

**ASSESSING THE IMPACT OF FLOODS ON FOOD SECURITY IN THE ZAMBEZI REGION:  
A CASE STUDY OF THE IKABA AREA**

A MINI THESIS SUBMITTED IN PARTIAL FULFILMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF ARTS IN SECURITY AND STRATEGIC STUDIES

OF

THE UNIVERSITY OF NAMIBIA

BY

KENNEDY KAUMBA MABUKU

218337384

OCTOBER 2022

SUPERVISOR: DR. RICHARD IROANYA (UNAM)

## ABSTRACT

The present empirical study was conducted in the *Ikaba* area of *Kabbe* South Constituency (KSC) of the Zambezi Region, an area with a long and known history of persistent floods annually. Studies on flood and food security relations primarily focus on four dimensions of food security and have hardly received any attention from researchers, which is the reason that motivated this study. This study was aimed at assessing the impact of floods on food security by reviewing the lived experiences of those affected by flood in the *Ikaba* area of KSC. The present study used semi-structured interviews to collect data from a sample of 14 households that consisted of 9 to 23 people and 4 key informants in the Zambezi region who occupy key strategic positions.

A qualitative research approach was used, supported by the phenomenological research design. Data was analysed using thematic analysis to make sense of the participants' accounts of the impact of the floods on food security. The study's findings reveal that crop damages have been a recurring and uncontrolled phenomenon in the *Ikaba* area due to prevalent floods causing premature harvest, consequently affecting food availability. Besides, it has been found that accessing markets during flood time for all kinds of food is an unrealised endeavour, mainly due to a lack of proper road infrastructure in the area. In the end, food accessibility has become one of the food security dimensions that have been affected.

The study further discovered that insufficient nutritious food has become a recurring trend within the *Ikaba* community regarding food utilisation. In addition, food utilisation was found to be affected by poor health status caused by contaminated food and water which comes with high health risks due to the floods. While food supply chain disruption affects food stability, the study also concluded that lack of food retailers and failure to access Agri-loans due to a lack of collateral by community members in the area affects food stability. The study concludes that the *Ikaba* area inhabitants suffer from acute food insecurity. Not all people in the area have both physical and economic access to readily accessible, sufficient and suitable food to meet their dietary needs for a productive and healthy life.

In conclusion, the present study recommends the construction of permanent road infrastructure in the KSC to link the residents of *Ikaba* to the outside world, especially to markets. Also, the construction of a diversion canal, planting of early maturing varieties, improved access to affordable loans have been noted in the study as prospective coping strategies that may ameliorate the impact of floods on food security.

## TABLE OF CONTENTS

ABSTRACT .....	II
TABLE OF CONTENTS .....	III
LIST OF TABLES .....	VI
LIST OF FIGURES .....	VII
LIST OF ABBREVIATIONS .....	VIII
ACKNOWLEDGEMENTS .....	I
DEDICATION .....	III
DECLARATIONS .....	IV

### CHAPTER 1:

INTRODUCTION AND BACKGROUND OF THE STUDY .....	1
1.1 INTRODUCTION .....	1
1.2 BACKGROUND OF THE STUDY .....	2
1.3 PROBLEM STATEMENT .....	4
1.4 RESEARCH QUESTIONS .....	4
1.5 SIGNIFICANCE OF THE STUDY .....	5
1.6 DELIMITATIONS OF THE STUDY .....	5
1.7 OUTLINE OF THE STUDY .....	5
1.7.1 Chapter 1: Background to the Study .....	5
1.7.2 Chapter 2: Review of Literature .....	6
1.7.3 Chapter 3: Research Methodology .....	6
1.7.4 Chapter 4: Presentation .....	6
1.7.5 Chapter 5: Discussion of the results, conclusion and recommendations .....	6
1.8 CONCLUSION .....	6

### CHAPTER 2:

LITERATURE REVIEW .....	7
2.1 INTRODUCTION .....	7
2.2 DISCUSSION OF KEY TERMS .....	7
2.2.1 THE SECURITY CONCEPT .....	7
2.2.1.1 The traditional definition of security .....	7
2.2.1.2 Human Security .....	7
2.2.2 FLOOD .....	9
2.2.3 FOOD .....	10
2.2.4 FOOD SECURITY .....	10
2.2.5.1 Food Availability .....	11
2.2.5.2 Food Access .....	11
2.2.5.3 Food Utilisation .....	12
2.2.5.4 Food Stability .....	12
2.2.5 FOOD INSECURITY .....	14

