the education of the household head and income diversification.....	92
4.53 Relationship between access to credit and income diversification.....	92
4.54 Relationship between Rural households' satisfaction with amenities.....	93
4.55 Relationship between the value of the total household assets and agricultural training.....	94

CHAPTER ONE

INTRODUCTION

1. 1. BACKGROUND

In the Sudan there are three agricultural sub-sectors: the irrigated; the mechanized rain-fed; and the traditional. The importance of the Sudanese traditional rain-fed sector is that it occupies 90 percent of the rural population. In the traditional rain-fed sector, women have been found to play crucial roles in food production, rearing of small animals and in income generating activities. (IFAD, 2006).

However, despite their contributions in ensuring food security in rural areas, such women in most developing countries form part of the most economically and socially disempowered groups in society. The definition of food security in this study is based on the FAO's definition; "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". This definition consists of four dimensions: availability, stability, accessibility, and utilization. A food system is said to be vulnerable when one or more of the four components of food security are uncertain and insecure

(FAO, 2008). Women are vulnerable on all dimensions of food security: availability, access, utilization, and stability. They suffer the most from macro- and micronutrient deficiencies, especially during reproductive years, with long-term negative development impacts for society. (Oxfam,2019). Understanding the vulnerability of food and livelihood insecurity problem areas among rural women has continued to generate debates in economic and policy fora worldwide. The 1996 World Food summit discussed the issue of food insecurity in many countries of the world. The target was to reduce the number of poor populations who are

affected from extreme hunger and have income less than \$ 1 a day by half between 1990 and 2015. Whereas approximately 14 percent of the world population face hunger, over 60 percent of the population in Sub-Saharan Africa is undernourished (FAO, 2015). Gender is an integral and inseparable part of rural livelihoods. Men and women have different assets, access to resources, and opportunities. Women rarely own land may have lower education due to discriminatory access as children, and their access to productive resources as well as decision-making tend to occur through the mediation of men. Women typically confront a narrower range of labor markets than men, and lower wage rates. In this regard (Nazneen,2008) noted the following:

food and livelihood insecurity are a gender justice issue. Low status and lack of access to resources mean that women and girls are the most disadvantaged by the inequitable global economic processes that govern food systems and by global trends such as climate change. Evidence shows strong correlations between gender inequality and food and nutrition insecurity for example, despite rapid economic growth in India, thousands of women and girls still lack food and nutrition security as a direct result of their lower status compared with men and boys. Such inequalities are compounded by women and girls' often limited access to productive resources, education, and decision-making.

Livelihoods are a set of activities and assets that are accessed together to determine the living acquired by an individual or family to obtain the basic needs in life, which are food, water, shelter, and clothing. Frankenberger, T. 1996) defined Household livelihood security.

"as adequate and sustainable access to income and resources to meet basic needs (including adequate access to food, potable water, health facilities, educational opportunities, housing, time for community participation and social integration".

The risk of livelihood failure determines the level of vulnerability of a household to income, food, health, and nutritional insecurity. Therefore, livelihoods are secure when households have secure ownership of, or access to, resources and income earning activities, including reserves and assets, to offset risks, ease shocks and meet contingencies.

1.2. PROBLEM STATEMENT

The population of Sudan is estimated to be between 32 and 34 million, about 70 percent of whom live in rural areas (IFAD, 2006). Women make up about half of the population in general, but there are significant differences between different parts of Sudan. However, women make up most of the people in rural areas of Sudan due to the migration of males from rural to urban areas. Rural women are key to achieving the transformative economic, environmental, and social changes required for sustainable development. (Fatima, 2009). One of the major factors threatening food security and livelihoods in Sudan Province is the recurrent vulnerability to recurrent drought lasting for two or three years, and parts of the country are subject to annual floods. In recent years, climatic shocks have increased in severity and frequency particularly affecting the poor and food insecure populations with varying impacts across sectors of society including rural and urban households (WFP, 2018).

The main agricultural data for Sennar State shows that it is largely dominated by rain-fed agriculture, with mechanized farming representing 78% of agricultural land use, while traditional small-scale agriculture represents 12% of agricultural land use irrigated farming represents approximately 10% of agricultural land use, forests and natural rangelands represent 13% of the total land area of the State. (IFAD,2010). Despite the great diversity of resources, livelihoods and food security in the state face many obstacles represented in civil conflict and drought, insufficient funding for the running costs of agricultural services, lack of access to services such as education, health, drinking water and sanitation, difficulty in transportation, endemic diseases, poor housing. al of these challenges have a direct contribution to the high food insecurity index among rural women in the study area.

1.3. IMPORTANCE OF RESEARCH

The importance of research is the food security issues that have become a major concern for everyone, whether women or not, even to get peace of mind to give your best in terms of mental and physical work. A study by the African Development Bank (2011) found that nearly half (44 percent) of the African population lived on less than \$1.25 a day in 2010, and this. Given the volatility of food prices, the plight of people, especially rural women, are among the groups most affected by the rise in food prices. Those who live in extreme poverty

1.4. OBJECTIVES OF THE STUDY

The main of this study is to assess the factors that influence food and livelihood security of the rural women in Sennar State, Sudan

Specific Objectives:

- 1- To determine the food security situation of female-headed households in the study area.
- 2- To Analyses the impact of social and economic factors that affect the food security of female-headed households
- 3- To estimate the determinants of the livelihood income diversification of the rural households in the study area.
- 4- To assess the effectiveness of the organizations for obtaining livelihood opportunities in the study area.
5. To identify needs of households to achieve more sustainable livelihoods.

1-5- RESEARCH QUESTION

1. What is the food security situation of female-headed households?
2. What are the social and economic factors that affect the food security of female-headed households?
3. What are the factors influencing livelihood income diversification of rural households?

4. What are the organizations that work in study area to improve the level of livelihood of rural households?
5. What are the needs of households that will help them to achieve more livelihoods?

1.6. Hypothesis

- 1- There is no significant relationship between Age of household head and level of Food security on household
- 2- There is no significant relationship between household size and level of Food security on household
- 3- There is no significant relationship between Marital status of household head and level of Food security on household
- 4- There is no significant relationship between educational of the head and level of Food security on household
- 5- There is no significant relationship between the employment status and level of Food security on household
- 6- There is no significant correlation between monthly income of the household head and level of Food security
- 7- There is no significant correlation between deaths in childbirth and level of Food security on household
- 8- Access to assets was significant and positively correlated with level of household food security

1.7. Organization of study

This study consists of five chapters. Chapter one present introduction, problem statement, importance of research, objectives of the study, research question and hypothesis. Chapter two present literature reviews. Chapter three research methodology. Chapter four discusses the results and Chapter five present conclusions from the study and suggest some policy recommendations

CHAPTER TWO

LITERATURE REVIEW

2.1. Definition of Food Security

Food is defined as a nutritious substance which is solid in form, and can be taken by humans, animals and into plants to maintain life and growth (Allen, 1990). Food is regarded as the most important basis for human and economic development (Smith et al., 2006). It is one of the basic physical needs for human survival. Food is a critical determinant for health, because the quality and quantity of food that is consumed has an effect on health (Ostry, 2010). Food is vital because it helps to improve wellness in terms of physical, mental and social health. Without food, people cannot carry out various activities and in turn lowers productivity. An individual can attain food by producing, consuming and obtaining it through food aid (Madziakapita, 2008).

The concept of food security was brought to light by the early stages of increasing food supply in order to reduce famine and hunger throughout the world. (Wiggins, 2004). Since the World Food Conference of 1974, definitions have changed from viewpoints that ranged from national food security or an increase in supply to those emphasizing improved access to food in the 1980s (FAO, 1983). Hoddinott (2001) cites that relevant literature provides about 200 definitions of food security. During the 1970s the United Nations defined food security in terms of sufficient production and supply of food at the global and national level (Clover, 2007). Food security was regarded as a primary need. The most common definition today was adopted by the World Food Summit in 1996 and this has become a general understanding of what food security entails (FAO, 1996a). The definition states that; ‘at the individual, household, national, regional and global level, food security 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, 1996a). Four fundamental elements (food access, availability, utilization, and stability) are identified from the definition.

2.1.1. Food access

Food access suggests that every individual should have sufficient access to sufficient resources to have appropriate food to live a healthy life. Food accessibility by households can be obtained through consumption, production and receiving gifts from other households (Fanta, 2006). The extent to which each member of a household has access to sufficient food depends on several factors such as gender, age, and the employment status (Benson, 2004). The purchasing power of households is the most critical determinant for food access. The purchasing power depends on various pricing policies and market conditions (WFP, 2007). Access to food is closely associated with poverty because poor people usually do not have sufficient resources to attain access to the right number of quantities (Lado, 2001). Households that are food insecure lack the necessary resources to pay the price for imports and access sufficient supply of food (Boussard et al., 2006). In rural areas households are unable to access sufficient food because they live far from supermarkets and do not have appropriate transportation (Nord et al., 2009). Food access incorporates both physical and economic access. Physical access involves a place where food is attainable and available, while economic access relates to entitlement to food (Staatz et al., 2009). Sen (1981) explained entitlement to food access by using four key components: (i) trade-based entitlement which entails that a person has the ability to trade something through consumption and purchase for food from individuals who are willing to trade, (ii) production-based entitlement which implies that a person is entitled to grow and produce food by using their own resources or by obtaining resources from people who are willing to trade through the medium of exchange by agreeing to the terms of trade, (iii) own-labor entitlement which means that an

individual is entitled to sell his own labor skills and experiences, therefore both the trade-based and production-based entitlements are associated with an individual's labor skills and experience, and (iv) inheritance and transfer entitlement which implies that an individual is entitled to have access to resources that are provided by the government or any member of the community in a form of social transfers.

2.1.2. Food availability

Food availability implies that enough food should be available, and every individual must have access to food (FAO, 2006). Supply of food should be distributed through domestic and international production. Kannan (2000) argue that food supply is very essential, and that the government of any country should not depend entirely on international markets for food supply. Goodall (2009:2) maintains that the availability of food is interpreted differently across countries; it could simply mean the availability of food to survive or to sustain a healthy life by having enough nutrients. Food availability does not guarantee food access; this is because several factors such as institutional structures, government policies, business and the market have an influence on food security at a household level, which in turn is accomplished through empirical analysis (Page & Redclif, 2002; Hadley, 2011). The challenges associated with food supply in a country include several factors such as political instability, war and riots, the shortage of effective transportation and inefficient market structure (Benson, 2004). A food balance sheet provides relevant information about food availability among nations, regions, and sub-regions (Babu & Sanyal, 2009).

2.1.3. Food Utilization and Stability

Utilization of food involves the preparation of sufficient food with clean water, sanitation, and special health care (Richardson, 2010). This ensures that the well-being of individuals' psychological needs are met efficiently (IICA, 2009). Food utilization implies that the amount of nutritional food intake by an individual

should be safe, of the right quality and be sufficient for a diet that provides adequate energy and vital nutrients (WFP, 2007). A person's body must be able to extract and use the nutrients from consuming food; this is according to the meaning of an 'active and health life' in the definition of food security. The preparation of food and health status of a person has a direct influence on food security (Staatzet al., 2009). Food utilization is limited by several factors such as loss of nutrients during food processing, inadequate sanitation, lack of proper care. This in turn might have an adverse effect on other members of a household. Food utility entails food usage, therefore, throughout the year food utility changes with seasonal variation and food availability when there is food production and consumption domestically (Yin et al., 2008). Food stability emphasizes that every individual should always have access to sufficient food. Unexpected economic shocks should not be a risk factor to food access when needed (IICA, 2009). Stability also relates to the loss in resources due to income shocks and insufficient reserves. The loss in resources may either be temporal or permanent (Schmidhuber & Tubiello, 2007). The concept of stability is interrelated with the elements of both access and stability (FAO, 2006).

2.2. Food Insecurity

The Food and Agricultural Organization (FAO, 2002) defines food insecurity as a situation where there is limited availability of safe and nutritious food needed to live an active and healthy life. This condition also involves being worried about not having sufficient food to eat or not having money to buy food when it runs out (Burns, 2004). People found to be food insecure generally cannot consume or grow enough food due to limited resources (Boussard et al., 2006). Other instances of food insecurity are found amongst those who have been victims of wars, the urban poor and low-income households, especially in underdeveloped countries. Moreover, women residing in low-income households are mostly vulnerable to

food insecurity. This is because women usually spend a large share of their income on children's needs. They are also responsible for producing or preparing the food they purchase (FAO, 2011; European Commission, 2009). Von Braun et al., (1992) note that theory differentiates two types of food insecurity, chronic and transitory food insecurity:

2.2.1. Chronic food insecurity

Chronic food insecurity occurs when the shortage of food lasts for long periods of time and it is usually caused by lack of productive and financial resources due to poverty (FAO, 2008). It persistently affects individuals that are not able to meet necessary requirements to purchase or produce enough food (European Commission, 2006). Chronic food insecurity breeds conducive conditions for vulnerability - which is defined as continual susceptibility to food insecurity (Devereux, 2006). Chronic food insecurity is regarded as mild or moderate food insecurity and it usually dominates when there is consistent market or structural failure within a nation (Misselhorn et al., 2010). Chronic food insecurity influences almost one billion people in each year (Staatz et al., 2009). Cathie (2006) argued that the minimum daily food intake and nutritional policy measures are essential policy recommendations to alleviate the challenges related to chronic food insecurity.

2.2.2. Transitory food insecurity

Transitory food insecurity is a temporal shortfall of food and last for short periods of time. It is rooted from several factors such as short-term shocks and lack of food availability due to fluctuations in food prices (FAO, 2008). The condition of transitory food insecurity happens when there is an unexpected change in the ability to purchase or produce sufficient food to maintain a healthy lifestyle. Transitory food insecurity is regarded as the most serious manifestation of household food insecurity because it causes hunger and famine, even though the

condition occurs in the short-term. (Staatz et al., 2009). Inappropriate government policy may lead to transitory food insecurity due to the destabilization of food consumption trends (Cathie, 2006).

Chronic and transitory food insecurity is interrelated because chronic food insecurity is rooted in one or more incidences of transitory shocks (Misselhorn et al., 2010). Coping strategies employed by households outlines a clear indication of the relationship between the two concepts. A household is likely to sell off its assets to cope with transitory food insecurity, thus this sacrifices their ability to attain food or income, which in turn leads to chronic food insecurity. This whole process is called a poverty trap (Staatz et al., 2009)

2. 3. Women's Role in Food and Nutritional Security

Agricultural interventions are most likely to affect nutrition out-comes when they involve diverse and complementary processes and strategies that redirect the focus beyond agriculture for food production and toward broader consideration of livelihoods, women's empowerment, and optimal intrahousehold uses of resources. (FAO, 2009).

Successful projects are those that invest broadly in improving human capital, sustain and increase the livelihood assets of the poor, and focus on gender equality. (World Bank, 2007). Women are crucial in the translation of the products of a vibrant agriculture sector into food and nutritional security for their households.

They are often the farmers who cultivate food crops and produce commercial crops alongside the men in their households as a source of income. When women have an income, substantial evidence indicates that the income is more likely to be spent on food and children's needs. Women are generally responsible for food selection and preparation and for the care and feeding of children. (Quisumbing et al., 1995). In rural areas the availability and use of time by women is also a key factor in the availability of water for good hygiene, firewood collection, and frequent feeding

of small children. In sub-Saharan Africa transportation of supplies for domestic use fetching fuelwood and water is largely done by women and girls on foot. (IFAD, 2001).

In Ghana, Tanzania, and Zambia women expend most of their energy on load-carrying activities involving transport of fuelwood, water, and grain for grinding. Fields dedicated to food crops are often farther from home than those related to cash crops. Because women must also perform domestic tasks, they must spend a considerable amount of time traveling between their home and the fields. This burden, together with other domestic and reproductive activities, severely constrains the amount of time available to women. (IFAD,2001) b.

As women's time constraints increase because of engagement in wage labor and other factors, they will need to build "strategic alliances with men" to meet all the needs of the household. In the WIN project (Empowerment of Women in Irrigation and Water Resources Management for Improved Food Security, Nutrition and Health).

In Nepal, one woman trained as a para-veterinarian convinced her husband to care for their children and per-form other domestic tasks while she made her rounds. (UN,2005) Changes in the availability of natural resources, due to the depletion of natural resources and/or impacts of climate change, can compromise food security by further constraining the time available to women., water degradation and pollution can force women to travel farther to collect water, reduce the amount they collect, and compromise hygiene practices in the household.

Recognizing women's needs for environmental resources, not only for crop production but also for fuel and water and building these into good environmental management can release more time for women to use on income generation, childcare, and leisure. Agriculture has an additional impact on food security through its impact on health. For example, poorly managed irrigation

infrastructures may become a breeding ground for mosquitoes, and excessive use of groundwater for irrigation may compromise water sources needed by women to ensure good hygiene practices and clean food preparation, without which children suffer more frequently from diarrhea and compromised growth. Poverty is a major driver of food insecurity, but the two are not always linked. Poorer households headed by women have demonstrated that they often succeed in providing more nutritional food for their children than those headed by men (Kennedy and Peters 1992).

This demonstrates the importance of gender-based knowledge and roles with regard to food security. Men who lack knowledge about food preparation may not be able to translate food availability into nutritional security for their households.

2.4. Women and Food Insecurity

Women farmers remain on the razor edge of extreme shocks to the system and in a warming world, with a growing number of hungry people and more conflicts, they face ever greater risks. Indeed, according to FAO, ‘Women are slightly more likely to be food insecure than men in every region of the world FAO, IFAD, UNICEF, WFP and WHO (2017).’, especially if they live in rural areas, where poverty and food insecurity are very much linked, and especially in a context of increased reliance on markets and a decrease in subsistence agriculture. Actual food stresses are linked to prices and access to markets rather than to production, Gaye et al., 2018). but women are vulnerable in all dimensions of food security: availability, access, utilization, and stability.

2.4.1. Availability

Ten years on, food production has increased and remains adequate to feed all the increased population in all of the world’s regions. Per capita food availability has increased globally over the past 20 years (UN, 2014).

Nevertheless, climate change and its impacts on agriculture constitute a substantial threat to food availability. FAO projects that global average cereal yields will decrease by 3–10% for each degree of warming. (FAO,2018). Africa and a belt stretching from the Middle East through South Asia to mainland South-East Asia and on into Indonesia and the Philippines are forecast to be the worst affected by disasters caused by natural hazards associated with climate change. (FAO ,2018) This is likely to cause severe harm to harvest and external trade, among other things. (FAO ,2018) b. It is also forecast to increase food prices, most of all in West Africa and India; people’s purchasing power is expected to decline by nearly 12% in West Africa and 6.2% in India. FAO (2018)c . Reduced buying power will have severe impacts on rural poor people. (FAO ,2018) d

Climate variability and extreme weather events can have severe local impacts even when overall national food production figures look good, and this can lead to serious hunger problems in the affected areas FAO, IFAD, UNICEF, WFP and WHO, (2018). Rural people in developing countries, who usually have low carbon footprints and depend on renewable natural resources, are acutely vulnerable to climate shocks and natural hazards.(FAD, 2018)

Which can cause them devastating production losses and undermine their food security and nutrition (Quisumbing et al. 2011). on. Women have especially high vulnerability as they tend to have less access than men to the resources that can facilitate climate change adaptation, such as social capital, land, finance, credit, health, education, information, mobility, and formal employment, and they frequently lack a seat at the decision-making table. Climate change related drought and water scarcity add to their gender-related workloads (such as collecting fuel wood and water (FAO ,2016).

2.4.2. Access

Even when food is available, poor and marginalized people may lack the resources to access it through purchase or production, and too often neither public social protection programmes nor private charity reach them, if these even exist in poor countries. (Drèze et al., 1989). Most often women are expected to find ways to cope with their families' hunger. (UN, 2014) a

Within concentrated global and domestic value chains, women farmers are at risk because of their weak bargaining position: global food industries and supermarket chains play an increasingly prominent role in food supply, and access to food depends on income, price levels and social transfers, factors over which women have no power or in which they face discrimination. (UN ,2014) b

Smallholders find that they are being driven out of markets, squeezed by corporate entities on both the input side (seeds, machinery) and the buyer side (traders, food industry, supermarket chains). Oxfam has found that in the context of patriarchal norms and social practices, women feel (Willoughby et al., 2018) a.

They are relegated to low-paying and often informal work within agri-food systems, are denied most socio-economic and political rights and are under the threat of sexual harassment and violence. All these factors put their ability to access food into question. A survey of South African grape farm workers in 2018 found that over 90% said that they did not have enough to eat during the prior month. Nearly a third said that they or someone in their family had missed at least one meal in that month (Willoughby et al., 2018)b.

When policies have been implemented to give women better access to markets, they have not necessarily been beneficial. Entering into market relations usually brings large changes – negative or positive – to the ways that people live. These changes can alter relations within the household, to the benefit or detriment of women.

In general, it is widely thought that direct access to income increases a woman's autonomy, but in the household economy it is not always that simple A. (Britwum,2009). Within farming households, there are often gender differences in revenue earning from crops.

Men tend to produce high-value crops, leaving women to cultivate traditional produce which may be rich in critical micronutrients but has been neglected by post-crisis policies that have primarily targeted cereal production to reach national sufficiency. FAO analysis of gender and cash crop production in Ghana found that women cocoa farmers are as productive as men. But because they tend to be more cash strapped than male producers, women cocoa cultivators tend to use more labor intensive and less high-tech approaches than men, which adds to their workloads. (FAO, 2011). Conflict also has gendered impacts on food security. (FAO,2017)a.

Men tend to do the bulk of the fighting, leaving women in charge of household livelihoods and well being. (FAO,2017)b. Violence can directly harm women, and can also reduce their capacity to provide for their families. Conflict related displacement also is a major reason for food insecurity and affects women and children disproportionately (FAO, 2017)c.

2.4.3. Utilization

At the household level, women are frequently the ones who eat least, last and least well. Increased poverty in female-headed households affects women's nutrition: to adjust to the decline in their capacity to purchase or grow high-quality, diverse foods, they often shift to cheaper and less diverse diets, which frequently lack the key nutrients that pregnant women and young children require. (FAO ,2013).

2.5. The concept of sustainable livelihoods

The concept of sustainable livelihoods is a reference point for a wide range of people involved in different aspects of development policy formulation and

planning. As analysts point out, there are two broad approaches to defining livelihoods. One has a narrower economic focus on production, employment and household income. The other: takes a more holistic view which unites concepts of economic development, reduced vulnerability and environmental sustainability while building on the strengths of the rural poor. (Carney, 1999). The livelihoods framework is not restricted to analyzing rural livelihoods. It has important applications in understanding urban livelihoods and vulnerability and the linkages between rural and urban areas. Although there are differences of interpretation and different variations of the livelihood's framework, they all build on earlier development theory. These include aspects of the integrated rural development planning (IRDP) approaches of the 1970s; (Carney et al., 1999)

food security initiatives during the 1980s; rapid rural appraisal (RRA); participatory rural appraisal (PRA); farming systems research; gender analysis; new understandings of poverty and well-being; risk and vulnerability assessment; and agrarian reform.

Many earlier development approaches assumed that rural society was homogenous (in other words, that there was no differentiation between households in rural areas) and that households had single-purpose economies (in other words, that they only had one way of making a living). As a result, development agencies tended to focus on narrow, sectoral, production-orientated strategies that often bypassed those most at risk and failed to recognize that poor households have multiple economic strategies.

(Chambers, et al., 1992)

One of the key findings that flowed from participatory research and appraisal was a much more subtle understanding of livelihoods and the different elements that they combine. The work of Chambers and Conway in the early 1990s built on participatory research practices and ideas put forward by the World Commission

on Environment and Development. They developed a definition of livelihoods and the factors that make them sustainable which underpins all of the livelihood's frameworks currently being used:

A livelihood comprises the capabilities, assets (stores, resources claims and access) and activities required for a means of living a livelihood is sustainable which can cope with and recover from stress and shocks, maintain and enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels in the long and short term. (Drinkwater et al 1999)

The Chambers and Conway definition was modified by DFID in 1999, a definition that is widely used:

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from shocks and stresses and maintain and enhance its capabilities and assets both now and in the future whilst not undermining the natural resource base.

Other livelihoods definitions make people more central and are less concerned with precise terminology for different kinds of assets. They highlight issues of ownership, access and decision making. One of these definitions of livelihoods states:

People's capacity to generate and maintain their means of living, enhance their well-being and that of future generations These capacities are contingent upon the availability and accessibility of options which are ecological, economic and political and which are predicated on equity, ownership of resources and participatory decision making (Frankenberger,et al., 1999)

Despite differences in emphasis by different practitioners, the livelihoods framework helps us to:

- identify (and value) what people are already doing to cope with risk and uncertainty
- make the connections between factors that constrain or enhance their livelihoods on the one hand, and policies and institutions in the wider environment
- identify measures that can strengthen assets, enhance capabilities and reduce vulnerability.

2.5.1. Livelihood Assets

Assets represent the stock of resources on which households can draw to generate income, meet their basic needs, manage risk, and cope with stresses and shocks. A larger asset base generally translates into greater livelihood opportunities and greater livelihood security. Six types of assets are generally recognized: human, physical, social, financial, natural, and political.

2.5.1.1. Human assets

refer to the livelihood knowledge and capabilities possessed by individuals, in addition to the intangible character traits (ambition, drive, persistence, etc.) and health status that determine how effectively individuals apply their knowledge and capabilities to livelihood activities. Critical determinants of human assets include individuals' access to education and training, health services, sanitation, clean water, and adequate amounts of nutritious food.

2.5.1.2. Physical assets

include the physical economic infrastructure along with the household's productive and other assets that enable the household to pursue its livelihood. The physical economic infrastructure includes, among other things, roads, rail networks, communication facilities, ports, etc. The household's productive assets

include land, machinery, tools, and draft animals. Other household physical assets include moveable assets that can be converted into cash or exchanged for goods or services, such as jewelry, furniture, electronics, appliances, or animals.

2.5.1.3. Social assets

are commonly referred to as social capital. Social capital is generated by the household's connections in a social network, and the trust, reciprocity, and resource sharing qualities of those connections. It can be activated by households to gain social support or social leverage, or by communities to facilitate organization and collective action. Social capital is a resource in which households can invest with the expectation of a future flow of benefits. Social capital is commonly viewed as a positive resource, but can become negative when used to exclude outsiders, impose social sanctions, or advance special interests that are detrimental to the greater good.

2.5.1.4. Financial assets

are financial resources that are available to the household and include savings, credit, insurance, remittances, pensions, cash transfers from social welfare programs, and assets held as a store of value, such as livestock or jewelry. To act as a store of value, assets must be able to be saved and retrieved at a later time and have a predictable value when liquidated or exchanged.

2.5.1.5. Natural assets

include the physical environment and the natural resource stocks that can be controlled by the household and used to expand or enhance livelihoods. Natural assets include land, water, wildlife, biodiversity, and forests.

2.5.1.6. Political assets

are defined as the ability to use power to further political or economic positions, which in turn affects livelihood options and outcomes (Baumann and Sinha, 2001). They refer to the legitimate distribution of rights and power, and how illicit

operations of power can frustrate efforts of households to access and defend entitlements. Illicit use of political power by state officials and community elites can divert significant resources away from vulnerable households.

Another useful way to think about livelihood assets is to differentiate between ‘productive assets’ and ‘protective assets.’ Productive assets are physical assets that increase the household’s labor productivity and production thereby enabling it to increase its income and food security over time. Protective assets include physical, financial, and social assets that can readily be converted into cash or goods in time of need.

2.5.2. Livelihood Activities

Household livelihood activities fall generally under one of three categories: income generating activities, risk reduction strategies, and loss management strategies. Income generating activities include wage labor and self-employment. Wage labor includes local or migratory labor, formal employment or casual (day) labor, and payment in cash or in kind. Income generating activities are also distinguished by whether they are formal or informal and legal or illegal. Self-employment activities in turn can be grouped into five categories: (1) agricultural production, including crops, aquaculture, and livestock; (2) agro or other processing; (3) small-scale manufacturing; (4) service provision; and (5) trading. (Risk reduction and loss management strategies). A household’s choice of livelihood activities reflect factors such as the diversity of its asset base; geographic location; the economic, political, and natural environment; and social/ cultural traditions. For household members, livelihood activities also depend on their gender, age, and health status. It should be emphasized that household income generating activities are dynamic. Vulnerable households often engage in a continuously changing portfolio of income generating activities to spread risk or take advantage of earning opportunities. Income generating activities in a single rural household might, for

example, include food crop production, cash crop cultivation, day labor provided periodically by a household member, retail marketing of fruits and vegetables at the local market and remittances from an adult member of the household working in the city.

2.6. The Vulnerability Context

How well a household can draw on its assets to pursue its diverse livelihood activities depends on its vulnerability context. Vulnerability refers to a household's susceptibility to a future acute loss and its capacity to maintain its livelihood and food security over time. Vulnerability is defined as: "the household's susceptibility to shocks and stresses that affect the household's ability to generate sufficient income to earn a livelihood and achieve a there hold level of nutritional requirements for a healthy life both now and in the future." Vulnerability is a day-to-day reality for many households. (Washington, DC 2009)

The household's vulnerability context is influenced by factors both outside of and within its control. Those outside its control include stresses and shocks as well as external structures and processes. Structures and processes include factors like the public and private sectors, civil society, laws, policies, culture, and social institutions that affect how households accumulate and utilize assets. Stresses are long-term trends or recurring events that put ongoing pressure on the household's livelihood and food security. In contrast, shocks are unanticipated (and often dramatic) adverse events that undermine the household's livelihood and food security. Stresses and shocks emanate from a variety of sources in the economic, natural, health, political, and social environments. As Moser (1998) notes: "*Vulnerability is therefore closely linked to asset ownership.. ..The means of resistance are the assets and entitlements that individuals, households, or communities can mobilise and manage in the face of hardship.. ..The more assets people have, the less vulnerable they are, and the greater the erosion of people's assets, the greater their insecurity.*"

Households and individuals will have different and varying degrees of access to and thus different portfolios of assets. However not only do fewer assets equate to greater vulnerability, but also lower potential for substitution between assets and activities makes livelihoods more vulnerable, especially to shocks. Assets that can readily be liquidated and used to purchase more appropriate assets provide for greater livelihood flexibility (Ellis, 2000). Substitution within asset categories can also occur. One notable example relates to the re-allocation of labour between domestic and outside earning opportunities in response to changing circumstance. With access to different portfolios of diverse assets, individuals and households will consequently respond in different ways to given livelihood shocks or trends. Devereux, (1999) identified the following examples of Trends, Shocks and Seasonality:

Trends:

- Population trends
- Resource trends
- Environmental degradation
- National/international economic trends
- Trends in governance
- Technological change
- Human health trends

'True' shocks :

- Human health shocks
 - Droughts, floods
 - Economic shocks
- Conflict, civil upheaval
- Pestilence, crop diseases
- Livestock health shocks

Regular or seasonal shocks:

- Of prices
- Of production
- Of health
- Of employment opportunities

2.7. Food Security and livelihoods in Sudan

Sudan has poverty rates at around 46% World Bank, (2011) with approximately 18.5 million UN, (2015) people living in poverty. The majority of the population lives in rural settings (65% on average) and this proportion is higher in the western states (around 75%), with rural poverty at around 58% World Bank,(2011). The World Bank estimates that up to 80% of the labour force is engaged in agriculture, accounting for around one third of the Gross Domestic product (GDP), a proportion that has increased in the last few years due to reduced revenue from oil. Agriculture, therefore, plays a critical role in both household and national economy. Agriculture is also predominately rain-fed in Sudan, which means there is an inherent sensitivity to rainfall amounts and timings, making climate change a key factor in the future of Sudan's economy, livelihoods, and food security.

2.8. Food Security Factors in Sudan

Food security is tightly linked to agricultural production. However, as 60-75% of households (WFP, 2011; WFP, 2012; WFP, 2013) are reliant on food purchase, and fragmented markets being noted as a key issue in trade within Sudan (FEWS NET, 2015), physical and economic access to food and the trading of agricultural goods (market access) are also important factors. Agricultural labour is also an important source of income for poor households. As such changes in production will have a secondary impact on both labour opportunities and ability for employers to pay for the labour required (in the case of reduced yields), reducing income and thus access to food (lowered purchasing power). However,

as some agricultural adaptations to climate change require more labour, it is difficult to accurately anticipate the changes within this income group without a solid understanding of the evolution of agricultural practices. Sorghum is a key crop in Sudan and as such is the focus of price monitoring systems (WFP, 2016; FEWS NET, 2015). Market prices of sorghum have been steadily increasing over the last 9 years (with some lowering in 2011, with studies indicating that prices are likely to increase further if agricultural policies are not adjusted (Sassi, 2013). Market access is also important for the sale of agricultural products, with people living closer to Khartoum having better access to markets, whilst those further away face lower prices and difficulties of distance to main markets (FEWS NET, 2015)

In addition to food production for direct consumption, and sale at market, cash crops play an important part of food security at the household level, as well as nationally. Cotton, gum Arabic and sesame are important exports World Food Programme (WFP) assessments identify poverty as being a key contributor to food insecurity, with people that rely most on natural resources (charcoal, firewood, wild food) being the most vulnerable (WFP, 2011; WFP, 2012; WFP, 2013). Sudan also has a long history of resource-based conflict as a result of competition for limited resources (water, pasture for livestock, etc.), particularly where the population is concentrated around such resources. These conflicts have led to displacement, and food insecurity as a result of reduced access to markets and loss of livelihoods. As such, western states have frequently experienced food insecurity at crisis or emergency levels (Integrated Food Security Phase Classifications (IPC) 3 and 4; IPC, 2016), as indicated by food security assessments and analysis. Resource conflict is also tied in with land tenure issues, a broader issue that affects households across Sudan, not including areas affected by conflict (UNEP, 2012). Further pressures on food security have been felt in years when reduced rainfall

has led to insufficient availability of pasture, and reduced crop production and/or yield. The consequence of low water availability relative to demand, either as a result of a fluctuation and reduction in total rainfall, or simply delays in the onset of the rainy season, have seen decreased availability of cereals nationally, and potentially at the household level that may lead to reductions in dietary diversity for households. producing vegetables for own consumption, and reductions in milk production from animals. The long droughts that occurred in 1983, 1997, 2000 and 2011 displaced large numbers of people and had devastating effects on the agricultural sector with severe consequences for food security (Elagib and Elhag, 2011; FAO, 2011).

2.9. Overview of livelihoods in Sudan:

The livelihood activities in Sudan can be grouped into 19 categories, henceforth referred to as livelihood zones (LHZs; FEWS NET, 2011). These are a common way of categorizing the predominant livelihood strategies and widely recognized by stakeholders in Sudan.

Up to 80% of the population (approximately 32 million people) are engaged in agriculture as a principal livelihood strategy. Agriculture in Sudan can be summarized into three main categories:

- **Livestock:** include - pastoralism - agro-pastoralism
- **Cropping:** include - traditional rain-fed - mechanized rain-fed - irrigated and riverine
- **Forestry**

These strategies exist according to the agro- climatic features of the country and represent the key climate sensitive aspects of livelihoods in Sudan.

2.10. Factors Hindering Women Access to Livelihood Security

Rural women constitute one-fourth of the world's population (ESC,2012). They account for a great proportion of the agricultural labor force, produce the majority

of food grown, especially in subsistence farming, and perform most of the unpaid care work in rural areas (FAO.2010). Their contributions are essential to the development of local and national economies and to the well-being of their households and communities. While there are examples of countries making progress in promoting gender equality, in many others, women's situation is significantly below men's, particularly in rural and farming areas. Rural women still face difficulties when trying to access productive and economic resources, such as land. In North Africa and West Asia, they represent fewer than 5 percent of all agricultural land holders, while across Sub-Saharan Africa women average 15 percent of agricultural land holders (FAO,2011). They are still less likely than men to access rural wage employment, e.g., their participation in rural wage employment in Malawi, Guatemala and Bangladesh is equivalent respectively to less than 15, 10 and 5 percent compared to men, who represent respectively more than 25, 30 and 20 percent(4ibid). Rural women often have limited or no access to education, public services as well as decision-making and protection from violence. For example, globally only 39 percent of rural girls attend secondary school compared to 45 percent of rural boys, 59 percent of urban girls, and 60 percent of urban boys (UN.2011). This section examines factors which constrain livelihood and food security among rural women. These include limited land, employment, infrastructure, financial resources, education, extension services, nutrition and health care, access to information and technology and other. The factors are discussed below.

2.10.1. Access to land

Land rights are usually conceived as the rights and legitimacy to access, use, own, control, enjoy and exploit land. In terms of gender construction, land rights go beyond merely the rights to use or control land as a vital economic asset, but also involve laying claim to information about, decision-making around (for instance,

lease or sell) and ultimately enjoying the benefits thereof (Wanyeki 200). In South Africa for instance, despite the constitutional guarantee of gender equality, land reform in many rural areas has not benefitted women due to customary law practices which deny women access to land (Rangan and Gilmartin,2002).In Africa, the bulk of the land about 75%, as an economic asset, is under customary tenure, administered by norms, historical practices and unwritten law based on tradition and cultural affiliation (Odeny, 2013). The objectives of effective land reform are to redistribute wealth, achieve agrarian reform, increase access to land and bridge the gender-gap in the land sector. Globally, “at least 1.5 b people today have some farmland as a result of land reform, and are less poor, as a result. But huge, inefficient land and land inequality remains, or have reemerged in low income countries” (Lipton, 2009) Africa continues to play host to many low-income countries. Therefore, acquiring women’s property rights is crucial to the socio-economic development of the continent (Garvelink,2012).The Millennium development Goal three promotion of gender equality and empowerment of women, highlights the imperativeness of implementing laws and policies that would abolish social-economic and political exclusions of women (UNDP,2015).Global non-state actors, like the World Bank, Food and Agriculture Organization (FAO) of the United Nations and the Convention on the Elimination of Discrimination Against Women continue, to advocate for gender parity in the land sector. These organizations emphasize the importance of land to the developmental agenda of developing countries. Land deprivation is connected with diminishing livelihoods and increasing food insecurity in the continent. From Southern to East, and West Africa, poverty reigns. Furthermore, the issue of skyrocketing food prices persists, while food shortage becomes disturbing. Like their male counterparts, a large percentage of women are active farmers and highly dependent on the agricultural sector for their livelihood. Similarly, Odeny

commented thus, "Land is one of the cornerstones of economic development on which farmers, pastoralists and other communities base their livelihoods. Land is also a significant component of business assets, which play significant role in business investment strategies. Thus, securing land rights can have a profound impact on economic development...land is a source of identity and cultural heritage" (Odeny, 2013). Based on the prevailing land relations, "most women remain dependent on the existence and goodwill of male relatives for access to land" (Allendorf,2007). It has therefore become important to "explore gender inequalities in the control of productive resources, together with policies and institutional processes underpinning gender inequalities in land"(Tsikata and Amanor,2009). In the 2000s, "women's rights to land have remained at the core of the quest for gender equality in Kenya" (Kameri, 2009).Although, there are no legal barriers on women's property rights in Kenya as stipulated in the National Land Polic. however, this provision in practical terms, has yielded little success in respect to women's ownership of land. This is due to several impediments, which are structural, economic, and cultural in nature. Of all the limitations, the most complex to abolish is the cultural restraint to the attainment of women's property rights.