2.3	FRAMEWORK ON FLOODS AND FOOD SECURITY .....	14
2.4	EMPIRICAL LITERATURE REVIEW .....	16
2.4.1	HISTORICAL OVERVIEW OF FLOOD.....	16
2.4.1.1	Global perspectives .....	16
2.4.1.2	African perspectives .....	16
2.4.1.3	Namibian perspectives .....	17
2.4.2	FLOOD AND FOOD INSECURITY .....	17
2.4.3	FLOOD AND FOOD SECURITY .....	19
2.4.4	DETERMINANTS OF FOOD SECURITY AND INSECURITY .....	21
2.4.3.1	Spatial factors .....	21
2.4.3.2	Non-spatial factors .....	22
2.5	CONCLUSION .....	23
 CHAPTER 3: 		
	METHODOLOGY .....	25
3.1	INTRODUCTION .....	25
3.2	DESCRIPTION OF THE STUDY AREA .....	25
3.3	RESEARCH METHODOLOGY .....	28
3.3.1	RESEARCH DESIGN.....	28
3.3.2	RESEARCH APPROACH .....	28
3.3.3	THE POPULATION OF THE STUDY .....	29
3.3.4	SAMPLING AND SAMPLING METHOD.....	29
3.3.5	DATA COLLECTION PROCEDURE AND DATA INSTRUMENT .....	31
3.3.5.1	Interviews .....	31
3.3.5.1.1	Individual Interview.....	32
3.3.5.1.4	Building rapport with the participants .....	33
3.3.6	QUALITATIVE DATA ANALYSIS .....	34
3.3.6.1	THEMATIC ANALYSIS .....	35
3.3.7	TRUSTWORTHINESS OF THE STUDY .....	35
3.3.7.1	Credibility .....	36
3.3.7.2	Transferability .....	36
3.3.7.3	Dependability .....	36
3.3.7.4	Conformability .....	37
3.4	LIMITATION OF THE STUDY.....	37
3.4.1	LIMITATIONS AS A RESULT OF THE RESEARCH APPROACH.....	38
3.4.2	LIMITATIONS AS A RESULT OF THE SAMPLING METHOD .....	38
3.4.3	LIMITATIONS RESULTING FROM THE SAMPLE SIZE AND CHARACTERISTICS .....	38
3.5	ETHICAL CONSIDERATIONS.....	39
3.5.1	INFORMED CONSENT .....	39
3.5.2	RESPECT FOR RESEARCH PARTICIPANTS .....	39
3.5.3	DATA OWNERSHIP .....	39
3.5.4	INTEGRITY AND QUALITY .....	40
3.6	CHAPTER SUMMARY .....	40

## CHAPTER 4:

PRESENTATION AND DISCUSSION OF THE RESULTS .....	41
4.1 INTRODUCTION .....	41
4.2 RESEARCH FINDINGS.....	41
4.3 DEMOGRAPHIC PROFILE OF PARTICIPANTS.....	42
4.3.1 Household composition .....	42
4.3.2 The years of residing in Ikaba area for household heads.....	43
4.3.3 Composition of household members .....	44
4.3.4 The means of survival.....	46
4.3.5 Pull factors for residing in Ikaba area.....	47
4.4 QUESTIONS RELATED TO THE RESEARCH OBJECTIVES .....	48
4.4.1 How does flood affect the availability of food in Ikaba areas? .....	48
4.4.2 How does flood affect food accessibility during flood season in Ikaba? .....	55
4.4.3 Food utilisation during flood season?.....	61
4.4.4 Food stability during flooding time in the Ikaba area?.....	63
4.4.5 Improving food security during floods .....	66
4.3 Discussion of the findings.....	70
4.5 CHAPTER SUMMARY .....	78

## CHAPTER 5:

SUMMARY AND CONCLUSION .....	80
5.1 INTRODUCTION.....	80
5.2 SUMMARY OF THE CHAPTERS .....	80
5.3 EVALUATION OF RESEARCH QUESTIONS .....	82
5.4 RECOMMENDATIONS.....	84
RECOMMENDATIONS ARE DIVIDED INTO LONG, AND SHORT-TERM SOLUTION, INCLUDING RECOMMENDATIONS FOR FUTURE RESEARCH AS FOLLOW. ....	84
5.4.1 Immediate or short term solutions to food security .....	84
5.4.2 Long lasting solutions to food security.....	85
5.4.3 Future research .....	86
5.5 CONCLUSION .....	86
REFERENCES.....	88
APPENDIX A: FOCUS GROUP QUESTIONS FOR THE HOUSEHOLDS	
APPENDIX B: INTERVIEW SCHEDULE FOR KEY INFORMANTS	
APPENDIX C: PERMISSION LETTER FROM THE INSTITUTION	
PERMISSION LETTER FROM THE INSTITUTION	
APPENDIX: D PERMISSION LETTER FROM IKABA TRIBAL COURT	
APPENDIX: E ENGLISH PROFESSIONAL EDITOR CERTIFICATE	