2.10.2. Access to Credit

Rural women's access to financial services is also limited by the fact that, in general, they do not possess productive assets or property which can be accepted by formal financial institutions as conventional forms of collateral. For example, evidence suggests that women are less likely to own, manage, control, or inherit property or land compared to men (World Bank, 2016). According to the Gender and Land Rights Database of the Food and Agriculture Organization of the United Nations (FAO), women's ownership of agricultural land worldwide is lower than that of men. The same database shows that women's land ownership is particularly

low in developing countries (FAO, 2016). This lack of collateral makes it difficult for women to obtain loans or use other financial services. The World Bank's index on women, business and law shows that women are less likely to save and borrow money or own a bank account in countries where they face legal discrimination regarding ownership rights (World Bank, 2018). However, studies have found a strong relationship between rural land rights and access to agricultural credit as well as rural incomes linked to agricultural and rural off-farm activities (Foltz, Larson, and Lopez, 2000). In addition, women are usually not seen as potential clients by formal financial providers, as they often work in the informal sector and have lower income levels than men (Aterido and Lacovone, 2011; Quisumbing and Pandofelli, 2009). In African countries for example, most economically active women work in the informal sector, which translates into lower wages compared to men and restricted access to assets that can be used as collateral (Taylor and Boubakri, 2013). As a result, women tend to rely on informal sources of funding to meet their financial needs (Hansen, 2013). For the reasons presented above, it is often quite hard for women to build up a credit history. In certain contexts, women can face additional difficulties in this regard, as their credit history might be linked to that of their husbands or other family members. Formal finance providers consider a solid credit history to be an important factor in deciding whether or not to provide a loan, or in fact any other financial service (Taylor and Boubakri, 2013). In many developing countries often do not have access to a range of official identity documents, such as identity cards or passports (Klapper, 2016; Napier et al., 2013). Oftentimes, due to institutional or regulatory provisions, formal proof of identity is a requirement for opening a bank account as well as gaining access to various other financial services. Furthermore, married women in certain countries, such as Chad, Guinea-Bissau and the Niger, are still required to have

their husband's or male relative's permission in order to open a bank account, which further restricts their access to financial services (World Bank, 2018)

2.10.3. Access to Extension Services

Extension services can be reformed to better serve women. A 1988–1989 survey covering 97 countries found that only 5% of extension services were addressed to rural women, and only 15% of extension advisors were female (FAO 1993; FAO 1996). More recently, 16 researchers from the World Bank and IFPRI identified large gender inequalities in access to extension services in surveys made in Ghana, Ethiopia, and the Indian state of Karnataka (World Bank and IFPRI 2010). In Karnataka, 27% of male-headed rural households reported having received visits of an agricultural advisor during the previous year. Only 20% of female-headed households reported such visits. The gap was smaller, however, for livestock-related extension services (advice to 78% of male-headed households versus 71% to female-headed households). Researchers attributed the difference to the importance of dairy cooperatives in the Indian context, as cooperatives tend to be more gender neutral. The failure of extension services to benefit women farmers as much as men seems to be attributable to four factors. One is a striking underrepresentation of women among extension services agents (De Schutter 2010). World Bank (2010) notes that in Karnataka, none of the 41 agriculture extension workers were female, only 1 of 41 junior engineers was female, and only 4 of 40 veterinary assistants were female. This matters because, in some contexts, religious, social, or cultural rules may prohibit contact between a woman farmer and a male agricultural agent—especially when the woman is single, widowed, or abandoned. Female extension agents may also experience such constraining norms and rules affecting their ability to work in the field. Male agents, on the other hand, may have less understanding of the specific constraints faced by women, such as time poverty, limits on mobility, and the gendered division of tasks in agricultural

work. A second factor is the common presumption of extension services that knowledge transmitted to men automatically trickles down to women and benefit the latter equally. Extension workers often assume that men are the only producers in the household and the sole decision-makers regarding household farming activities. This virtually ensures that women will not receive at least some of the knowledge required to enhance their agricultural productivity, and that their participation will be severely limited in key production decisions: e.g., what to plant, whether to sell, to whom to sell and at what price, and whether to invest. This presumption also reinforces preexisting imbalances in decision making within the household. Additionally, it neglects the fact that the needs and priorities of women may be different than those of men. The knowledge they demand will most likely correspond to the specific constraints they face—e.g., a very limited command over labor, fewer options for buying and transporting external inputs, and social or cultural norms that discourage use of certain machinery. A third factor relates to women's time poverty. Because of the many and conflicting demands on their time, attendance is difficult at meetings organized by agricultural advisors and held outside the home or during hours when women must attend to children and other inflexible duties. This difficulty also applies to the need for travel and lengthy periods of attendance. Training in Papua New Guinea by the United States Agency for International Development could not be attended by most women because of the required travel and 3 days away from family responsibilities (Cahn 2008). A fourth factor is institutional participation by women within community organizations that is different from that of men. A 2010 survey by the World Bank and IFPRI and by an earlier study of 304 rural households in the Philippines found that women generally join women self-help groups or women's groups, whereas men tend to socialize in cooperatives or other producers' organizations. Godquin and Quisumbing summarized their main conclusions Males are more likely to be

members of production groups, while females are more likely to participate in civic groups. This may indicate a division of labour within the household or separate spheres of decision making. Men, who are more heavily involved in agricultural production, are indeed more involved in groups related to income generation whereas women, who tend to be engaged in non-agriculture and are largely responsible for maintaining social networks, are more involved in civic and religious groups (Godquin and Quisumbing 2008).

2.10.4. Access to Education and Training

Women constitute almost half of the world population but are discriminated in various spheres of life and are more subjected to problems in many aspects because of gendered social structure (Daraz, 2012). The fact is evident that women are among the vulnerable segment in society (Bari, 2005). The importance of women's role in the process of development was recognized long ago. Women have economic, political and social roles to play. Keeping in view the importance of female education, it is believed that major cause of lagging behind in general, in economic and social progress, in most of the developing countries, including Pakistan is the absence of a higher percentage of educated and technically qualified women (Ahmad, A. 1984).

According to UNESCO estimates, around the world, 132 million girls are out of school, including 34.3 million of primary school age, 30 million of lower-secondary school age, and 67.4 million of upper-secondary school age. In countries affected by conflict, girls are more than twice as likely to be out of school than girls living in non-affected countries. And in many countries, among girls who do enter primary school, only a small portion will reach and far fewer will complete secondary school. In developing countries, the females living in the rural areas are the most neglected part of the population in their schooling and higher education. Of those, who belong to peasant households have more subordinate position and

are ignored towards their schooling as compared to boys (Song, et.al 2006). The educational backwardness of rural people is due to their traditional attitude towards female education. In rural areas number of schools are insufficient and existing school do not full fill the needs of rural females. (Asghar, S., 1992, sited in Tahir,2014). Socio-economic factors of family life directly and indirectly affect the education of its members. We cannot neglect any aspect as these are directly and strongly interrelated with each other. Lack of educational facilities is one of the main factors responsible for the unsatisfactory conditions of females.

2.10.5. Access to Information and Communication Technologies

In an increasingly globalized and networked world, rural women and men should have access to a range of information to enable them to make informed choices concerning their livelihoods, management of resources, community health, and development, and to understand and influence the policy decisions that impact them. The role of ICTs in enabling women and men to access and compile this kind of information cannot be overestimated. Despite much support for the diffusion of ICTs in rural areas, gender disparity in access to ICT services continues, much to women's detriment. A widespread assumption that rural women have no real use for or interest in ICTs persists. Examples from around the world prove otherwise. ICTs are commonly referred to as comprising the converging modern-day technologies of phone, wireless, and Internet. ICTs in a rural context, however, must also include traditional technologies, such as radio, satellite radio, and television. Over time, we can expect these distinctions to blur as the technologies converge further. The three defining characteristics of modern ICTs are their convergence, their speed, and, increasingly, their comparatively low operating costs. These characteristics offer a broad range of possibilities for information collection, manipulation, transfer and transmission, storage, and presentation, which can be effectively applied in rural contexts. As technologies

and software applications improve and their diffusion spreads, ICTs offer rural populations new ways of networking and communicating. ICTs complement other forms of communication that are indispensable to improving rural livelihoods: FAO, 2006

At the time of writing, the technology of choice in terms of bridging the information gap between rich and poor is the cellular telephone and not the personal computer: “emerging markets will be wireless-centric, not PC-centric.” Pralahad, 2005 Mobile telephone subscriptions will continue to increase at a very dramatic pace, rising from an estimated 15 million in 2004 to 191.8 million by 2014—raising the penetration level from 2.2 percent to 19.4 percent in all least developed countries. Andersson et al. 2007. Wireless phones allow farmers to check prices in different markets before selling their produce, they make it easier for people to find work, they can be shared by a village, they pose fewer problems for the illiterate, and the content is in the local dialect and instantly shared. One limitation to ICT access is its dependence on a dependable source of energy. Radios may run on batteries, but cell phones and computers are ultimately dependent on a supply of electricity. In other words, the physical access to ICTs in rural areas (including community connectivity points such as tele centers or Internet cafés) is reliant on a dependable energy infrastructure. (UNECA, 2005)

2.10.6. Access to market

in many part of the world, women play a major role as farmers and producers, However, their access to resources and opportunities to enable them to move from subsistence agriculture to higher value chains is much lower than men’s. Women increasingly supply national and international markets with traditional and high-value produce, but compared to men, women farmers and entrepreneurs face a number of disadvantages, including lower mobility, less access to training, less access to market information, and less access to productive resources. Evidence

suggests that women tend to lose income and control as a product moves from the farm to the market (Gurung 2006). Women farmers can find it hard to maintain a profitable market niche. Men may take over production and marketing—even of traditional “women’s crops”—when it becomes financially lucrative to do so. Women-owned businesses face many more constraints and receive far fewer services and less support than those owned by men (Bardasi, Blackden, and Guzman 2007; Ellis, Manuel, and Blackden 2006; World Bank 2007a, 2007b). These disadvantages reduce women’s effectiveness as actors in value chains and reduce overall market effectiveness. Providing women producers and entrepreneurs with the same inputs and education as men in Burkina Faso, Kenya, and Tanzania could increase their output and incomes by an estimated 10–20 percent (World Bank 2005). Apart from efficiency gains, food security and welfare gains are also strongly linked to the provision of greater economic opportunities for women. Studies show that resources and incomes controlled by women are more likely to be used to improve family food consumption and welfare, reduce child malnutrition, and increase the overall well-being of the family (FAO 2006).

2.10.7. Access to Water

A crucial issue in groundwater development and management is that of access to and use of the groundwater resource, including access to groundwater abstraction technology and groundwater management activities. Different rights come into play when discussing groundwater: rights to the resource either by virtue of owning the groundwater technology (individually or through a group) or by being a member of the groundwater users’ group, rights to decide water allocation and distribution after water is pumped out, as well as adjudication and decision-making rights on who holds which rights (Gautam, 2006; warteveen, 2006). Water rights are directly related to land rights in many countries. In such cases men and women without clear land titles are restricted from being members of groundwater users’

group even when they may be the main decision makers on the farm or in the household for a project that overcame this constraint). In the Andean countries, Bangladesh, India, Nepal, and countries in southern Africa, migration of men from rural areas has led to an increase in women-headed households so women are overburdened with the task of maintaining the household as well as the farms. (Bakker,1999). Women and girls are typically responsible for collecting water for daily needs. This includes water for drinking purposes for the household, livestock, cooking, cleaning, and overall health, and hygiene within the household. Clear water rights lead to improved access to water, which is critical for maintaining good health and a sustainable livelihood. Studies from Africa. show that both rural and urban women are engaged in small-scale enterprises and that improved access to water would help them to pursue these activities more effectively. Deere, et al, 1997 Experience from India has shown that when groups of landless women were provided a share of water by the members of a “land-owning” water users’ association in a lift irrigation project, the women were able to work out alternative livelihood strategies. They contracted the available wasteland in the village on a long-term lease and derived an income through biomass produced from this land (Kulkarni 2005), while taking part in the restoration of the land

2.10.8. Access to transport

In many developing countries men’s control of household cash and intermediate means of transport (IMTs), such as draft animals, bicycles, and carts, and social and cultural constraints on women’s mobility limit women’s access to transport opportunities that could reduce their transport burdens (Edmonds 1998). Men’s control also creates differential access to markets, inputs, training, extension services, grain mills, and financial and health services for women and men. A multidoor report, “Can Africa Claim the 21st Century?” concluded that in Tanzania reducing time burdens of women could increase household cash incomes for

smallholder coffee and banana growers by 10 percent, labor productivity by 15 percent, and capital productivity by 44 percent; in Kenya, giving women farmers the same level of agricultural inputs and education as men could increase yields obtained by women by more than 20 percent (World Bank 2000). Rural transport services are often infrequent and expensive. Schedules and frequency of service are based on peak periods of travel to and from work rather than the multiple travel tasks of women who often “trip-chain,” combining various domestic and caretaking responsibilities with wage earning trips that occur throughout the day when services are limited (Peters 2002). The high cost of providing transport in areas with low population density often translates into high tariffs unless government subsidies are provided to service operators and users. Many rural men and most rural women lack the resources to pay these tariffs or to purchase intermediate means of transport. Thus, if the distance is too great to headload crops to market, farmers must sell to middlemen, who take a large share of the profit. For women and men who can afford rural transport services, only limited amounts of produce can be accommodated making the transport costs high in relation to profits sales (Plessis-Fraissard 2007). Limited access to transport has serious human costs as well. Every minute around the world a woman dies in childbirth, and most of these deaths are preventable. Transportation delay to emergency obstetrical care because of lack of roads, transport services, and money to pay for transport is one of three types of delays that can lead to medical complications, including obstetric fistula,² which can result in maternal and newborn deaths (Babinard and Roberts 2006; Riverson and others 2005). These losses reduce labor and production capacity and threaten family welfare.

2.10.9. Access to Energy

Although it is a core priority for meeting people’s basic needs, domestic energy for household needs such as cooking, heating and cooling, lighting, and food

processing until fairly recently has stayed as invisible in energy sector policies, programs, and projects as household tasks are to the economy: not counted in GDP, not considered important. For example, in Uganda, although 90 percent of energy consumption is traditional biomass for basic needs and only 1 percent is electricity, 90 percent of investments have gone to the electricity sector and 1 percent for domestic energy, according to 2003 data (Blackden 2007). Domestic energy tasks in rural areas are disproportionately women's responsibilities, especially when the main sources of energy are collected fuelwood and animal wastes, and where women and girls do most of the cooking. One of the main characteristics of these gender disparities is the time burden on women and girls and, to some extent, young children of both sexes. Another example from Uganda illustrates the problem: there the transport burden of women is four times that of men in time spent, it is five times greater in volume, and a significant share of this burden consists of fuelwood and water. In Nepal women can walk over 20 kilometers on each trip, and the time spent collecting fuelwood is at the expense of income-earning activities or rest. By contrast, when wood sources are significantly closer to homesteads, the time gains and therefore the potential economic improvement to the household and the economy are significant. In Zambia about 600 hours per household could be saved annually if wood sources were within a 30-minute walk from the homesteads. Where modern fuels (kerosene, liquid propane gas) are available and affordable, men's share of time spent on procuring energy on markets increases, as documented in an Integrated Research and Action for Development (IRAD) study (Parikh and Sharma 2006) in Himachal Pradesh, India. Another major characteristic of gender disparities in domestic energy is the impact on women's and children's health. In Himachal Pradesh 19 percent of the people reported symptoms such as backaches (50 percent), neck aches, headaches, and bruises every week (80 percent). In addition

the unsafe use of traditional biomass fuels causing indoor air pollution is now recognized as a major public health issue. Children under five years of age account for 56 percent of total deaths from indoor air pollution, the main cause being acute lower respiratory infections. The World Health Organization (2002) estimates that 50 percent of the 2.1 million deaths of children under five annually from respiratory infections are attributable to indoor air pollution, lack of adequate heating, and other precarious conditions. Women are also more at risk than men, not just from more acute lower respiratory infection due to smoke inhalation but also from chronic obstructive pulmonary disease, lung cancer, pulmonary tuberculosis, eye damage, and having low-birth-weight babies. Finally, women are more at risk of violence (rape, beating, and injuries), and girls often miss school to assist in wood collection and other food-processing-related chores, at the expense of furthering their education.

2.10.10. Women and Informal Employment

Women's informal employment comprises of 65 per cent of non-agricultural work in the Asia-Pacific (ILO 2002). Informal work includes workers in the unorganized or informal economy that include both employee and own account workers in non-agriculture and manufacturing employment.¹⁸ According to Kelkar and Nathan (2005), in South Asia, the informal workers have grown in both absolute and relative terms compared to the formal workers and this trend has a female face. There are about 50 million home-based workers in South Asia and 80 per cent of them are women (Doane 2007). In India, the unorganized sector accounts for about 90 per cent of female workers, including wage and piece rate workers and the self-employed (Doane 2007). However, the women moving out of home-based production, or self-employment to salaried wage work is low compared to Southeast Asia (Kelkar and Nathan 2005). Informal workers have been incorporated into the global commodity chains to reduce costs. Different types of

home-based work have developed, which reduce the cost of production by transferring part of the cost to the worker and economizing on the benefit accorded to formal economy workers. Home-based workers in Southeast and South Asia are not covered by social protection laws and classified as housewives in the censuses. They are assumed to be supplementary workers for the family. HNSA (2006) points out that while home based work allows women to carry the double burden, there is an income and social hierarchy among informal workers and home-based workers at the lowest rung. At the upper end of the hierarchy are those workers who are less vulnerable to shocks and have access to resources and market information, supplying high quality products. At the lower end, are workers with limited access to resources, market information, and technology with fewer direct linkages. It is difficult to categorize home-based workers along this hierarchical scale based on what they do. However, mostly isolated, rural self-employed workers comprise the bottom rung of the ladder.

2.10.11. Sanitation, Hygiene

Sanitation usually refers to the disposal of human excreta, but it may also involve wastewater and solid waste. Safe sanitation, better hygiene, and better access to potable water can greatly improve health and reduce health costs of families and nations. Diarrhea and acute respiratory infections are the two main causes of death of children. Hand washing can reduce the former by 40 percent, and research indicates that hand washing also prevents respiratory infections from spreading (Fung and Cairncross 2006; Shordt 2006). Other significant reductions in infections from improved sanitation, hygiene, and water supply include dracunculiasis, or guinea worm, disease (75–81 percent), schistosomiasis (59–87 percent), trachoma (up to 79 percent), and the worm loads from hookworm (26 percent) and ascariasis (60 percent) (Cairncross and Valdmanis 2006). Half of patients with HIV or AIDS get chronic diarrhea. Having access to a toilet, hygiene

promotion, and enough water for hygiene enables patients to stay healthy and productive longer and lowers the work burden and negative development impacts (such as reduced school attendance) for the caregivers (Kgalushi, Smits, and Eales 2004).

Good sanitation, hygiene, and water supply are also priorities for women and girls because of harassment and the risk of rape linked to open defecation and the collection of water and firewood and because of their challenges in observing menstrual hygiene. Finally, improvements can also reduce time and energy spent walking long distances, especially for women and girls. Women often use time gains for economic work in agriculture, food processing, education, and community development. Improvements provide girls more time for schooling, especially when separate toilets for girls are also available. The reductions in time and energy spent give women involved in agriculture and the informal sector more time for childcare, rest, and social relations. An improved water supply can further make it easier to use larger quantities of water, not only for domestic hygiene but also for domestic production: for example, vegetable gardening and food processing (usually by women), brick making (often by men), and animal raising (by both sexes, often with a gender division by animal type, type of work, and control over products and income). Higher levels of education and economic productivity are linked to improvements of women's status and gender relations (Verhagen and others 2004)

2.10.12. Nutrition and labour productivity

Women are generally considered vulnerable because of their energy and nutritional needs during pregnancy, lactation and menstruation as well as the impact of their nutritional status on their offspring. On the other hand, when they are not pregnant, lactating or menstruating their energy requirements are usually lower (typically 25 percent less) than those of men, although they require the same

amount or even more of many nutrients than men require (FAO, 2000). Poor female nutrition early in life reduces learning potential, increases reproductive and maternal health risks, and lowers productivity. This situation contributes to women's diminished ability to gain access to other assets later in life and undermines attempts to eliminate gender inequalities. In essence, women with poor nutrition are caught in a vicious circle of poverty and undernutrition. (FAO, 1992). Inequities in access to and control of assets have severe consequences for women's ability to provide food, care, and health and sanitation services to themselves, their husbands, and their children, especially their female children. Women with less influence or power within the household and community will be unable to guarantee fair food distribution within the household. These women will also have less ability to visit health clinics when their infants and children are sick and to spend time interacting with their infants and other children (World Bank.2001). Furthermore, malnutrition in women contributes significantly to growing rates of maternal deaths and is directly related to faltering nutritional status and growth retardation in children. Maternal malnutrition has been linked to low birth weight, which in turn results in high infant morbidity and mortality rates, adding to health care costs and undermining the human resource potential for an economy. It is also now clear that fetal malnutrition harms health status in later life, and in fact predisposes one to increased incidence of noncommunicable diseases. (Ruth & Mukudi, 2002) In addition, malnutrition in mothers put in danger the quality of care giving they can offer their children by reducing the meaningful mother-child interaction that is necessary for proper growth.

2.11. The Role of the NGOs to Promote livelihood security

NGOs have an important role to play in supporting the efforts of poor people to tackle the causes and effects of food insecurity. Throughout the 1980s alongside global and national policies for economy growth there has been an increasing

emphasis on the potential role of NGOs in rural food security at households' level (Sahley, 1997). A rapidly growing population of overseas aid resources is now flowing through indigenous NGOs in Africa a thriving and mature NGO sector is an important catalyst of self-reliant development activities but can also become a permanent sector in society that influences policy, empowers grassroots organizations, forges links with public and private debates. It can become a permanent sector in society actively striving to create the conditions conducive to more equitable forms of development (Sahley, 1997)

an increasingly important issue for NGOs active in food security is their relationship with government. One might expect the state's attitude to NGOs to be the mirror image of the NGOs opinion to the state. It might therefore be expected that those NGOs which remain apolitical attract little adverse attention from the state. Whereas NGOs that are politically critical of the state will face greater likelihood of repression (Fowler, 1990; Lehman, 1990) .Bratton (1989) Fowler (1988) conclude that the amount of space allowed to NGOs in any given country is determined first and foremost by political considerations rather than by calculations of the contribution of NGOs to economic and social development.

According to Ellis, (2000) livelihoods comprise of capabilities, material and social resources and activities required for a means of living which also takes into account the role played by policies and processes influencing the choice of livelihood strategies by the rural people. Banks and Hulme, (2012) say that NGOs play important roles in Impoverished rural communities with regards livelihood development. Thus, motivated by a desire for caring and development, NGOs establish and are involved in Interventions such as education, health, welfare, and sport economic empowerment and nutrition mainly focusing on vulnerable populations. NGOs have also been involved in pioneering new approaches to meeting needs and solving problems in underdeveloped societies. They have been

at the center of renewed searches for sustainable processes of social, political, economic and environmental development as well as acting on such issues as peace, democracy, gender equity and human rights among several others (Banks, 2012)

CHAPTER THREE RESEARCH METHODOLOGY

3.1. Introductions

This chapter presented the information about the area study, the conceptual model of the study and research methodology, which covered the sampling procedure and sample size, data types and sources and statistical techniques. Furthermore, the chapter highlighted the definition of concepts

3.2. Area of study

3. 2.1 Geographical Location

Sennar State is a central state Located between latitudes (11-14) degrees north and longitudes (32 - 36) degrees east bordered on the north by the Gazeira State and south Blue Nile State and east of Gedaref and the Sudanese border of Ethiopia while bordering the West in the state of White Nile and South Sudan. The total area of the State is 40608 km², this is estimated to be about 9.7 million feddan approximately, and this comprise is 2.7% of the total area of the country.

Ministry of Agriculture and Animal Wealth (2003).

3. 2.2. Administrative Structure

According to federal organization the State consists of three provinces (recently moatamadies or counties) namely, Singa, Sennar and Dinnder. Those provinces consist of 21 localities.

Table 3.1 the administrative structure of sennar state

Provinces	No. of Localities	No. of Village	area/square kilometer	Population
Senga	7	143	1800	316083
Sennar	7	429	1800	660054
Dinder	7	247	1468	368628
Total	21	819	5,068	1,344,765

3.2.3. Population

According to 2008 census the population of Sennar State was 1,550,593 capita. number of males: 777,002 number of females 773,591 Population density 33.63 km² person Demographics of the state (men / women): (49% men / 51% women). Average number of family members: 5.7 . Annual rate of population growth 2.32% Report of the State of Sennar 2015)

3. 2.4. Climate

The continental climate is prevailing in Sennar State with its two main seasons, the dry summer, and the wet autumn. The northern part of the State lies in the poor savanna (low rainfall savanna), where the rainfall varies between 300 m-500 m while the southern parts lay in the rich savanna region (high rainfall savanna) and the rainfall average reach up to 650 mm. The rainy season extends from June to October.

The temperature varies between 35-40 ° C during summer, and between 20-25° C during winter. The prevailing wind from October to April, is the north and northeast dry wind with an average degree of humidity between 15-20% while in the period May-September, the prevailing wind is the southwest wind and the relative humidity ranges between 75 to 80%

3. 2.5. Soil and Topography

The state is a flat and semi-flat plain that slightly descend to the north and represent an extension of the middle mud plains. The state surface is divided into six physiographic units with different soil characteristics: The flood plain: adjacent to the Nile and green soil with good physical and chemical properties. - Slope land: with light soils. It is the low areas that are flooded every year with solid soil. The muddy plain covers most parts of the state, and its soil is cracked mud. The clay content is about 70%. The alkaline reaction is dominated by calcium and

magnesium and is characterized by high capacitance. - Metamorphic soil: from rocks and represented by the plains below the mountains, which is a natural product of weathering, washing and sedimentation. There are some scattered mountains in the western parts of the state, such as Jabal Muwa, Sakadi, Kirdous, Abu Qardud, Tuzi, Buzi, Dali and al-Muzammum, as well as many valleys, trenches, highlands and very few dune dunes.

3. 2.6 Water Resources

The study area has different sources of river water namely.

The Blue Nile: its tributaries are the main source of State its annual revenue is 50 billion cubic meters it's the main major source of irrigation for the Gazira, Rahad and agriculture pump schemes, it also represents a source of drinking water for humans and animals as well as the generation of electric power in the Sennar reservoir.

River Dinder is a seasonal river that takes place during the period of rainfall between July and September of each year and has an average annual revenue of about 3 billion cubic meters during the flood, and is used to drink human and animal and horticultural activities and meet the Blue Nile in the area of Priyab

Al Rahad river is a seasonal river that can be used for irrigation projects in the state.

3. 2.7. Agricultural crops

The most important agricultural crops in the state are cotton, gum arabic, sunflower, sesame, mango, guava, banana, corn, soybeans and sugar cane, which is the state's sugar industry. The irrigated projects include the Sokki agricultural project, the Blue Nile projects (formerly Al-Barir, Shashina, Dasilman, Al-Sima, Kassab project, Al-Khubair project), Agricultural projects that rely on irrigation on rain and the most important crops are corn and sesame and find the most important projects in the regions of Dali and Almtzum.

3. 2.8. Roads and bridges

in the state are a good network of paved roads linking the important production areas in the main cities of the state and the national roads linking the state to the federal capital, the main port of the country and the river port of Kosti, Nile White State, the White city of North Kordofan state and the state of Blue Nile state of Damar.

There are many paved roads linking the parts of the state with their different notes to facilitate the flow of transport during the autumn months, such as the road of Sennar and al-Abbas and the road of Sinja Aldender. As for the bridges there are two bridges on the Blue Nile, namely: - Bridge Sennar Reservoir is designed for the movement of caravans, cars and livestock and to link the western and eastern parts of the state. - The bridge of the city of Sinja is the latest and was designed to fit the specifications of the flow of greater traffic of cars and livestock. In addition to the presence of a lot of crossings and bridges on the seasonal rivers and coves. It should be noted here that studies have been completed for the construction of a high-pressure line to reduce pressure.

on the reservoir bridge.

3. 2.9. Post-harvest management

Area under horticulture in Sennar State is about 56,500 feddans located mostly near the riverbanks and along the khors. Crops grown include vegetables (okra, onions, and tomatoes) and fruits (banana, mango, and guava). Farmers practice a tree-pricing regime⁵, under which the price received by the farmer is very low in comparison to the retail price⁶. About 80% of fruit production is marketed in Khartoum and the remaining 20% is exported to Jordan, Lebanon, and Syria. Vegetables are sold mainly at local markets, Khartoum included. According to the

Ministry of Agriculture, post-harvest losses vary from 25% for guava to 40% for mango, tomatoes, and between 10% and 20% for cereals. IFAD,2010

3. 2.10. local markets

The main local markets for sale of grains, vegetables and livestock are the central markets in Sinja (capital city of Sinnar State), Sinnar, Dinder, Dali and Mazmoum and the rural markets in Azaza, Jaberki and Abuhashim in Dinder locality and Abuareif and Elgarabein in Dali&Mazmoum locality. All these markets lack suitable structures for the sale of commodities, thus leading to an approximate loss of 15% of goods. Community access to these markets is blocked during the rainy season due to the impassability of the khors. Transportation costs are multiplied by threefold, and the price of vegetable commodities can increase by up to 150% IFAD,2010

3. 2.11. Livestock husbandry.

Sennar State accommodates around 6.5 million heads of animals. Livestock is the main source of livelihood as it provides food, income and constitutes a coping mechanism in case of crop failure. Livestock tax revenues constitute the main source of funding for recurrent expenditures of localities (salaries and operational costs) indicating the importance of livestock at household and locality level. Nonetheless, this vital subsector faces critical challenges; the pastoralists are currently losing access to grazing resources as a result of continuous encroachment of mechanized farming on grazing lands and stock routes. Crop stubble used to be freely grazed by pastoralists' livestock. It is now sold for 4,000 SDG/scheme of 1000 feddans. Haffirs were previously used by pastoralists as a major water source for humans and animals, particularly those located in the stock routes. They are now incorporated within the large mechanized agricultural schemes thus excluding pastoralists from accessing them. The same applies to forests that provided an important source of green forage for pastoralists' livestock during periods of

drought and are now destroyed. These problems continue also in the rainy season when animals have to be kept away from cultivated areas as very limited grazing land is available in the rainy season. IFAD,2010

3. 2.12. Employment opportunities

According to UNDP,2010) The main sectors for employment opportunities in Sennar state is agriculture and livestock especially in the new sugar schemes that the state is planning to be established.

The most potential employment opportunities providers with possible job opportunities lie within cooperative committees, small business work and partnership working groups. The most potential job placement opportunities for ex-combatants in Sennar state is the agriculture sector.and livestock while the opportunities for women entrepreneurship in the State is weak.

Main obstacles to employment creation are:

- Funding availability.
- Limitation of resources.
- Lack of skills and experience.

3. 2.13. Health Sector

Health Official data estimate that maternal mortality rate (MMR) in Sennar state is at 325 deaths per 100,000 live births. The main causes of mortality are bleeding, complication, early marriage and high frequency of pregnancy number of trained midwives in the state is 603

The rate of FGM in the state is 79% UNDP, 2010.

3.3. The Conceptual Model of the Study

Conceptual model was employed in this study is the sustainable livelihoods framework. (SLA). The livelihoods framework is a way of understanding how households derive their livelihoods by drawing on capabilities and assets to develop livelihood strategies composed of a range of activities.

according to. (IFAD, FAO, World Bank, 2009).

The livelihoods framework has emerged from rural development debates as a conceptual approach to understanding and analyzing how rural households depend for their security not only on agriculture, but also on a diversity of other natural resources. (See figure 3.1

3.4. Sampling Procedure and Sample Size

This study was conducted to cover Sennar locality. The survey was conducted in four villages, two of them from West Sennar, namely: the village of Al-Kila and the village of Jabal Al-Kabashi, and the other from the east of Sennar represented in the village of Abu Jaili and Hillat Al-Shariq. The size of the population in each village was about 1500. Therefore, a sample size of 50 was taken from each village and divided by the total population in each village, and a sample of 30 households was taken from each village using the stratified random sampling. techniques. Thus, the total sample size was 120 rural households headed by women.

$(1500/50 \times 4 = 120)$

3.5. Target population

The research community is represented in the women who support families and consists of the divorced woman, the widow, the single and married woman who was left by her husband and she assumed the responsibility of the family

3.6. Data Types and Sources

Primary data were collected using a structured interview questionnaire. Secondary data was collected from both published and unpublished documents from governmental and non-governmental organizations

3.7. Method of Data Analysis

The primary data were analyzed using the electronic Statistical Package for the Social Sciences (SPSS) Version 26.0 was used with the following techniques: descriptive statistics methods to describe the characters of the sample

To achieve the objectives of the study, tabulation, and cross-tabulation of responses on different criteria were done. The test of hypotheses on the other hand was done through the use of relevant statistical tests such as chi-square and correlation coefficient

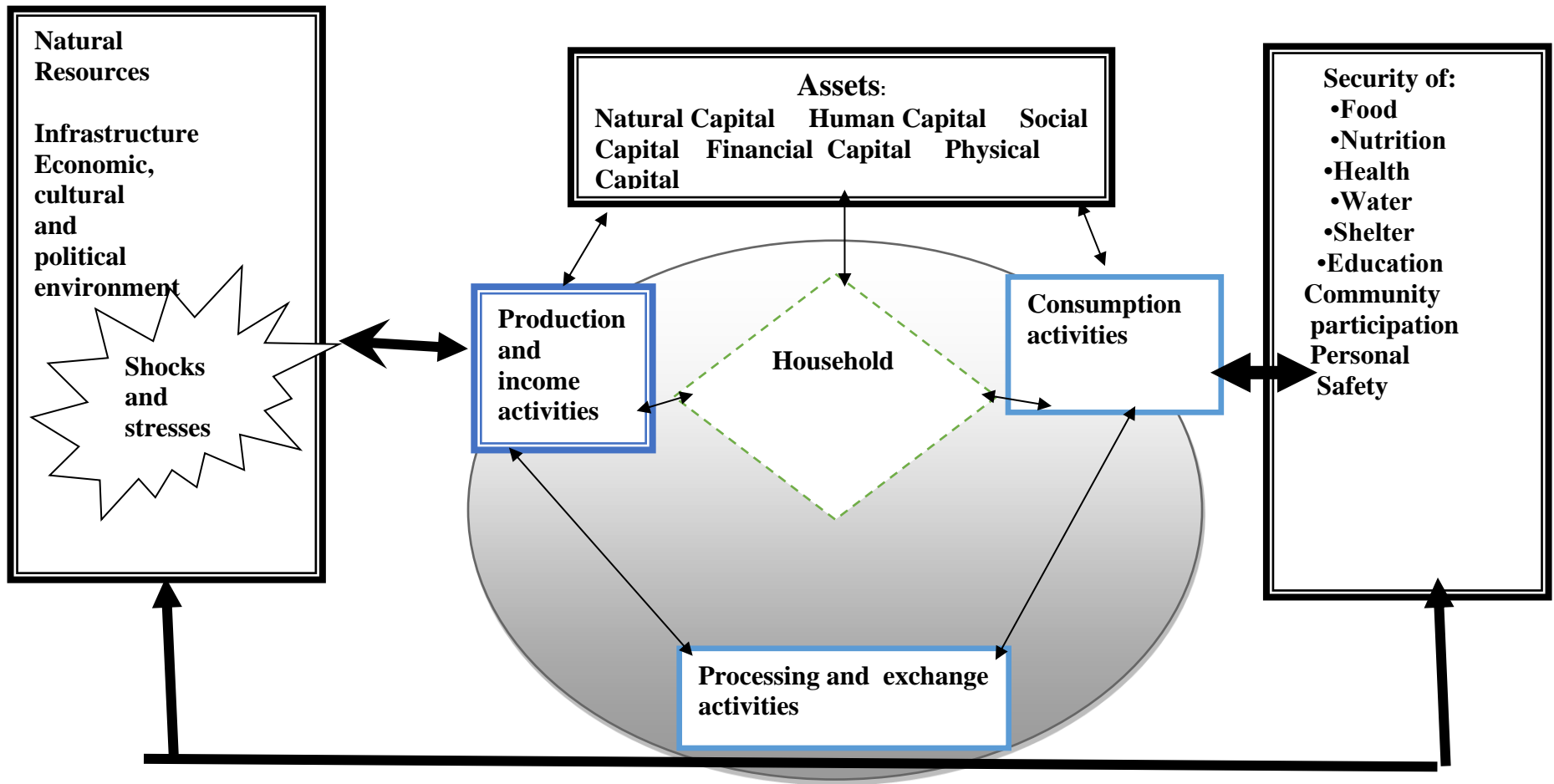


Fig. 3.1: The conceptual model The CARE livelihoods framework

3.8. Definition of Concepts

Below are definitions of concepts that were explored to achieve the objectives of this study.

3. 8.1. Income Diversification

refers to the sources of household income from agricultural and non-agricultural activities

3. 8.2. Household size

refers to number of household members residing in the household.

3. 8. 3. Age of the household head

defined as the chronological age of the respondents.

3. 8.4. level of education of household head

Education refers to the level of formal education reached by the household head. It's divided into five categorized: illiterate, primary, intermediate, secondary and graduate

3. 8.5. Socio-Economic Status

It refers to the status of the head of the family in the local community and identifies various social and economic variables such as land ownership, the profession of the head of the family and marital status

3. 8. 6 Access to infrastructure

This refers to access to basic facilities to improve lives of people. It includes transportation, market, electricity, agricultural water supply and supply of drinking water

3. 8.7. level of food security

refers to the household food security status. It includes four levels namely food security, mildly food secure, moderate food insecurity, and severe food insecurity

3. 8.8. Health Security

Health security is measured using indicators of malnutrition among children and death during childbirth

3. 8.9. Shelter and Sanitation Security

Shelter and sanitation security is measured using indicators of housing condition and sanitation of water sources and toilet facilities

3. 8.10. Education Security

Education security is measured using indicators of family members' completion of the basic stages of education

3. 8. 11. Vulnerability context

Vulnerability refers to the external environment in which people pursue their livelihoods and their exposure (risk) to the negative effects of the external environment, as well as external shocks and trends of seasonality.

3. 8.12. Livelihood assets

refer to resources and assets that access by households

These different forms of asset holdings have been categorized as

3. 8.13. Human capital

education, skills, knowledge, health, nutrition; these are embodied in the labor of individuals.

3. 8.14. Natural capital

refers to access to land, water, and wildlife

3. 8.15. Social capital

refers to membership in organizations and groups, social and professional networks.

3. 8.16. Physical capital

refers to houses, vehicles, equipment, and livestock.

3. 8.17. Financial capital: refers savings and access to credit

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1. Demographic Characteristics of Respondent

Five demographic variables are included in this study. The results in table represent distribution of sample individuals according to demographic variables.

Table 4.1 distribution of respondents according to age group

Age group	Frequency	ercent %
18-30	12	10%
31-45	72	60%
above 45	36	30%
Total	120	100%

Source: Survey data, 2019

4.1.1 Age of household head

It is clear from the data presented in table 4.1 that the age of the household head was grouped into three age brackets: 18-30 years were 10%, 31-45 were 60%, above 45 were 30%. Descriptive analysis showed that a majority of households within the 31-45 age group engage in other economic activities

Table 4.2: distribution of respondents according to level of education

Education	Frequency	Percent %
Illiterate	33	27.5%
Primary	39	32.5%
Intermediate	9	7.5%
Secondary	32	26.7%
Graduate	7	5.8%
Total	120	100%

Source: Survey data, 2019

4.1.2. Education Level

Education is an important element of societal development and for that matter educational level is considered as an important index for human development. In table 4.2 the percentage of household heads without formal education was higher 27.5%. Most of them had only attended primary and secondary education. While only few received high education

Table 4.3: distribution of respondents according to marital status

Categories	Frequency	Percent %
Married	49	40.8%
Single	20	16.7%
Widow	37	30.8%
Divorce	14	11.7%
Total	120	100.0%

Source: Survey data, 2019

4.1.3. Marital Status

the result on marital status as indicated in table 4.3 shows that majority 40.8%) of the respondents were married and 16.7% were not married Or single, 30.8% were widow and 11.7% separated or divorced.

Table 4.4: distribution of respondents according to family size

Categories	Frequency	Percent %
2-5	11	9.2%
6-9	108	90.0%
above 9	1	0.8%
Total	120	100.0%

Source: Survey data, 2019

4.1.4. Family Size

table (4.4) shows that 9.2% of the sample have family Size (2-5), 90% of the sample (6-9), and 0.8% of the sample (above 9). The result shows that most of the sample have more than 5 of family Size, with percent of 90.8%.

able 4.5: distribution of respondents according to employment status

Categories	Frequency	Percent %
Farmer	62	51.7%
Salaried regular work	4	3.3%
seasonal function	9	7.5%
Free Work	45	37.5%
Total	120	100.0%

Source: Survey data, 2019

4.1.5. Employment Status

The result on employment status as indicated in table 4.5 shows that majority (51.7%) of the respondents were farmer and 37.5% were have free work. Only few of the respondents have salaried regular and seasonal function. Therefore, it can be said that the majority of women in the study area occupy the agricultural profession because rural women are more interested in agricultural activities

Table 4.6: distribution of respondents according to access to land

Access to Land	Frequency	Percent %
Yes	109	90.8%
No	11	9.2%
Total	120	100.0%

Source: Survey data, 2019

4.2. Access to Land

From Table 4.6, a majority of the respondents have access to land 90.8% while view of them have not access to land 9.2%the reason of that the majority of women in rural areas are farmers

Table 4.7: distribution of respondents according to type of land and crop

Land tenure type	Freq.	%
Freehold land	63	52.5
Rented land	5	4.2
Partnership	43	35.8
Total	111	92.5
Crop type		
Dura	58	48.3
dura and sesame	12	10.0
millet and sesame	7	5.8
vegetable	1	.8
Dura and Millet	24	20.0
Dura and Cotton and sesame	9	7.5
Total	111	92.5

Source: Survey data, 2019

4.3. Type of land and Crop

The result on type of land and crop as indicated in table 4.7 show that most of respondents were found to be using land possessed by husbands and relatives (freehold) 52.5%. Some of them were operating Partnership 35.8. Also, the result show that majority of respondents produced Dura 48.3% and only 20% of them produced dura and millet

Table 4.8: distribution of respondents according to Problems Facing Agricultural production

the problems facing agricultural production	Frequency	Percent %
bad climatic conditions	3	2.5%
No production incentives	47	39.2%
increased taxes	39	32.5%
lack of experience in agriculture	1	0.8%
Low prices in previous seasons	30	25%
Total	120	100.0%

Source: Survey data, 2019

4.4. Problems Facing Agricultural production

It is clear from the data presented in table 4.8 that the majority of respondents facing several problem present of No production incentives 39.2% , increased taxes 32.5% and Low prices in previous seasons 25%

Table 4.9: distribution of respondents according to main purpose of cropping activities

the main purpose of this engagement in cropping activities	Frequency	Percent %
Main source of food	60	50.0%
Extra source of food	29	24.2%
Main source of income	9	7.5%
Extra source of income	22	18.3%
Total	120	100.0%

Source: Survey data, 2019

4.5. The main purpose of engagement in cropping activities

The table 4.9 shows that majority of the respondents indicate that the cropping activities is main source of food 50%, and 24.2% of them indicate is extra source of food while few of them mention that is main source of income. The reason of these results because the most of household in rural area depended on agricultural.