## **LIST OF TABLES**

<b>TABLE 1: RESEARCH SAMPLE STATISTICS .....</b>	<b>30</b>
<b>TABLE 2: DAMAGE ESTIMATES FOR MAIZE CROPS.....</b>	<b>50</b>
<b>TABLE 3: AN ESTIMATED LOSS OF LIVESTOCK DUE TO FLOODING .....</b>	<b>54</b>
<b>TABLE 4: HOUSEHOLD LOSS ESTIMATES FOR CASSAVA FIELDS DUE TO FLOOD.....</b>	<b>60</b>

## LIST OF FIGURES

Figure 1: Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS)...	15
Figure 2: Map of the study area.....	25
Figure 3: Namibian Rainfall Map.....	26
Figure 4: Gender of Household Heads.....	42
Figure 5: The years of residing in Ikaba area for household heads.....	43
Figure 6: Composition of household members.....	45
Figure 7: The means of survival.....	46
Figure 8: Pull factors for residing in Ikaba area.....	47
Figure 9: Maize crop field in Ikaba area pre-mature submerged in flood water.....	49
Figure 10: Herd of cattle being evacuated from Ikaba area to higher ground during flood season.....	53
Figure 11: Banana boat as a mode of transport during flood season.....	56
Figure 12: The Overloaded dugout canoe used as a link to town for the residents of Ikaba during flood.....	56
Figure 13: A fisherman removing fish from the net and a young boy with fish ready for consumption.....	58
Figure 14: A Man trying to uproot the flooded cassava tubers for consumption.....	59
Figure 15: Resident of Ikaba with a small portion of harvested cob of maize from a 4.2-hectare field.....	64
Figure 16: Mongu-Kalabo road in Zambia linking the flood-affected community to markets...	67

## **LIST OF ABBREVIATIONS**

<b>EIU</b>	-	Economic Intelligent Unit
<b>FAO</b>	-	Food and Agricultural Organisation
<b>FIVIMS</b>	-	Food Insecurity and Vulnerability Information and Mapping Systems
<b>GRN</b>	-	Government of the Republic of Namibia
<b>KNC</b>	-	Kabbe North Constituency
<b>KSC</b>	-	Kabbe South Constituency
<b>NGOs</b>	-	Non-Governmental Organisations
<b>OECD</b>	-	Organisation for Economic Co-operation and Development
<b>SADC</b>	-	Southern African Development Community
<b>UN</b>	-	United Nations
<b>UNDP</b>	-	United Nations Human Development Report
<b>USAID</b>	-	United States Agency for International Development
<b>USDA</b>	-	United States Department of Agriculture
<b>WFS</b>	-	World Food Summit
<b>WHO</b>	-	World Health Organisation

## ACKNOWLEDGEMENTS

To any researcher, acknowledgement is an integral part of academic modesty. Therefore, people are acknowledged for their contribution to the study. Over the years, I have been appreciative of the many kind words of encouragement and great assistance from people of different calibre on my academic route. As is the case with any research project, the researcher is indebted to several individuals and organisations.

First and foremost, my most tremendous thanks go to Dr Iroanya Richard, my study leader. Your fervent contribution and untiring guidance were terrific from the inception of the study. Indeed, researcher can never extort the entire realm of all research facets, especially in food security in relation to human security. Your forbearance was enough to help me complete this paper. I endeavour to use all you have imparted in me in my future undertakings. I was fortunate to have your cheerfulness and expertise behind the scene in completing this research project.

My earnest gratitude also goes to my lovely wife, Patricia Mabuku. When I first met you, I would not have imagined that you would be my best companion. However, you have become a solid foundation and a refuge that has harboured me for thirteen years now. Words alone cannot describe how you, as a source of assistance you have been to me in this professional itinerary, you nudged me to perceive. Thank you, dear Wife, “I love you”.

Heartfelt gratitude goes to my mother, Hildah Kalubi, for teaching me the value and importance of education throughout my life. You never ceased to continually remind me of the significance of work-study-life balance, thank you “ma”.