Table 4.10: distribution of respondents according to access to livestock

Access to livestock	Frequency	Percent %
Yes	102	85%
No	18	15.0%
Total	120	100.0%

Source: Survey data, 2019

4.6. Access to livestock

The major source of livelihood amongst household is livestock production. Most respondents have access to different type of livestock 85% confirmed that even though livestock is their main economic activity

Table 4.11: distribution of respondents according to type of livestock

Type of Live Stock	Frequency	Percent %
Sheep	22	21.6%
Goats	7	6.9%
Cows	7	6.9%
Sheep and Cow	29	28.4%
Poultry	27	26.5%
Sheep and Goats and Cow	10	9.8%
Total	102	100.0%

Source: Survey data, 2019

4.7. Type of livestock

Rural household mainly keep cattle, goats, sheep, and cows Table 4.11 shows Majority of respondents keep sheep and cow 28.4%, and poultry 26.5%, while few of them keep goat 6.9%.

Table 4.12: distribution of respondents according to purpose of engaging in livestock activities

the main purpose of this engaging in livestock activities	Frequency	Percent %
Main source of food	20	16.7%
Extra source of food	73	60.8%
Main source of income	4	3.3%
Extra source of income	23	19.2%
Total	120	100.0%

Source: Survey data, 2019

4.8. Purpose of engaging in livestock activities

Majority rural household keep livestock for milk production. This is because they are well adapted to the harsh environment and are easily sold to raise income for food purchases. Table 4.12: show that most of the respondents reported that the main purpose of livestock is extra source of food 60.8%, and extra source of income 19.2%. but few of them Saied that is main source of income 3.3%.

Table 4.13: distribution of respondents according to access to non-agricultural income

Non-agricultural wage income	Frequency	Percent %
Yes	102	85.0%
No	18	15.0%
Total	120	100.0%

Source: Survey data, 2019

4.9. Access to non-agricultural wage income.

The non-agricultural or off farm activities are important activities in rural area most rural household depend on it on livelihood. Table 4.13 show majority respondents participate in non-agricultural activities 85%

Table 4.14: distribution of respondents according to type of non-agricultural income

the type of activity	Frequency	Percent %
Handicrafts	16	15.7%
Washing clothes	17	16.7%
Trade	45	44.1%
Formal employment	8	7.8%
Selling Tea	12	11.8%
Selling Food and Tea	3	2.9%
Other	1	0.9%
Total	102	100.0%

Source: Survey data, 2019

4.10. Type of non-agricultural activities

From table 4.14 the results reveal that 44.1%, 16.7% and 15.7% of the households reported participating in trade, cloth washing and handicraft activity, respectively. While few of them selling tea and food 2.9% .

Table 4.15: distribution of respondents according to non-agricultural wage income per month

Non-agricultural wage income per month	Frequency	Percent %
Poor	48	40%
Average	35	29.2%
Good	17	14.2%
Very Good	1	0.8%
Excellent	1	0.8%
Total	102	100.0%

Source: Survey data, 2019

4.11. Non-agricultural wage income per month

Table 4.15. show that the income from activities per month 40% of respondents their income are poor and 28.2% their income are average whilst 14.2% are good

Table 4.16: distribution of respondents according to problem affect income

Problem Facing at work and affected your income	Frequency	Percent %
Disasters like a flood	8	6.7%
price fluctuations	77	64.2%
Policies	9	7.5%
the disease	22	21.7%
Total	120	100.0%

Source: Survey data, 2019

4.12. Problem Facing at work and affected your income

The problems commonly cited by the respondents as affected their income are price fluctuation, the disease, disaster like floods and policies as show in table 4.16. The low-income status of women limits their livelihood opportunities

Table 4.17: distribution of respondents according to access to training

Access to training	Freq.	%
Yes	40	33.3%
No	80	66.7%
Total	120	100.0%
provided the training		
Government	28	23.3%
Organization	10	8.3%
Association	2	1.7%
Total	40	100.0%

Source: Survey data, 2019

4.13. Access to training

Empowering women is key to achieving food security. This is done through training women and providing them with skills. Table 4.17, 66.7% of the respondents do not receive training. The table also shows that the majority of respondents indicated that most of the training provided by the government.

Table 4.18: distribution of respondents according to type of training

training type	Too much		Many		Few		No	
	Frequency	%	frequency	%	Frequency	%	Frequency	%
1/ Literacy	0	0	6	5%	26	21.7%	88	73.3%
2/Manual work	8	6.7%	6	5%	23	19.2%	83	69.2%
3/ Small industries	0	0	0	0	20	16.7%	100	83.3%
4/animal husbandry	0	0	0	0	21	17.5%	99	82.5%
5/ first aid	0	0	1	0.8	0	0	119	99.2%
6/marketing	0	0	0	0	0	0	120	100%

Source: Survey data, 2019

4.14. Type of training

It is evident in table 4.18 that the majority of respondents have no take too much training on literacy. Manual work, small industries, animal husbandry, first aid and marketing, however few respondents said they have few accesses, while a small group said they have many accesses to these type of training

Table 4.19: distribution of respondents according to health condition

Cases of illness			death during childbirth		malnutrition among children	
	Freq	%	Freq	%	Freq	%
Yes	67	55.8%	71	59.2%	88	73.3%
No	53	44.2%	49	40.8%	32	26.7%
Total	120	100.0%	120	100.0%	120	100.0%

Source: Survey data, 2019

4.15. Health condition

Health security is measured using indicators of family illness episodes, death during childbirth, and malnutrition among children. According to table 4.19: the respondents reporting that 73.3%, 59.2% and 55.8% from malnutrition among children, death during childbirth and cases of illness respectively

Table 4. 20: distribution of respondents according to complete the basic stages of education

family members unable to complete the basic stages of education	Frequency	Percent %
Yes	100	83.3%
No	20	16.7%
Total	120	100.0%

Source: Survey data, 2019

4.16. Access to education

In rural areas number of schools are insufficient and existing school do not full fill the needs of rural females. Table 4.20 show that most of respondents indicate 83.3% from family members unable to complete the basic stages of education

Table 4.21: distribution of respondents according to difficult to get school or hospital

Reason for difficult to get school or hospital	Frequency	Percent %
for distance	49	67.1%
for lack of money	24	32.9%
Total	73	100.0%

Source: Survey data, 2019

4.17. Reason for difficult to get school or hospital

From the study, most areas of rural do not have adequate social services like schools, hospitals. Majority walk very long distances to access these services.

Table 4.21 show that 67.1% of respondents indicate the reason for difficult to get school or hospital for long distance while 32.9% said for lack of money

Table 4.22: distribution of respondents according to material used for the roof and walls

material used for the roof and walls	Frequency	Percent %
Block and cement	66	55%
iron and zinc	9	7.5%
thatch and mud	45	37.5%
Total	120	100.0%

Source: Survey data, 2019

4.18. Material used for the roof and walls

Table 4.22 show that most respondents use for the roof ad walls block and cement 55% and 37.5% use mud whilst 7.5% use zinc

Table 4.23: distribution of respondents according to type of sanitation and toilet

Type of sanitation			Type of toilet		
	Freq	%		Freq	%
Traditional	88	73.3%		90	75%
Improve	32	26.7%		30	25 %
Total	120	100.0%		120	100.0%

Source: Survey data, 2019

4.19. Type of toilet and sanitation

Good sanitation, hygiene, and water supply are also priorities for women and girls because of harassment and the risk of rape linked to open defecation and the collection of water and firewood and because of their challenges in observing menstrual hygiene. Table 4.23. result that 73.3% and 75% of respondents indicate that their sanitation and toilet are traditional

Table 4.24: distribution of respondents according to access to assets

Access to Assets	Yes		No	
	Frequency	%	Frequency	%
1/cell phone	90	75%	30	25%
2/Radio	93	77.5%	27	22.5%
3/Television	86	71.7%	34	28.3%
4/personal computer	2	1.7%	118	98.3%
5/Water tank	75	62.5%	45	%
6/Refrigerator / Freezer	38	31.7	82	68.3%
7/car	36	30%	84	70%
8/hoe and cutlass	103	85.8%	17	14.2%

Source: Survey data, 2019

4.20. Access to assets

value of economic assets is used as proxy to measure the wealth or poverty level of households (Geda et al., 2001; Fofack, 2002). The asset base of households in the study area is shown in table 4.24, a majority of the respondents have access to manual farm tools such as cutlass and hoe (85.8%). The reason was that these tools are used by households for their daily farming activities. Electrical gadget and appliances which can be classified as communication and entertainment tools such as television, radio, mobile phone, computer, and other devices like refrigerator have low percentage in the study area. Apart from mobile phone and radio which have high percentage of 77.5% and 75% respectively, percentage in the rest of the electrical appliances; television (71.7%) was above average whilst that of refrigerator (31.7%) and computer (1.7%) were below average. However, the low percentage of the usage of electrical appliances may be due to the lack of interest and money

Table 4.25: distribution of respondents according to the level of rural households' satisfaction with amenities

Status level Infrastructure type	Very hard		Hard		Easy		very easy	
	Frequency	%	Frequency	%	frequency	%	Frequency	%
1/Transportation	61	50.8%	32	26.7%	27	22.5%	0	0
2/market	32	26.7%	58	48.3%	30	25%	0	0
3/ electricity	58	48.3%	61	50.8%	1	0.85	0	0
4/ Agricultural water supply	11	9.2%	61	50.8%	48	40%	0	0
5/ supply of drinking water	45	37.5%	31	25.85	41	34.2%	3	2.5%

Source: Survey data, 2019

4.21. Access to infrastructure

Infrastructure within rural communities, is constrained by the lack of good roads, access to electricity, sanitation, health care services water infrastructure and productive assets. The table show that majority of respondents interviewed (50.8%) mentioned that their access to transportation is very hard and 26.7%, 22.5% indicated that their access is hard and easy respectively. Also, the table illustrates 48.3% of respondents said that their access to market is hard and 26.7% they said very hard whilst that of electricity 50.8% and 48.3% is very hard and hard. As for drinking water and agricultural water, most of respondents mentioned that it is almost easy to obtain them.

Table 4.26: distribution of respondents according to membership of co-operative household members, belong to any agricultural cooperative

household members, belong to any agricultural cooperative	Frequency	Percent %
No	73	60.8%
Yes	47	39.2%
Total	120	100.0%

Source: Survey data, 2019

4.22. Membership of Co-operative group

Membership in an association is an avenue for the acquisition and dissemination of information. It also provides opportunity for farmers to acquire loans and credit facilities from financial institutions such as banks, savings and loans, and microfinance companies. In Table 4.26, most of the respondents (60.8%) did not belong to any co-operative or farmer-based organization (FBO) whilst only 39.2% belonged to co-operative group

Table 4.27: distribution of respondents according to use any source of information

use any source of information	Frequency	Percent %
Yes	113	94.2%
No	7	5.8%
Total	120	100.0%

Source: Survey data, 2019

4.23. Use any source of information

The source of information is very useful for rural households because it promotes them to improve their food security. n Table 4.27. As shown, majority of the households (94.2%) use source of information whilst only 5.8% did not use any source of information

Table 4.28: distribution of respondents according to source of the information

Source of information	Frequency	Percent %
radio, TV	53	44.2%
The Internet	3	2.5%
Associations	57	47.5%
Phone	0	0%
Total	113	100.0%

Source: Survey data, 2019

4.24. The source of the information

In the study area there are common source of information like radio, television, phone, internet and local associations. From Table 4.28, the result indicated that most of respondents use their information from local associations 47.5%, and 44.2% from radio and television whilst only 2.5% use the internet

Table 4.29: distribution of respondents according to access to credit

Access to credit	Frequency	Percent %
Yes	73	60.8%
No	47	39.2%
Total	120	100.0%

Source: Survey data, 2019

4.25. Access to credit

Difficulty in accessing credit is considered as one of the major challenges facing households especially those engaged in farming. Access to credit has a positive impact on food security status of households as credit can serve as a consumption smoothing mechanism that household could use to supplement household income to purchase food. From Table 4.29 the result indicated that 60.8% of the respondents have access to credit whilst only 39.2% did not have access to credit

Table 4.30: distribution of respondents according to kind of credit

type of saving	Frequency	Percent %
formal	30	41.1%
informal	43	58.9%
Total	73	100.0%

Source: Survey data, 2019

4.26. kind of credit

It is clear from the data presented in table 4.30 that most of the respondents, 58.9%, prefer informal sources because there are easy to access. But Few of respondents prefer formal sources 41.1%

Table 4.31: distribution of respondents according to the purpose of credit

the purpose of the loan	Frequency	Percent %
Personal borrowing for household consumption	14	19.2%
Farming	50	68.5
Other livelihood activity	9	12.3%
Total	73	100.0%

Source: Survey data, 2019

4.27. The purpose of credit

Production credit is either cash or in-kind credit obtained for the purpose of augmenting farm input while consumption credit is used to supplement household income. As presents in table 4.31 majority of respondents 68.5% said the purpose of credit for farming and 19.2% mentioned for household consumption whilst 12.3% of the respondents reported that for other livelihood activities

Table 4.32: distribution of respondents according to reason for haven't any credit

the reason	Frequency	Percent %
I could not secure the required collateral	20	42.6%
I have my own funds	1	2.1%
It isn't accessible	26	55.3%
Total	47	100.0%

Source: Survey data, 2019

4.28. The reason for haven't any form of credit

Obtaining official financing is one of the challenges that a domestic family faces. As show in table 4.32 most respondents 55.3% they not accessible to formal credit, and 42.6% of respondents mentioned they could not secure the required collateral. Whilst 2.1% of respondents said they have own funds.

Table 4.33: distribution of respondents according to necessary needs

the needs that improve food and livelihood security	Frequency	Percent %
Improve the education	9	7.5%
own assets	16	13.35%
Providing job opportunities	6	5%
Health Care	16	13.3%
Improve the Education and Health	73	60.85%
Total	120	100.0%

Source: Survey data, 2019

4.29. Necessary needs that improve the food and livelihood security

The majority of poor rural people are what we may call peasants, or their livelihoods have many of the characteristics of peasants' livelihoods. These people engage in part-time farming activities with a mode of agricultural production distinct from that of other farms (such as commercial, smallholder family or co-operative farms) with multiple economic activities which are predominantly in small scale (often household) activities and enterprises in the informal economy. As show in table 4.33 majority of respondents 60.85% mentioned that their necessary needs improve the education and health, and 13.35% of them said they want to own assets. Whilst 13.3% and 5% of respondents their needs health car and providing job opportunities respectively.

Table 4.34: distribution of respondents according to organization working to improve food security

organizations working to improve food security	Frequency	Percent %
Yes	41	34.2%
No	79	65.8%
Total	120	100.0%

Source: Survey data, 2019

4.30. Organizations working to improve food security

The food security issue is being highly controlled by the government, yet the government does not have adequate resources. Therefore, the government needs to work in partnership with Non-Governmental Organizations (NGOs) or monitor their work in order to ensure that food security is restored. Table 4.34 show that majority of respondents 65.8% mentioned no organization working in their area and 34.2% of them said there are organizations working in the field of food security.

Table 4.35: distribution of respondents according to type of intervention working to improve food security

type of intervinsion	Frequency	Percent %
Governmental	9	22%
NGOS	18	43.9%
private sector	14	34.1%
Total	41	100.0%

Source: Survey data, 2019

4.31. Type of intervention working to improve the food security

The 1980s and 1990s have seen an increase in the number of NGOs active in relief and development. The rise of NGOs on the international scene is an important phenomenon which has implications for the development prospect for the poor marginalized rural households. As show in table 4.35 majority of respondents 43.9% mentioned that the intervention work in their area is NGO and 34.1% is private sector whilst 22% is government

Table 4.36: distribution of respondents according to level of food security

Food security level	Frequency	Percent %
Food Secure	33	27.5%
Mildly Food secure	49	40.8%
Moderately Food Insecure	27	22.5%
Severely Food Insecure	11	9.2%
Total	120	100.0%

Source: Survey data, 2019

4.32. Level of food security

The Household Food Insecurity Access Scale (HFIAS) was used to measure food security. There are four repeat questions for participants whose scores were 'never', 'sometimes' and 'often' with scores of 1, 2, 3, and 4 respectively. According to the scheme recommended by the HFIAS Index Guide, the continuous score was divided into four categories, namely food security, Mildly Food secure, moderate food insecurity, and severe food insecurity (Knueppel et al., 2009)

Table 4.36. show that about 27.5% of the households were classified as food secure 40.8% as mildly food secure, 22.5% as moderately food insecure and 9.2% as severely food insecure.

Household Food Insecurity Access Scale questions

HFIAS questions	No		Rarely		Sometimes		Often		HFIAS SCOR
	N	%	N	%	N	%	N	%	
Worry about food	33	27.5%							1
Unable to eat preferred foods			49	40.8%					2
Eat a smaller meal					27	22.5%			3
No food of any kind in a household							11	9.2%	4

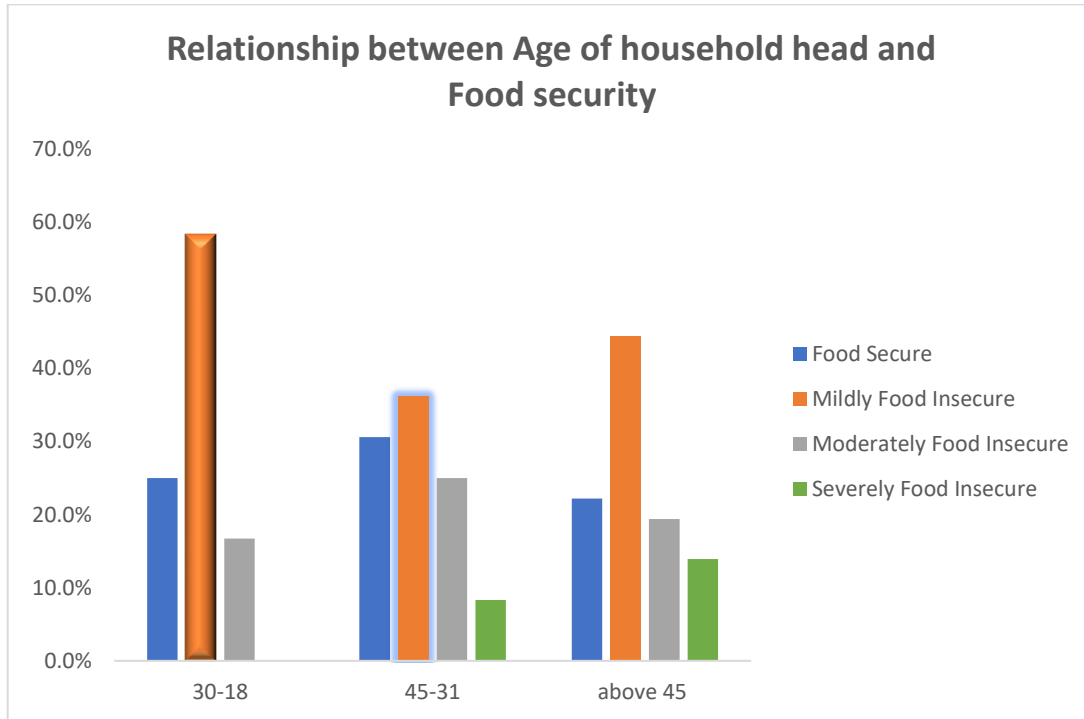
4.33. Household food security and demographic variables

The purpose of this subsection is to examine the relationship between socio-economic variables of households and level of household food security. These variables include age, household size, marital status, education, and employment

Table 4.37: Relationship between Age of household head and Food security

Age group * level of food security Cross tabulation							
			level of food security				Total
			Food Secure	Mildly Food Insecure	Moderately Food Insecure	Severely Food Insecure	
Age group	18-30	Count	3	7	2	0	12
		% within Age group	25.0%	58.3%	16.7%	.0%	100.0%
	31-45	Count	22	26	18	6	72
		% within Age group	30.6%	36.1%	25.0%	8.3%	100.0%
	above 45	Count	8	16	7	5	36
		% within Age group	22.2%	44.4%	19.4%	13.9%	100.0%
Total		Count	33	49	27	11	120
		% within Age group	27.5%	40.8%	22.5%	9.2%	100.0%