Great thanks to my sons Ben and Kennedy Junior, you would always crave full attention from my side, but when I failed to fulfil such duty, you understood me fittingly. Thanks once again, sons.

To my beautiful daughters Nelly, Selly, Hildah, Desi and Bethel for their continuing source of encouragement and optimism throughout the paper. Their existence cleared uncertainty in my study and pushed me to the core.

I am indebted to Mr Mudabeti my professional editor, for editing this thesis. You worked tirelessly within the limited time. I am indebted for your work rate and knowledge in English language. Further, Mr. Kamukwanya Eino and Mr Joseph Ok it will be a remiss of duty to fail to acknowledge you for an unstinting source of support in terms of grammar. My best friends indeed, not only in this professional circuit but life in general. Many thanks, 'gurus'.

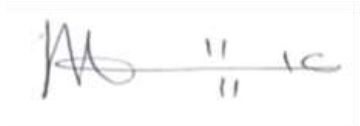
I am immensely appreciative of the support from the research participants for agreeing to participate in this study. Too numerous to mention individually, but not forgotten. Thank you a million times.

Last, but certainly not the least, it will be remiss of duty to fail to acknowledge The Almighty God for everything. He has given me the strength to deal with every aspect of the research. For that, praise be to Him!

Lastly, my cordial and profound thanks to those who will read this research paper and strive to utilise the research to make a tangible contribution towards mitigating the effects of floods on food security. I owe you an obligation of gratitude.

## DEDICATION

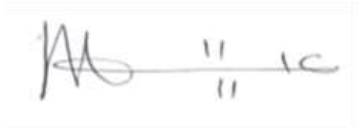
This study is dedicated to my late father, Vincent Mabuku Sichaba, who died in 2007 during flood season at Bulila village of Ikaba area. He succumbed to an illness due to failure to access health facilities timely, lack of affordable acumen and access readily available medical services. Your teaching still revitalises my potential, great hero, indeed. Rest in peace, 'Dad'.

A handwritten signature in black ink, appearing to read 'Kennedy Kaumba', enclosed in a thin black rectangular border.

Kennedy Kaumba

## DECLARATIONS

I, Kennedy Kaumba Mabuku, declare hereby that **ASSESSING THE IMPACT OF FLOODS ON FOOD SECURITY IN THE ZAMBEZI REGION: A CASE STUDY OF THE IKABA AREA** is my work both in execution and content apart from the legal guidance from my supervisor and English editorial care from the professional editor. The present study reflects the researcher's efforts since the current work has not been submitted for a degree in any other institution of higher education. All the sources consulted are cited and referred to in the reference list using a comprehensive APA referencing system. No part of this thesis may be reproduced, stored in any retrieval system, or transmitted in any form or any means without the author's prior permission or the University of Namibia on that behalf. Provided it meets the University's requirements, the consent is granted to The University of Namibia to reproduce the thesis in whole or in part, in any manner or format, which The University of Namibia may deem fit any person or institution requiring it for study and research.

A handwritten signature in black ink, appearing to read 'KK' followed by a horizontal line and the numbers '11' and '10' below it.

October 2022

Kennedy Kaumba

## **CHAPTER 1:**

### **INTRODUCTION AND BACKGROUND OF THE STUDY**

#### **1.1 INTRODUCTION**

This study was aimed at examining the impact of floods on human security in Kabbe South Constituency (KSC) of the Zambezi region in Namibia. Recurrent floods are particularly a serious threat to the inhabitants of Kabbe constituency, where widespread poverty and limited government support to address this problem has resulted in the loss of lives and means of livelihood lost. Flood, as a natural disaster, is difficult to predict in the context of Kabbe South in particular and Namibia in general due to poor planning, limited knowledge and expertise, lack of technology and early warning systems. Moreover, the problem of floods is expected to intensify in the region due to climate change. One of the effects of floods on human security in the region is the washing away of houses and destruction of crops; this is also confirmed by several studies undertaken on floods in Africa and the Southern African Development Community (SADC) region and Namibia. These studies, in particular, include researchers such as (Adelekan, 2011; Alicia, 2012; Mashebe, 2015).