Source: Survey data, 2019



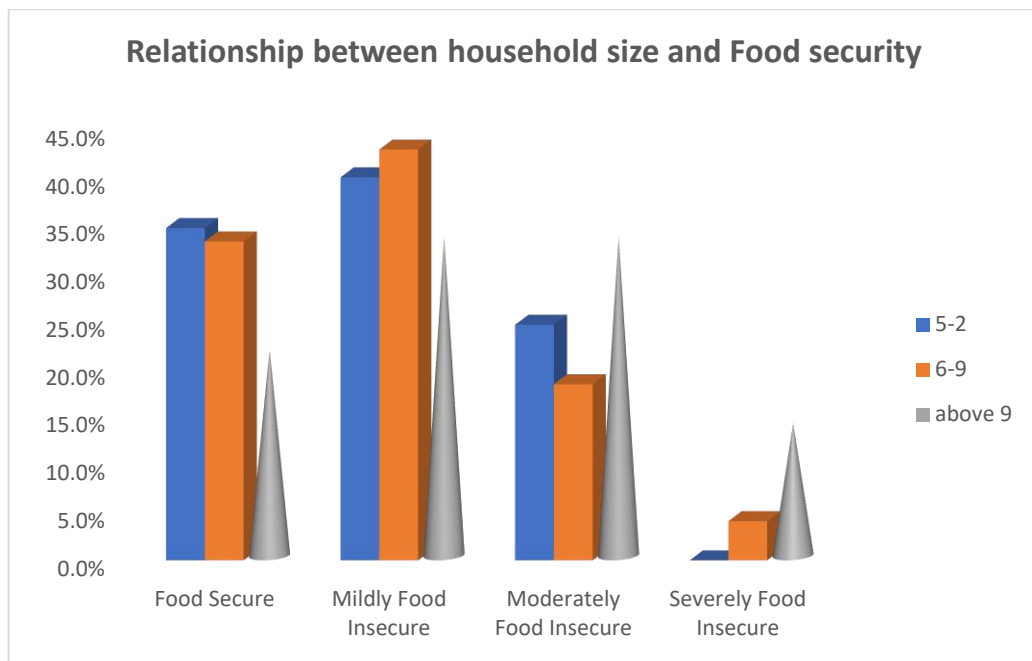
4.33.1. Age of the household head

Table 4.37 indicates the condition of food insecurity varies with age. The food security category showed that the level of food security increases with an increase in age 18- 30 (25%) and 31- 45(30.6%). The mildly food insecurity is higher for the working-age bracket of 18- 30 (58.3%). The results imply that older household heads are more food secure than younger household heads. Mwita et al. (2011) concluded that those households headed by people who are over 65 years of age are more food secure because they have more experience in social and physical

Table 4.38: Relationship between household size and Food security

family Size * level of food security Cross tabulation							
			level of food security				Total
			Food Secure	Mildly Food Insecure	Moderately Food Insecure	Severely Food Insecure	
family Size	2-5	Count	14	26	16	9	65
		% within family Size	34.7%	40.0%	24.6%	.0%	100.0%
	6-9	Count	17	21	9	2	49
		% within family Size	33.3%	42.9%	18.4%	4.1%	100.0%
	above 9	Count	2	2	2	0	6
		% within family Size	21.5%	33.3%	33.3%	13.8%	100.0%
Total		Count	33	49	27	11	120
		% within family Size	27.5%	40.8%	22.5%	9.2%	100.0%

Source: Survey data, 2019



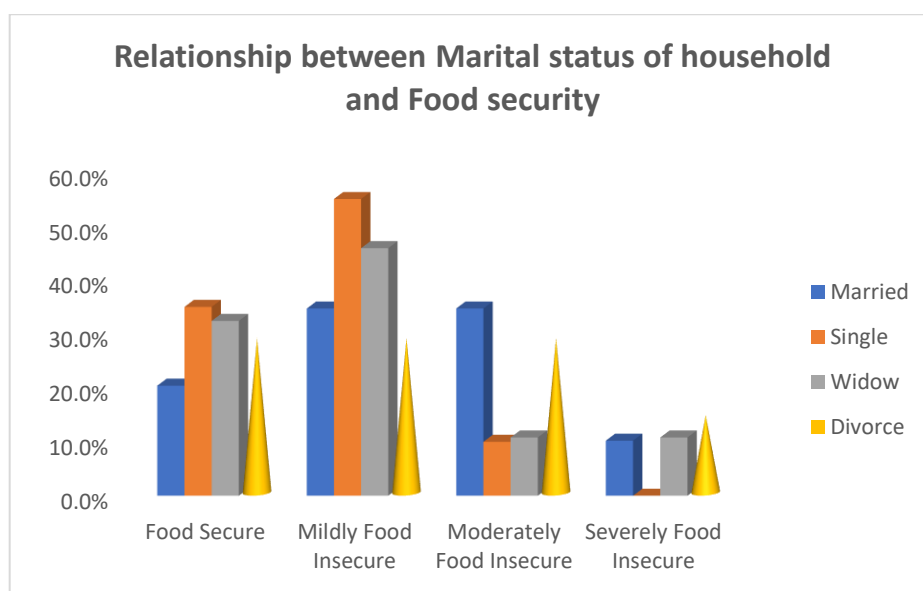
4.33.2. Household size

From Table 4.38, approximately 34.7% of households with 2 to 5 members are food secure. The results indicate that food insecurity increases with the rise in household size. Households with more than 9 members experienced high incidences of severe food insecurity than those with 6-9 members (13.8% and 4.1% respectively). The findings are in line with (Battersby, 2011) which showed a weak link between household size and food security. This is because food security decreased with an increase in household size.

Table (4.39): Relationship between Marital status of household and Food security

		Marital Status * level of food security Cross tabulation					
		level of food security					Total
			Food Secure	Mildly Food Insecure	Moderately Food Insecure	Severely Food Insecure	
Marital Status	Married	Count	10	17	17	5	49
		% within Marital Status	20.4%	34.7%	34.7%	10.2%	100.0%
	Single	Count	7	11	2	0	20
		% within Marital Status	35.0%	55.0%	10.0%	.0%	100.0%
	Widow	Count	12	17	4	4	37
		% within Marital Status	32.4%	45.9%	10.8%	10.8%	100.0%
	Divorce	Count	4	4	4	2	14
		% within Marital Status	28.6%	28.6%	28.6%	14.3%	100.0%
Total		Count	33	49	27	11	120
		% within Marital Status	27.5%	40.8%	22.5%	9.2%	100.0%

Source: Survey data, 2019



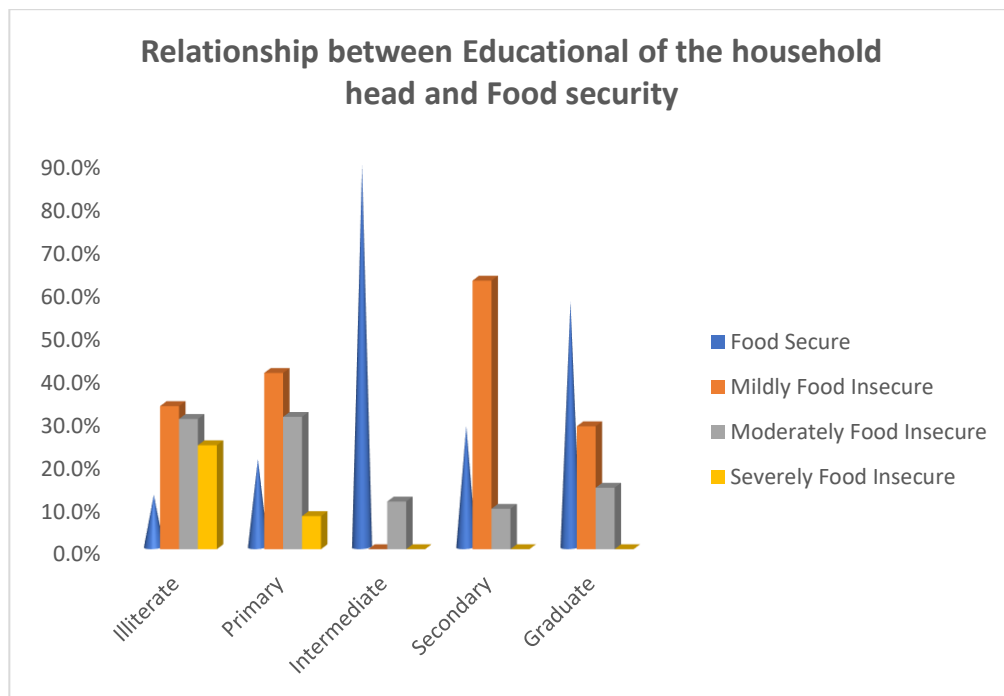
4.33.3. Marital Status of household head

Table 4.39 indicates the condition of food insecurity varies with marital status. The food security category showed that the level of food security increases in case of single (35.0%) and widow (32.4%) compared to married people 20.4%. also Severe and moderately food insecurity is mostly linked to people who are not married it increase in divorce 28.6% and 14.3% respectively. the finding is inconsistent with a similar study by Cancian and Reed (2009) where a household headed by unmarried people was more likely to depend on an adult's income, increasing their likelihood of food insecurity.

Table (4. 40): Relationship between Educational of the household head and Food security

Level of Education * level of food security Cross tabulation								
			level of food security				Total	
			Food Secure	Mildly Food Insecure	Moderately Food Insecure	Severely Food Insecure		
Level of Education	Illiterate	Count	4	11	10	8	33	
		% within Level of Education	12.1%	33.3%	30.3%	24.2%	100.0%	
	Primary	Count	8	16	12	3	39	
		% within Level of Education	20.5%	41.0%	30.8%	7.7%	100.0%	
	Intermediate	Count	8	0	1	0	9	
		% within Level of Education	88.9%	.0%	11.1%	.0%	100.0%	
	Secondary	Count	9	20	3	0	32	
		% within Level of Education	28.1%	62.5%	9.4%	.0%	100.0%	
	Graduate	Count	4	2	1	0	7	
		% within Level of Education	57.1%	28.6%	14.3%	.0%	100.0%	
	Total		Count	33	49	27	11	120
			% within Level of Education	27.5%	40.8%	22.5%	9.2%	100.0%

Source: Survey data, 2019



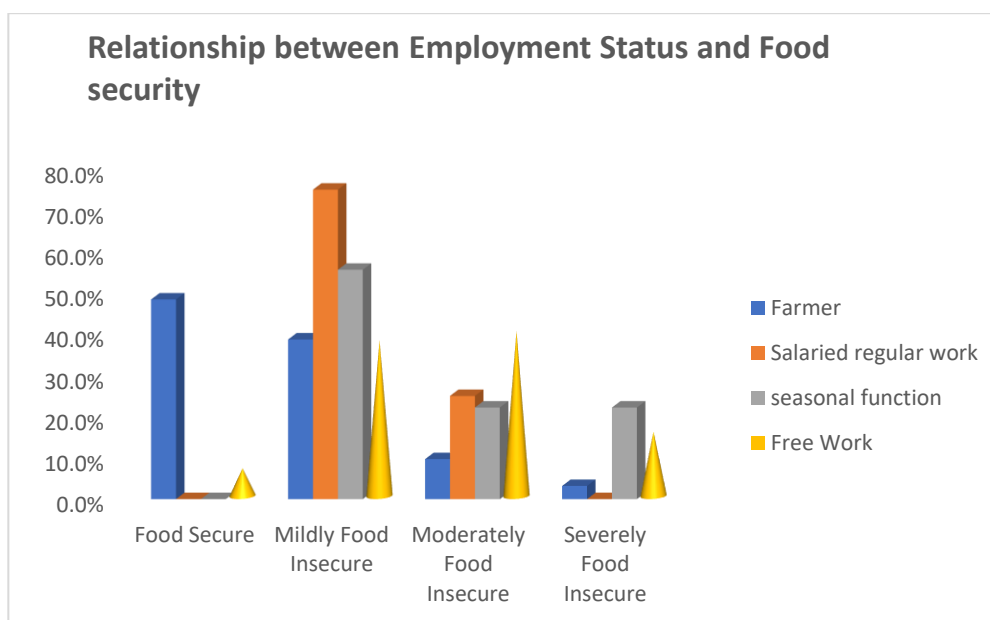
4.33.4. Educational attainment

Household food security was seen increasing with the educational attainment of the household head. Primary and intermediate (20.5% and 88.9% respectively) compared to lower levels of education (illiterate 12.1%. Food insecurity is mostly frequent in households headed by people with lower levels of education and no formal schooling. This is because better educated people can improve the quality of labour for generating-income. The findings are in line with Sakyi (2012) who indicated that severe food insecurity is directly linked with household headed by people with low educational levels and no formal education.

Table (4.41) Relationship between Employment Status and Food security

Employment Status * level of food security Cross tabulation								
			level of food security				Total	
			Food Secure	Mildly Food Insecure	Moderately Food Insecure	Severely Food Insecure		
Employment Status	Farmer	Count	30	24	6	2	62	
		% within Employment Status	48.4%	38.7%	9.7%	3.2%	100.0%	
	Salaried regular work	Count	0	3	1	0	4	
		% within Employment Status	.0%	75.0%	25.0%	.0%	100.0%	
	seasonal function	Count	0	5	2	2	9	
		% within Employment Status	.0%	55.6%	22.2%	22.2%	100.0%	
	Free Work	Count	3	17	18	7	45	
		% within Employment Status	6.7%	37.8%	40.0%	15.6%	100.0%	
	Total		Count	33	49	27	11	120
			% within Employment Status	27.5%	40.8%	22.5%	9.2%	100.0%

Source: Survey data, 2019



4.33.5. Employment Status

Table 4.41 indicates that Households wherein the head was farmer are more food secure (48.4%) than those employed are salaried regular work, seasonal function and free work. Severely food insecurity is higher in households headed by employed in seasonal function and free work at 22.2%, 15.6% respectively, compared to those headed by employed farmer at 3.2%. These findings are in line with those of McLntyre et al. (2012) which indicated that the likelihood of food insecurity is high in households headed by people who hold part-time jobs such as seasonal workers.

4.34. Correlation analysis

Correlation analysis measures the degree to which the dependent variable and the independent variable are correlated. The HFAIS score was significantly linked with the explanatory variables which includes age, household size, marital status, household education, household employed, access to livestock and household income.

Table (4.42) coefficient between Age of household head and Food security

Food security on household is affected positively by Age of household head	Value
correlation coefficient	0.103
p- value (sig)	0.265
Result	Reject

Source: Survey data, 2019

4.34.1. Age of household head

From table (4.42) show that the correlation coefficient between Age of household head and Food security equals (0.103) and the p- value (sig) equals (0.265). The p- value (sig) is above than 0.05, so the correlation is statistically insignificant at (0.05). It can be concluded there is not exists a significant relationship between Age of household head and Food security

Table (4.43) correlation coefficient between household size and level of Food security

The household size is positive or negative effect on food security	Value
correlation coefficient	-0.186
p- value (sig)	0.042
Result	Accept

Source: Survey data, 2019

4.34.2. Determinant of household size

From table (4.43) show that the correlation coefficient between household size of household head and Food security equals (-0.186) and the p- value (sig) equals (0.042). The p-value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). It can be concluded there exists a significant negative relationship between household size and Food security.

Table (4.44) correlation coefficient between marital status of household and Food security

Marital status of household head is negative effect on food security	Value
correlation coefficient	-0.093
p- value (sig)	0.311
Result	Reject

Source: Survey data, 2019

4.34.3. Determinant of marital status

From table (4.44) show that the correlation coefficient between marital status of household and Food security equals (0.093) and the p- value (sig) equals (0.311). The p-value (sig) is above than 0.05, so the correlation is statistically insignificant at (0.05). It can be concluded there is no exists a significant positive relationship between marital status of household and Food security.

Table (4.45) correlation coefficient between Educational of the head of the household and Food security

Educational of the head of the household has positive effect on household food security	Value
correlation coefficient	0.416
p- value (sig)	0.000
Result	Accept

Source: Survey data, 2019

4.34.4. Determinant of household head education

From table (4.45) show that the correlation coefficient between Educational of the head of the household and Food security equals (0.416) and the p- value (sig) equals (0.000). The p-value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). It can be concluded there exists a significant positive relationship between Educational of the head of the household and Food security.

Table (4.46) correlation coefficient between the employment status and Food security

The employment status is expected to affect household food security positively	Value
correlation coefficient	0.493
p- value (sig)	0.000
Result	Accept

Source: Survey data, 2019

4.34.5. Determinant of household head employment

From table (4.46) show that the correlation coefficient between the employment status and Food security equals (0.493) and the p- value (sig) equals (0.000). The p-value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). It can be concluded there exists a significant positive relationship between the employment status and Food security.

Table (4.47) correlation coefficient between monthly income of a household and Food security

Total monthly income of a household is expected to positively affect household food security	Value
correlation coefficient	0.491
p- value (sig)	0.000
Result	Accept

Source: Survey data, 2019

4.34.6. Determinant of monthly income

From table (4.47) show that the correlation coefficient between monthly income of a household and Food security equals (0.491) and the p- value (sig) equals (0.000). The p-value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). It can be concluded there exists a significant positive relationship between Total monthly income of a household and Food security

Table (4.48) correlation between Cases of malnutrition and level of Food security

Cases of malnutrition and deaths in childbirths affected positively by access to hospital	Value
correlation coefficient	0.028
p- value (sig)	0.884
Result	Reject

Source: Survey data, 2019

4.34.7. Determinant of Cases of malnutrition and deaths in childbirths

From table (4.48) show that the correlation coefficient between Cases of malnutrition and deaths in childbirths and access to hospital equals (0.028) and the p- value (sig) equals (0.000). The p-value (sig) is above than 0.05, so the correlation is statistically insignificant at (0.05). It can be concluded there is no exists a significant positive relationship between Cases of malnutrition and deaths in childbirths and access to hospital

4.35. Household income diversification and demographic variables

The purpose of this subsection is to examine the socio-economic and demographic variables of households the choice of these variables was based on previous studies, theory, and the available data. From the factors known to affect income diversification, this study considers age of the household head, number of household members residing in the household, Household member's employee education, size of the arable land accessed, marital status, household access to credit, agricultural training and infrastructure of amenities

Table (4.49): Relationship between Age of the household head and income

Age of the household head is expected to positively influence income	Value
correlation coefficient	0.061-
p- value (sig)	0.545
Result	Reject

Source: Survey data, 2019

4.35.1. Age of the household head is expected to positively influence income

From table (4.49) show that the correlation coefficient between Age of the household head and income equals (-0.061) and the p- value (sig) equals (0.545). The p-value (sig) is above than 0.05, so the correlation is statistically insignificant at (0.05). It can be concluded there is no exists a significant positive relationship between Age of the household head and income.

Table (4.50): Relationship between Household member's employee and income diversification

the household member's employee is expected to positively influence income diversification	Value
correlation coefficient	-0.409
p- value (sig)	0.000
Result	Accept

Source: Survey data, 2019

4.35.2. the household member's employee is expected to positively influence income diversification

From table (4.50) show that the correlation coefficient between household member's employee and income diversification equals (-0.061) and the p- value (sig) equals (0.545). The p-value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). It can be concluded there is exists a significant negative relationship between household member's employee and income diversification.

Table (4.51): Relationship between; Land access by the household and income diversification

Land access by the household is expected to positively influence income diversification	Value
correlation coefficient	0.168
p- value (sig)	0.005
Result	Accept

Source: Survey data, 2019

4.35.3. Land access by the household is expected to positively influence income diversification

From table (4.51) show that the correlation coefficient between Land access and income diversification equals (0.168) and the p- value (sig) equals (0.005). The p- value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). It can be concluded there is exists a significant positive relationship between Land access and income diversification.

Table (4.52): Relationship between the education of the household head and income diversification

the years of formal education for the household head, is positively affected income diversification	Value
correlation coefficient	0.247
p- value (sig)	0.013
Result	Accept

Source: Survey data, 2019

4.35.4. the education for the household head, is negatively affected income diversification

From table (4.52) show that the correlation coefficient between the years of formal education for the household and income diversification equals (0.247) and the p- value (sig) equals (0.013). The p-value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). It can be concluded there is exists a significant positive relationship between the years of formal education for the household and income diversification

Table (4.53): Relationship between access to credit and income diversification

Access to formal and informal credit is negatively affect income diversification	Value
correlation coefficient	-0.344
p- value (sig)	0.000
Result	Accept

Source: Survey data, 2019

4.35.5. Access to formal and informal credit is negatively affect income diversification

From table (4.53) show that the correlation coefficient between Access to formal and informal credit and income diversification equals (-0.344) and the p- value (sig) equals (0.000). The p-value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). It can be concluded there is exists a significant negative relationship between Access to formal and informal credit and income diversification.

Table (4.54): Relationship between Rural households' satisfaction with amenities

Rural households' satisfaction with amenities	correlation coefficient	p- value (sig)	Result
1/Access to Transports	0.046	0.611	Reject
2/Access to Electricity	-0.003	0.977	Reject
3/Access to Market	0.172	0.070	Reject
4/Access to agricultural	0.289	0.000	Accept
5/Access to drinking water	0.434	0.000	Accept

Source: Survey data, 2019

4.35.6. The level of rural households' satisfaction with amenities

From table (4.54) show that the correlation coefficient between access to transport, market and electricity and income diversification were found to negatively influence income diversification. Whilst agricultural water supply and drinking water supply were found to positively influence income diversification

Table 4.55 the value of total household assets and training

the value of the total household assets are positively influence income diversification	correlation coefficient	p- value (sig)	Result
1/cell phone	0.190	0.045	Accept
2/Radio	0.228	0.016	Accept
3/Television	0.354	0.000	Accept
4/personal computer	0.037	0.704	Reject
5/Water tank	0.267	0.005	Accept
6/Refrigerator / Freezer	0.316	0.001	Accept
7/car	0.187	0.050	Reject
8/trolley Gas cylinder	0.459	0.000	Accept
agricultural training	0.475	0.000	Accept

Source: Survey data, 2019

4.35.7. Value of total household assets

From table (4.55) show that the correlation coefficient between Access to cell phone, radio, television, water tank, Refrigerator, Gas cylinder and agricultural training. The p- value (sig) equals (0.045), 0.016, 0.000, 0.005, 0.001, 0.000, 0.000 respectively. The p-value (sig) is less than 0.05, so the correlation is statistically significant at (0.05). whilst the correlation coefficient between access to personal computer and car the p-value (sig) equals 0.704 and 0.050 the p- value is more than 0.05, so the correlation is not significant

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Summary

The study was conducted in Sennar State to investigate the factors influencing food and livelihood security among rural women head households in sennar state, Sudan. Number of variables were assumed to be affecting food and livelihood security among rural women. The objective of the study is to investigate the food security status and levels of income diversification of households in area study. Primary data was collected from a sample of 120 women head household through individual interviews involving use of structured schedules. by using simple stratified random sampling techniques. Secondary data was collected from both published and unpublished documents of governmental and non-governmental organizations.

The general review of literature showed that food plays a crucial role for economic development, because it enables people to carry out their daily activities effectively. The concept of food security comes from an understanding of what lack of sufficient food entails. Food security is a multidimensional concept with ranging definitions, but at the most common level it refers to sufficient access by all people at all times to food needed to live and maintain an active and health lifestyle

Conceptual model was employed in this study is the sustainable livelihoods framework. (SLA). The livelihoods framework is a way of understanding how households derive their livelihoods by drawing on capabilities and assets to develop livelihood strategies composed of a range of activities.

This framework was used to assess the different factors influence household's livelihood security. These factors include several exogenous and endogenous variables. The exogenous variables are household demographic and Factors

related to risk and vulnerability. The endogenous variables include access to livelihood assets by households which are: Human capital, financial capital, social capital, Physical capital, and Natural capital.

The Household Food Insecurity Access Scale (HFIAS) was used to analyze the food security status of households. Correlation analysis was used to establish the socioeconomic and demographic factors that have an effect on household food security status to determine the significance of the hypothetical causal relationship among the variables. Descriptive, frequency and correlation analysis procedure used to identify the factors influencing the livelihood income diversification

5.2. Conclusion

The conclusions from the study are as follows:

The study concluded that majority of the respondents have access to land 90.8%

- ❖ 85% respondents have access to different type of livestock
- ❖ majority of respondents participate in non-agricultural activities 85% present in trade, cloth washing and handicraft activity
- ❖ The problems facing the respondents in their livelihood activities are price fluctuation 64.2%
- ❖ 50% of the respondents indicate that the cropping activities is main source of food.
- ❖ most of respondents indicate 83.3% from family members unable to complete the basic stages of education
- ❖ 66.7% of respondents have no access to training.
- ❖ 73.3%, 59.2% and 55.8% from malnutrition among children, death during childbirth and cases of illness respectively
- ❖ 67.1% of respondents indicate the reason for difficult to get school or hospital for long distance

- ❖ 73.3% and 75% of respondents indicate that their sanitation and toilet are traditional
- ❖ 50.8% of respondents mentioned that their access to transportation is very hard
- ❖ 48.3% of respondents said that their access to market is hard
- ❖ most of the respondents (60.8%) did not belong to any co-operative or farmer-based organization
- ❖ majority of respondents 60.85% mentioned that their necessary needs improve the education and health
- ❖ most of the respondents, 58.9%, prefer informal credit
- ❖ majority of respondents 65.8% mentioned no organization working in their area
- ❖ The HFIAS categorization results indicated that, about 27.5% of the sampled households were classified as food secure, 40.8% as mildly food insecure, 22.5% as moderately food insecure and 9.2% as severely food insecure.
- ❖ households headed by the working age category (18- 30) are severely food insecure (58.3%). than those with a head whose 31- 45(30.6%).
- ❖ Food insecurity increases with the rise in household size. Households with 2 to 5 members are food secure than those with more than 9 members.
- ❖ food security category showed that the level of food security increases in case of single (35.0%) and widow (32.4%) compared to married people 20.4%.
- ❖ Households headed by people with lower levels of education or no formal education experienced higher incidents of food insecurity than those who have attained secondary and tertiary education.

- ❖ Households wherein the head was farmer are more food secure (48.4%) than those employed are salaried regular work.
- ❖ The level of food insecurity decreases with an increase in household income.

In order to establish the determinants of household food security, nine explanatory variables (age, household size, marital status, educational attainment, employment status, household income and access to land. The correlation results showed that There is a clear significant correlation between the level of food security and variables such household size, education, employment status, access to livestock, access to health care and household income. No significant correlation existed between the level of food security and the explanatory variables, which include age, marital status and malnutrition and deaths in childbirths

Rural households participated in activities such as cropping, livestock, agricultural wage-earning, non-agricultural, self-employment. Most of the households in the study participated in crop farming and/or livestock

The factors influencing the choice of income diversification activities were the years of formal education of the household head, household size, dryland area accessed by the household, source of agricultural information., marital status and access to formal and informal credit, level of rural households' satisfaction with amenities, household assets, and agricultural training. The analysis indicated that income diversification was poor, that is, 40%, as an average. 29.2% of the households

The correlation results showed that There is no significant correlation between the income diversification and variables such the age of household head, access to Transports, electricity, and access to market. There is clear significant between income diversification and explanatory variables, which include formal education for the household head, marital status, household size, employment status, access to credit. The level of rural households' satisfaction with amenities of water

drinking and water for agricultural, the value of the total household assets, access to land and agricultural training

5.3. Recommendation

The following general recommendations are made

1. The state government should implement more strategies to address the issue of food insecurity at the households' level by holding workshops, and support groups, to ensure that their food intake is improved and the provision of high-quality food.
2. Food supplements such as vitamin E400 could be given to the children under the age of two years to avert the effects of malnutrition caused by food insecurity
3. The household size was a significant determinant for household food security; therefore, it is important to educate the community about awareness programs for family planning
4. Raising the capacity of rural families through agricultural training and access to credit to facilitate their participation in income-generating activities
5. Introduce efforts to develop basic literacy skills for rural women, through the work of an adult education
6. Improve the schooling systems in rural areas and enhance girls' access to education by reducing the cost of sending girls to school
7. Encouraging and motivating women to participate in cooperative societies in order to increase their chances of obtaining resources
8. Coordination by the state government with non-governmental organizations to introduce income-generating projects in order to improve the livelihood of rural women
9. Provision of adequate infrastructure which include Transports, electricity, water drinking and access to market to the rural communities to enable income diversification among rural households

REFERENCES

- Ahmad, A. (1984). Muslim Women and Higher Education. National Book Foundation, Islamabad. P. 14-17
- Allen, R.E., ed. 1990. The concise oxford dictionary of current english. 8th ed. United States of America: Oxford University Press
- Allendorf, K. (2007). Do women's land rights promote empowerment and child health in Nepal? *World Dev.* 35, 1975–1988.
- Allison, E.H., and Ellis, F. 2001. The livelihoods approach and management of small-scale fisheries. *Marine Policy* 25: 377-88.
- Andersson, Ingrid, Ananya Raihan, Milagros Rivera, Idris Sulaiman, Nidhi Tandon, and Friederike Welter. 2007. Handbook on Women-owned SMEs: Challenges and Opportunities in Policies and Programmes. Sponsored by International Organization of Knowledge Economy and Enterprise Development and Global Knowledge Partnership. Malmö, Sweden: IKED. A
- African Development Bank, AfDB, (2011). "Africa in 50 Years' Time; the Road towards Inclusive Growth". Tunis, Tunisia.
- Aterido, R., Beck, T. & Lacovone, L. 2011. Gender and Finance in Sub-Saharan Africa: Are Women Disadvantaged? Policy Research Working Paper 5571. Washington, DC, World Bank.
- Babinard, Julie, and Peter Roberts. 2006. "Maternal and Child Mortality Development Goals: What Can the Transport Sector Do?" World Bank Transport Sector Board Transport Papers TP-12, World Bank, Washington, DC.
- Britwum, A. (2009). The Gendered Dynamics of Production Relations in Ghanaian Coastal Fishing. In *Feminist Africa*, p.69. www.researchgate.net/public
- Babu, S.C. & Sanyal, P. 2009. Food security, poverty, and nutrition policy analysis: statistical methods and application. New York:
- Bakker Margaretha, Randolph Barker, Ruth Meinzen-Dick, and Flemming Konradsen, eds. 1999. Multiple Uses of Water in Irrigated Areas: A

Case Study from Sri Lanka. SWIM Paper 8, International Water Management Institute, Colombo, Sri Lanka

- Banks N, Hulme D. 2012. The Role of Non-Governmental Organizations and Civil Society Study in Development and Poverty Reduction .BWPI WP.
- Bardasi, Elena, C. Mark Blackden, and Juan Carlos Guzman. 2007. "Gender, Entrepreneurship, and Competitiveness in Africa." Washington, DC: World Economic Forum.
- Bari, F. (2005) .women political participation. issues and challenges.P.4
- Benson, T. 2004. African food and nutrition situation: where are we and how did we get here. 200 discussion paper. Washington DC: International Food Policy Research Institute.
- Blackden, Marc. 2007. Gender and Energy: Issues for the PEAP Revisions. Washington, DC: World Bank.
- Boussard, J., Françoise, B.D. & Voituriez, G.T. 2006. Sub regional office for southern and eastern Africa. Rome: International Cooperation Centre of Agricultural and Research and Development.
- Battersby, J. 2011. The state of food insecurity in Cape Town: Urban food Security series No 11. Kingston and Cape Town: African Food Security Urban Network
- Bratton, M. (1989). Beyond Community Development, The Political Economy of Rural Administration in Zimbabwe. Harare: Mambo Press.
- Burns, C. 2004. A review of the literature describing the link between poverty, food security and obesity with specific reference to Australia. Deakin University: Research School of Exercise and Nutrition Sciences
- Cahn, M. 2008. Women and Rural Livelihood Training: A Case Study from Papua New Guinea. *Gender & Development* 16(1):133–146.
- Cairncross, Sandy, and Vivian Valdmanis. 2006. "Water Supply, Sanitation and Hygiene Promotion." In *Disease Control Priorities in Developing Countries*, ed. Dean Jamison and others. Washington, DC: World Bank. Also available at www.dcp2.org/pubs/DCP.

- Carney, D. 1999. Introduction to sustainable rural livelihoods: What difference can we make? London: Department for International Development. Carney, D,
- Cancian, M. & Reed, D. 2009. Family structure, childbearing and parental employment: implications for the level and trend in poverty. Focus, 26(2): 21-26
- Cathie, J. 2006. The Elgar companion to development studies, edited by D.A Clark. Cheltenham: Edward Elgar Publishing Limited.
- Chambers, R & Conway G. 1992. Sustainable rural livelihoods: Practical concepts for the 21st century. Brighton: Institute of Development Studies, University of Sussex. (IDS discussion paper; no. 296.)
- Chambers, R. 1999. Relaxed and participatory appraisal: Notes on practical approaches and methods. Brighton: Institute of Development Studies, University of Sussex
- Clover, J. 2007. Farming issues of environmental security in Angola and Mozambique: the nexus of land, conflicts, and sustainable livelihoods in post-conflicts situations. Johannesburg: University of the Witwatersrand. (Dissertation - PhD).
- D. Gaye et al. (2018). Perspectives: Does West Africa have the money to respond to the next food crisis? In Grain de Sel, N°76, Rural Development
- Daraz, U. (2012). Pakhtun Social Structure and its Impacts on Women Education; published MS Thesis Department of Sociology International Islamic University Islamabad.
- De Schutter, 2010. Agroecology and the Right to Food. Report of the Special Rapporteur on the Right to Food to the Sixteenth Session of the Human Rights Council. UN doc. A/HRC/16/49. New York: UN.
- Deere, Carmen Diana, and Magdalena Leon. 1997. "Women and Land Rights in the Latin American Neo-Liberal Counter Reforms." Working Paper No. 264, Women in Development, Michigan State University.
- Devereux, S. 2006. Distinguish between chronic and transitory food insecurity in emergency needs assessment. Rome: World Food Programme

- DFID,2006 (Department for International Development). Sustainable livelihoods guidance sheets. Available from the livelihoods learning platform www.livelihoods.org
- Drinkwater, M & Rusinow, T. 1999. Application of CARE's livelihood approach. Paper presented at the National Resource Advisors' Conference (NRAC) 1999
- Drinkwater, M, Rusinow, T, Neefjes, K, Wanmali, S & Singh, N. 1999. Livelihoods approaches compared: A brief comparison of the livelihoods approaches of the UK Department for International Development (DFID) CARE, Oxfam and the United Nations Development Programme (UNDP), November 1999. London: Department for International Development
- Earthscan Schmidhuber, J. & Tubiello, F.N. 2007. Global food security under climate change, edited by William, E. New York:
- Economic and Social Council , 24th February 2012, Press release. Commission on the Status of Women to focus on rural women , their contributions - Challenges during fifty-sixth session at Headquarters
- Edmonds, Geoff. 1998. "Wasted Time: the Price of Poor Access." International Labour Organization, Geneva.
- Ellis F. 2000. Rural livelihoods and diversity in developing countries. Oxford university
- Ellis, Amanda, 2006. Claire Manuel, and C. Mark Blackden.. Gender and Economic Growth in Uganda: Unleashing the Power of Women. Directions in Development. Washington, DC: World Bank.
- FANTA, (2006) (Food and Nutrition Technical Assistance).. Food security. <http://www.fanta.com>
- FAO (2011). The role of women in agriculture. ESA Working Paper No. 11-02. Rome
- FAO (2013). Statistical Yearbook of the Food And Agricultural Organization of the United Nations. Part 3: 'Feeding the World'. <http://www.fao.org/3/i3107e/i3107e03.pdf>

- FAO (2015). The State of Food and Agriculture: Climate Change, Agriculture and Food Security, op. cit
- FAO (2018). The State of Agricultural Commodity Markets 2018. Agricultural trade, climate change and food security. Rome. <http://www.fao.org/3/I9542EN/i9542en.pdf>
- FAO (1983) (Food and Agriculture Organization).. World food security: a reappraisal of the concept and approaches. Rome: Food and Agriculture organization of the United Nations
- FAO (2002) (Food and Agriculture Organization).. The state of food insecurity in the world 2001. Rome: Food and Agriculture Organization of the United Nations.
- FAO (2008) (Food and Agriculture Organization). An Introduction to basic concepts of food security.
<http://www.fao.org/docrep/013/al936e/al936e00.pdf> der-
- FAO (2011) (Food and Agriculture Organization).. Gender: Food and Agriculture Program Organization
<http://www.fao.org/gender/genderhome/gender-programme/gen>
- FAO and GTZ. 2006. Framework on Effective Rural Communication for Development, ed. Riccardo Del Castello and Paul Mathias Braun. Rome: FAO.
- FAO, (1996) Rome declaration on world food security and world food summit plan of action. Rome: Food and Agriculture Organization of the United Nations.
- FAO, (2011). The State of Food and Agriculture 2010–2011. Women in Agriculture: Closing the Gender Gap for Development. Rome: FAO
- FAO, (2006). Agriculture, Trade Negotiations, and Gender. Prepared by Zoraid Garcia, with contributions from Jennifer Nyberg and Shayama Owaise Saadat. Rome: FAO.
- FAO, (2010) The State of Food and Agriculture, Women in agriculture: closing the gender gap for development

- FAO, (2011) Rural Women and the Millennium Development Goals. UN WOMEN, 2011-12. Progress of the World's Women: In Pursuit of Justice
- FAO, IFAD, UNICEF, WFP and WHO (2017). The State of Food Security and Nutrition in the World 2017: Building resilience for peace and food security, 11. Rome: FAO. <http://www.fao.org/3/a-i7695e.pdf>
- FAO, IFAD, UNICEF, WFP and WHO (2017). The State of Food Security and Nutrition in the World 2017, op. cit.
- FAO, IFAD, UNICEF, WFP and WHO (2018). The State of Food Security and Nutrition in the World 2018, op. cit
- FAO. (1992). International Conference on Nutrition, major issues for nutrition strategies. Rome: Food and Agriculture Organization of the United Nations and World Food Programme
- FAO. (2000). The State of Food Insecurity in the World 2000. Rome.
- FAO. (2016). Gender and Land Statistics. Rome (also available at <http://www.fao.org/3/a-i5488e.pdf>).
- FAO. (2008). Deriving Food Security Information From National Household Budget Surveys: Experiences, Achievements, Challenges, Food and Agriculture organization,
- Fatima, I.O. (2009). The Role of Women in Providing and Improving Household Food Security in Sudan: Implications for Reducing Hunger and Malnutrition
- Foltz, J., Larson, B. & Lopez, R. (2000). Land tenure, investment, and agricultural production in Nicaragua. Development Discussion Paper No. 738. Institute for International Development, Harvard University, Cambridge, USA.
- FAO. (2015). The state of food insecurity in the world (2015)., Rome, Italy.
- FAO, (1993). Agricultural Extension and Women Farm Workers in the 1980s. Rome.

- Fowler, G. (1990). Lehman (1990) in Farmington J. (1993). *Reluctant Partners? NGOs The State And Sustainable Agriculture Development*. New York: Routledge.
- Frankenberger, T & Drinkwater, M. (1999). Household livelihood security: A holistic approach for addressing poverty and vulnerability. CARE.
- Fung, Isaac Chun-Hai, and Sandy Cairncross. (2006). "Effectiveness of Handwashing in Preventing SARS: A Review." *Tropical Medicine and International Health* 11 (11): 1–10. Also available at www.sibs.ac.cn/sars/file/wenxian/051415.pdf.
- Garvelink, W. (2012). *Land Tenure, Property Rights, and Rural Economic Development in Africa*. Washington, DC: Center for Strategic and International Studies.
- Gautam, Suman Rimal. (2006). *Incorporating Groundwater Irrigation: Technology Dynamics and Conjunctive Water Management in the Nepal Terai*. Wageningen University Water Resources Series 8. Hyderabad: Orient Longman.
- Godquin, M., and A. R. Quisumbing. (2008). Separate But Equal? The Gendered Nature of Social Capital in Rural Philippine Communities. *Journal of International Development* 20(1):13–33
- Goodall, K. (2009) Food security: what is it all about.. <http://www.agrifood.info/connections/2009/goodall.pdf>
- Gurung, C. (2006). *The Role of Women in the Fruit and Vegetable Supply Chain in Maharashtra and Tamil Nadu India: The New and Expanded Social and Economic Opportunities for Vulnerable Groups Task Order under the Women in Development IQC*. Washington, DC: U.S. Agency for International Development.
- Hansen, A. (2013). Financial inclusion for rural areas and agriculture. In African Development Bank. *Financial Inclusion in Africa*, pp. 84–93. Tunis, African Development Bank Group
- Hoddinott, J. (2001). *Choosing outcome indicators of household food security*. Washington DC: International Food Policy Research Institute
- IFAD, (2007). *Gender and Water: Securing Water for Improving Rural*

- IFAD, (2001, Baseline Report. International Fund for Agricultural Development, Elobied.
- IFAD, (2006), Empowering the Rural Poor under Volatile Policy Environments in the Near East and North Africa Region Research Project: Sudan Case Study
- IFAD, (2010), Enabling poor rural people to overcome poverty, annual report, 2010
- IICA (Inter-American Institute for Cooperation on Agriculture). 2009 http://www.iica.int/esp/programas/SeguridadAlimentaria/Documentos/SeguridadAlimentarias_Quées_Eng.pdf
- International Food Policy Research Institute. World Bank. (2007). Gender and Economic Growth in Kenya. Washington, DC: World Bank.
- J. Drèze and A. Sen (1989). Hunger and Public Action. Oxford: Clarendon Press
- Kameri-Mbote, P. (2009). What would it take to realise the promises? Protecting women's rights in the Kenya national land policy of 2009. *Fem. Afr.* 12, 81–94.
- Kannan, K.P. (2000). Food Security in a Regional Perspective: Food Deficit' Kerala, working Paper NO. 304. Kerala: Centre for Development Studies
- Kennedy, Eileen, and Pauline Peters. (1992). "Household Food Security and Child Nutrition: The Interaction of Income and Gender of Household Head." *World Development*
- Kgalushi, Rudzani, Stef Smits, and Kathy Eales. (2004). "People Living with HIV/AIDS in a Context of Rural Poverty: The Importance of Water and Sanitation Services and Hygiene Education." Mvula Trust and Delft, IRC, Johannesburg, South Africa. Also available at www.irc.nl/page/10382.
- Klapper, L. (2016.) A phone of her own: How mobile access can change women's lives. Bill & Melinda Gates Foundation blog, <http://www.impatientoptimists.org/Posts/2016/03/A->
- Kulkarni, Semma. (2005). "Looking Back, Thinking Forward: The Khudawadi Experience with Access to Irrigation for Women and Landless." In

Flowing Upstream: Empowering Women through Water Management Initiatives in India, ed. Sara Ahmed. Thousand Oaks, CA: Sage.

- Knueppel, D., Demment, M. & Kaiser, L. (2009). Validation of household food insecurity access scale in rural Tanzania. California: Department of Nutrition.
- Labo, C. (2001). Environmental and social-economic factors behind food security policy strategies in Botswana. Development southern Africa. Nord, M., Andrews, M. & Carlson. 2009. Household food security in the United States. Washington DC: U.S Department of Agriculture.
- Lipton Michael. (2009). Land Reform in Developing Countries: Property Rights and Property Wrongs. New York, NY: Routledge: Tailor & Francis
ivelihood, Rome: IFAD
- Mwati, P.N., Otieno, R.O., Masanja, V.G. & Muyanja, C. (2011). Prediction of the likelihood of household food security in the lake Victoria Region of Kenya.
- Madziakapita, A. (2008). An evaluation of the impact of food aid on food security: the case of Ngabu area in Malawi. Pretoria: University of South Africa. (Dissertation - MBA).
- Misselhorn A., Eakin H., Devereux S., Drimie S., Msangi S., Simelton E. & Smith M. (2010). Vulnerability to What. (In Ingram J, Ericksen P, Liverman D., eds. Food Security and Global Environmental Change. London: Earthscan. p. 87-114).
- McLntrye, L., Bartoo, A.C. & Emery, J.C. (2012). When working is not
enough: food insecurity in the Canadian labour
- Nazneen, Sohela. (2008). Rural livelihoods and gender NGOs: BRAC and Proshlka in Bangladesh, DPhil Thesis, University of Sussex, UK
- Odeny, M. (2013). Improving access to land and strengthening women's land rights in Africa. Paper Prepared for Presentation at the Annual World Bank Conference on Land and Poverty, (Washington, DC: The World Bank).

- Ostry, A. (2010). Food for thought: the issues and challenges of food security. [http://www.phsa.ca/NR/rdonlyres/C3E70150-66FF-48E1-B2F1-45BB83B03019/0/Food for Thought _Research Booklet](http://www.phsa.ca/NR/rdonlyres/C3E70150-66FF-48E1-B2F1-45BB83B03019/0/Food%20for%20Thought_Research%20Booklet)
- Oxfam, (2019) Briefing Paper The food price crisis of 2007–08) International practice oxfam.org.uk/publications/ripe-forchange--ending-human-suffering-in-supermarket-supply-chains-620418-ending-human-suffering-in-supermarket-supply-chains-620418
- Page, E.A. & Redclif, M. (2002). Human security and the environment: international comparisons. Northampton: Edward Elgar Publishing, Inc.
- Pralahad, K. (2005). quoted in The Economist, Calling an End to Poverty.
- Parikh, Jyoti, and Saudamini Sharma. (2006). “Energy Poverty and the Gender Nexus in Himachal Pradesh.” ENERGIA International Network on Gender and Sustainable Energy, Leusden, the Netherlands.
- Pasteur, Kath.(2002) "Gender Analysis for Sustainable Livelihoods: Framework, Tools and Links to other Sources."
- Peters, Deike. (2002). “Gender and Transport in Less Developed Countries.” Paper commissioned by UNED Forum for expert workshop on “Gender Perspectives for the Earth Summit 2002,” Berlin, January 20.
- Plessis-Fraissard, Maryvonne. (2007). “Planning Roads for Rural Communities.” Paper presented at the Low Volume Roads Conference, Austin, June 24–27.
- Quisumbing et al. (2011). Gender and the Global Food-Price Crisis,
- Quisumbing, A. & Pandofelli, L. (2009). Promising Approaches to Address the Needs of Poor Female Farmers: Resources, Constraints, and Interventions. Discussion Paper No. 882. Washington, DC, International Food Policy Research Institute.
- Quisumbing, Agnes R., Lynn R. Brown, Hilary S. Feldstein, Lawrence Haddad, and Christin Peña. (1995). Women: The Key to Food Security. Food Policy Statement 21. Washington, DC:
- R. Pearl-Martinez (2017). Financing Women Farmers, op. cit.15

- R. Willoughby and T. Gore (2018). Ripe for Change: Ending human suffering in supermarket supply chains.
- Rangan, H., and Gilmartin, M. (2002). Gender, traditional authority, and the politics of rural reform in South Africa. *Dev. Chang.* 33, 633–658. doi: 10.1111/1467- 7660.00273
- Richardson, R.B. (2010). Ecosystem services and food security: economic perspectives on environmental sustainability. MSU international working paper. Michigan: Department of Agricultural, Food, Resources and Economics.
- Ruth Oniang'o and Edith Mukudi, (2002), "Nutrition and Gender." In *Nutrition: A Foundation for Development*, Geneva
- Sahley, C. (1997). *Strengthening The Capacity Of NGOs Cases Of Small Enterprise Development Agencies On Africa*, U.K.
- Sen, A. (1981). *Poverty and famines: an essay on entitlement and deprivation*. New York: Oxford University Press.
- Sakyi, P. (2012). *Determinants of food accessibility of rural households in Limpopo province, South Africa*. Belgium: Ghent University. (Dissertation - MBA).
- Shordt, Kathy. (2006). "Review of Handwashing Programs." Study for the HIP Project, IRC International Water and Sanitation Centre, Delft, Netherlands.
- Smith, L.C., Aderman, H. & Aduayom, D. (2006). *Food security in Sub-Saharan Africa: new estimates from household expenditure surveys*. Washington, DC: International Food Policy Research Institute
- Song, et.al (2006). Why do girls in rural China have lower school enrolment *World Development*, 34(9): 1639-16.
- Staatz, J.M., Boughton, D.H. & Dovovan, C . (2009). *Food security in developing countries*. Michigan: Department of Agricultural, food and resource economic

- Tahir, et.al (2014). Socio Economic Problems Faced By Rural Women in Getting Higher Education (A Case Study of District Karak, PhD, Department of Psychology and Behavioral Sciences Zhejiang University Hangzhou China
- Taylor, S. & Boubakri, N. (2013). Women and finance: unlocking Africa’s hidden growth reserve. In African Development Bank. Financial Inclusion in Africa, African Development Bank Group.
- Tsikata, D., and Amanor-Wilks, D. (2009). Editorial: land and labour in gendered livelihood trajectories. *Fem. Afr.* 12, 1–10.
- UN Women (2014). The World Survey on the Role of Women in Development: Gender equality and sustainable development.
- UNDP, (2015). The Millennium Development Goals Report 2015. 06 July. <http://www.undp.org/content/undp/en/home/librarypage/mdg/the-millennium-development-goals-report-2015.htm>
- UNECA, (2005). “African Regional Implementation Review for the 14th Session of the Commission on Sustainable Development (CSD-14),” Report on Energy for Sustainable Development in Africa.
- United Nations Division for the Advancement of Women (2005), gender equality and the empowerment of women through ICT. New York.
- Verhagen, Joep, A. J. James, Christine van Wijk, Reema Nanavatty, Mita Parikh, and Mihir Bhatt. (2004). “Linking Water Supply and Poverty Alleviation: The Impact of Women’s Productive Use of Water and Time on Household Economy and Gender Relations in Banaskantha District, Gujarat, India.” Occasional Paper OP_36E. IRC, Delft, Netherlands. Also available at www.irc.nl/page/5980.
- Von Braun, J., Bouis, H., Kumar, S. & Pandya-Lorch, R. (1992). Improving food security of the poor: concepts, policy and programs. Washington, DC: International Food Policy Research Institute
- WFP (World Food Program). (2007). Food assistance programming in the context of HIV. W
- WFP, (2018). Executive Board Second regular session Rome, 26–29 November 2018, The Sudan country strategic plan (2019–2023)

- WHO, (2002). "Healthy Environments for Children: Initiating an Alliance for Action." World Health Organization, Geneva, Switzerland
- Wiggins, S. (2004). Agriculture, hunger and food insecurity. London: Department for International Development.
- World Bank and IFPRI. (2010). Gender and Governance in Rural Services: Insights from India, Ghana, and Ethiopia. Washington, DC: World Bank/IFPRI.
- World Bank, FAO and IFAD. (2008). Gender in Agriculture Source Book, Washington DC, World Bank.
- World Bank. (2000). "Can Africa Claim the 21st Century?" Report prepared jointly by the African Development Bank, African Economic Research Consortium, Global Coalition for Africa, Economic Commission for Africa, and World Bank, Washington, DC.
- World Bank. (2001). Engendering development. Policy Research Report. Washington, D.C.: Oxford University Press for the World Bank.
- World Bank. (2016). Women, Business and the Law: Getting To Equal. Washington, DC.
- World Bank. (2018). Women, Business and the Law: Key Findings. Washington, DC.
- Yin, Y., Clinton, N., & Luo, B. (2008). Resource system vulnerability to climate stresses in the Hiehe basin of Western China. New York:

APPENDIX

Data Collection Instrument (In Arabic)

جامعة السودان للعلوم والتكنولوجيا

كلية الزراعة

قسم الإرشاد الزراعي والتنمية الريفية

استمارة استبيان

تقييم العوامل التي تؤثر على الأمن الغذائي وسبل العيش للأسر التي ترأسها النساء الريفيات
دراسة حالة ولاية سنار

القسم أ: المعلومات الأساسية:

١/ الرقم: ٢/ الاسم:

أنثى/.....2/ذكر..... ٣1/ النوع

٣/ العمر: أ/ ٣٠-١٨ ب/ ٤٥-٣١ ج/ أكثر من ٤٥

٤/ المستوى التعليمي:

المستوى التعليمي	أمي (٠)	خلوة (١)	ابتدائي (٢)	متوسط (٣)	ثانوي (٤)	جامعي (٥)	فوق الجامعي (٦)
------------------	---------	----------	-------------	-----------	-----------	-----------	-----------------

٦/ الحالة الاجتماعية:

١ / متزوج ٢ / عازب ٣ / أرمل ٤ // مطلق

٧. ما هي المهنة الرئيسية لرب الأسرة؟

١. مزارع متفرغ ٢. عمل منتظم براتب ٣. وظيفة موسمية ٤. متقاعد ٥. عمل حر

٨. حجم الأسرة

١-٥ / ٢-٩ / ٣- أكثر من ٩

القسم ب: استراتيجيات معيشة الأسرة

١/ الأنشطة الزراعية

٩. هل لدي أسرتك ملكية او الحصول على ارض زراعية؟ ١ = نعم / ٢ = لا.

١٠. إذا كانت الإجابة بنعم، أكمل الجدول أدناه.

نوع حيازة الأرض	متوسط مساحة المزروعات بالفدان	نوع المحصول	الدخل السنوي
رض موروثة الأرض			
أرض مستأجرة			
تمتلك الحر			
شراكة			
أخرى			

١١. ما هي المشاكل التي واجهت الإنتاج الزراعي

- ١/ حالة مناخية سيئة ٢/ لا يوجد مصدر تمويل مناسب ٣/ لا توجد حوافز إنتاج
٤/ زيادة الضرائب ٥/ قلة الخبرة في الزراعة ٦/ انخفاض الأسعار في المواسم السابقة

١٢. ما هو الغرض الرئيسي من هذا الانخراط في الأنشطة المحصولية؟ (ضع علامة في

الاستجابات الملائمة))

١. مصدر رئيسي للغذاء ٢. مصدر إضافي للغذاء ٣. مصدر الدخل الرئيسي
٤. مصدر دخل إضافي ٥. الملابس ٦. البناء ٧. أخرى

٢/ الثروة الحيوانية

١٣. هل لدي أسرتك ملكية او الحصول على الثروة الحيوانية؟ ١/ نعم ٢/ لا

١٤. إذا كانت الإجابة بنعم، أكمل الجدول أدناه.

النوع	العدد الكلي	الدخل السنوي

١٥. ما هو الغرض الرئيسي من هذا الانخراط في أنشطة الثروة الحيوانية؟ (ضع علامة)

١. المصدر الرئيسي للغذاء ٢. مصدر إضافي للغذاء ٣. مصدر الدخل الرئيسي
٤. مصدر دخل إضافي ٥. الملابس ٦. البناء
٧. أخرى.....

٣/ دخل الأجر الغير الزراعي.

١٦. هل لدي أسرته ملكية او الحصول على نشاط غير الزراعي؟ ١ = نعم / ٢ = لا.
١٧. إذا كانت الإجابة بنعم، أكمل الجدول أدناه.

نوع النشاط	مستوى الدخل
صناعة يدوية	ضعيف
غسل الملابس	متوسط
تجارة	جيد
عمل حكومي	جيد جدا
بيع الاكل والشاي	ممتاز

١٨. ما هو الغرض الرئيسي من الدخل غير الزراعي؟

١. مصدر رئيسي للغذاء ٢. مصدر إضافي للغذاء ٣. مصدر الدخل الرئيسي
٤. مصدر دخل إضافي ٥. الملابس ٦. البناء ٧. أخرى....

١٩. ما هي المشاكل التي واجهتك في العمل واثرت على الدخل الاقتصادي للأسرة؟

- ١/ الكوارث مثل السيول ٢/ تقلبات الأسعار ٣/ السياسات ٤/ المرض

ج/ مصادر الامن المعيشي للأسرة

ج١/ راس المال البشري

٢٠. هل أتاحت لكم فرصة للحصول على التدريب في أي مجال من قبل؟ ١/ نعم ٢/ لا
٢١/ إذا كانت الإجابة بنعم أكمل الجدول ادناه؟

نوع التدريب	لا (٠)	قليل (١)	كثير (٢)	كثير جدا (٣)	الجهة التي قدمت التدريب
١/ محو الأمية					
٢/ أعمال يدوية					
٣/ صناعات صغيرة					
٤/ تربية حيوانات					
٥/ اسعافات أولية					
٦/ تسويق					

٢٢. هل لم يتمكن أي من أفراد أسرته من العمل أو أداء واجباتهم بسبب المرض؟ ١ = نعم ٢ = لا

٢٣. هل توجد حالات وفاة أثناء الولادة؟ ١/ نعم ٢/ لا

٢٤. هل توجد حالات من سوء التغذية بين الأطفال؟ ١ = نعم ٢ = لا

٢٥. إذا كانت الإجابة بنعم ما هي الحالة التي يعاني منها.

١/ نقص في الفيتامينات ٢/ نقص في الحديد

٢٦. هل لم يتمكن أي من أفراد أسرته من تكلمة مراحل التعليم الأساسية؟ ١ = نعم ٢ = لا

٢٧. هل توجد صعوبة في الوصول الي المدرسة او المستشفى؟ ١ - نعم ٢ = لا

٢٨. إذا كانت الإجابة بنعم حدد الصعوبات.

أ/ بعد المسافة ب/ عدم توفر المال

ج ٢ رأس المال المادي

٢٩/ ما هو عدد الوحدات السكنية

٣٠/ ما هي المادة المستخدمة في البناء

١/ طوب واسمنت ٢/ الحديد والزنك ٣/ القش والطين

٣١/ ما هو نوع الصرف الصحي ١/ محسن ٢/ بلدي

٣٢/ ما هو نوع المراض ١/ محسن ٢/ بلدي

٣٣. ما رأيك في حالة البنية التحتية في المنطقة الخاصة بك؟

مستوى الحالة				نوع البنية التحتية
صعبة جدا (٠)	صعبة (١)	ميسرة (٢)	ميسرة جدا (٣)	
				١/ المواصلات
				٢/ السوق
				٣/ الكهرباء
				٤/ امدادات المياه الزراعية
				٥/ امدادات مياه الشرب

٣٤. ما هي الأصول في القائمة التالية التي يمكنك الوصول إليها؟

الأصول	نعم = ١	لا = ٢
الهاتف الخليوي		
راديو		
تلفزيون		
كمبيوتر شخصي		
خزان المياه		
ثلاجة / فريزر		
عربة		
أسطوانة غاز		

ج ٣ رأس المال الاجتماعي

٣٥. هل تنتمي أنت أو أي من أفراد أسرتك إلى أي جمعية تعاونية؟ ١ = نعم ٢ = لا
٣٦. إذا كانت الإجابة بنعم، فما هي أنشطة التعاونية؟
- ١/ تربية دواجن ٢/ تشجير او بستنة ٣/ صناعات صغيرة ٤/ صندوق تعاوني
٣٧. هل تستعين باي مصدر للمعلومات؟ ١ = نعم ٢ = لا
٣٨. إذا كانت الإجابة بنعم ما هي مصدر المعلومات؟
- ١/ وسائل الإعلام (الصحف والراديو والتلفزيون). ٢/ الإنترنت (رسائل البريد ٣/ اجتماعات المجتمع (جمعية). ٤/ الهاتف

ج ٤ رأس المال المالي

٣٩. هل لديك إمكانية الحصول على القروض؟ ١ = نعم ٢ = لا
٤٠. إذا كانت الإجابة بنعم فما نوع القرض؟ ١ = رسمي ٢ = غير رسمي
٤١. إذا كانت الإجابة بنعم، فما هو الغرض من القرض؟ (ضع علامة على المناسب)
- ١/ الاقتراض الشخصي للاستهلاك المنزلي
- ٢ / الزراعة
- ٣ / نشاط آخر لكسب العيش
- ٤/ أخرى (حدد)
٤٢. إذا كانت الإجابة بلا، فما السبب؟ (ضع علامة على المناسب)
- ١/ سعر الفائدة كان مرتفعًا جدًا
- ٢/ لم أستطع تأمين الضمانات المطلوبة
- ٣/ لدي أموال خاصة
- ٤/ لا يمكن الوصول إليه
- ٥/ أخرى (حدد)
٤٣. ما هي الاحتياجات الضرورية التي تعمل على تحسين الامن الغذائي والمعيشي للأسرة؟
- ١//٢/٣/٤/٥
٤٤. هل توجد منظمات طوعية تعمل على تحسين الامن الغذائي؟ ١/ نعم ٢/ لا

٤٥ / إذا كانت الإجابة بنعم حدد نوع الجهة؟

- ١ / حكومية
٢ / منظمة
٣ / قطاع خاص
د / مقياس الوصول إلى انعدام الأمن الغذائي للأسر

٤٦ / مستوى الامن الغذائي

- ١ / أمن غذائنا
٢ / أقل ما يقال من انعدام الأمن الغذائي
٣ / يعاني من انعدام الأمن
٤ / شديد انعدام الأمن الغذائي

٤٩ . في الأسابيع الأربعة الماضية، هل كنت قلقًا من أن أسرتك لن يكون لديها ما يكفي من الطعام؟ = ١
نعم = ٠ لا

٥٠ . إذا كانت الإجابة بنعم كم مرة حدث هذا؟

- ١ . دائما
٢ . في بعض الأحيان
٣ . نادرا

٥١ . في الأسابيع الأربعة الماضية، هل لم تتمكن أنت أو أي فرد من أفراد أسرتك من تناول أنواع الأطعمة التي تفضلها بسبب نقص الموارد؟ = ١ نعم = ٢ لا

٥٢ . إذا كانت الإجابة بنعم كم مرة حدث هذا؟

- ١ . دائما
٢ . في بعض الأحيان
٣ . نادرا

٥٣ . في الأسابيع الأربعة الماضية، هل اضطررت أنت أو أي فرد آخر من أفراد أسرتك إلى تناول وجبات أقل في اليوم بسبب عدم وجود ما يكفي من الطعام؟ = ١ نعم = ٢ لا

٥٤ . إذا كانت الإجابة بنعم كم مرة حدث هذا؟

- ١ . دائما
٢ . في بعض الأحيان
٣ . نادرا

٥٥ . في الأسابيع الأربعة الماضية، هل لم يكن هناك طعام من أي نوع تأكله في أسرتك بسبب نقص الموارد للحصول على الطعام؟ = ١ نعم = ٢ لا

٥٦ . إذا كانت الإجابة بنعم كم مرة حدث هذا؟

- ١ . دائما
٢ . في بعض الأحيان
٣ . نادرا