The furthest part of the Ikaba area is approximately 145 km east of Katima Mulilo town. The study area covers approximately an area of about 1,236 km<sup>2</sup> from 14,785 km<sup>2</sup> of the entire Zambezi region (Likando, 2019). This represents about 8.3 percent of the Zambezi region's land (Likando, 2019, p. 6). It is an area prone to erratic rainfall and flood, which has a negative impact on food security within the affected community. Studies have shown that a flood is a common natural disaster associated with food insecurity across the globe (OECD, 2010; Mitiku, Fufa, & Tadese, 2012; Ramakrishna, 2014; Tuwilika, 2016). These studies further reveal that floods destroy the environment, cause damages to property, destroys crops, and causes animal diseases resulting in food insecurity in terms of food stability, accessibility, availability and utilisation. Floods impact the social, economic and environmental which negatively affect both individuals and communities in terms of food security. The consequences of floods can be both negative and positive, this mainly depends on the location, the extent of flood and the community's vulnerability (Ramakrishna, 2014, p. 12).

Several studies have been undertaken on floods in Africa, the Southern African Development Community (SADC) region in general and Namibia. These studies include (Adelekan, 2011; Alicia, 2012; Mashebe, 2015). The material and potential threat of floods to food security in Ikaba motivated the researcher to carry out the present study.

Chapter one of the study discusses the background to the study, the statement of the problem, the research objectives, the significance of the study, the limitations of the research and the delimitation of the study.

## **1.2 BACKGROUND OF THE STUDY**

Over the years, Namibia has experienced recurrent disasters from different dimensions but in the same geographical areas. The northern regions are the most affected by the floods. The regions include Oshana, Ohangwena, Omusati, Kavango West and East, as well as Zambezi region (Niipare, Jordaan & Siyambango, 2020, p.1). Though the northern areas experience floods annually, Zambezi is the most affected region, especially the north-eastern part that comprises part of Kabbe North Constituency (KNC) and the entire KSC (Likando, 2019, p.5). Kabbe South Constituency is an electoral constituency of the Zambezi Region of Namibia which was established in August 2013 from the north-western part of Kabbe Constituency, following a recommendation of the Fourth Delimitation Commission of Namibia, and this was the focus area of the study, particularly the Ikaba area. It consists of approximately 2298 households (Likando, 2019). Ikaba area in the KSC is a severely flood-prone area (wetlands). Most of the communities in the area are located along the Zambezi River and *Kasaya* stream that encroaches from Zambia to another part of KSC, including the Ikaba community.

Mendelsohn and Roberts (1997) point out that the traceable major floods to have been retrieved from the archive in Southern Africa since the 1940s occurred in 1958, 1968/9, 1978 and 2009. In addition, close to these major floods were the ones in 1966, 1968, 1970, 1975/1976, 1979, 2004, 2007 and 2010/2011 devastating flood waves.

During these years, much of Southern African countries received above-normal rainfall. This has been described as the worst in terms of the amount of rain received and the level of impact on human security in general and food security specifically. A fascinating prime observation is that there is a heavy flood in Zambezi Region at least each decade. However, in 2020 the region experienced another heavy downpour nearly after 11 years after the previous heavy flood.

The Post Disaster Needs Assessment Report shows that flood contributes to food insecurity in flood prone areas (Government of the Republic of Namibia (GRN), 2009, p. 47). The report further indicates that in 2009, subsistence farmers lost about 80% of their maize and mahangu fields due to the flood situation. Not all Ikaba areas are built in low-lying terrain, most residents in the community built their villages or place of habitation in sites referred to as *mitunda* or

*mazulu* (moderate-higher ground) in *Silosi*, a local language. These places are natural hills that are formed by termites or mounds that rise above sea level. The location of these places is strategically chosen by the residents to prolong their stay within the area during flood season. This is mainly because it takes a bit longer for those places to submerge during floods than other sites.

The observation is that, because such elevated places are few, the areas usually accommodate between five to twenty-five (5- 25) households per village. Even though this does not serve as a permanent remedy to escape the impact of flood on livelihood, constructing houses in these places has become a routine and relevant practice for the people of Ikaba community. The majority of residents, approximately 85%, sell their fish produce to Zambia and obtain most of their necessities from Zambia due to the shorter distance to Livingstone, a town in Zambia, compared to Katima Mulilo, a town in Namibia. Other reasons cited are affordability of essential services, reasonable transport fees and big fish market in Zambia compared to Namibia.

The residents of Ikaba have become nomadic due to the prevalent annual floods. Unfortunately, depending on the flood level each year, they are forced to move to higher ground during a heavy downpour for most of the flood season if their *Mitunda* and *Mazulu* are submerged by water. When this happens, they, in most cases, suffer crop losses as they relocate to higher ground before they can harvest their crops and return after the flood season, generally in June each year. The residents in this area depend heavily on crops such as maize, cassava and pumpkins. Furthermore, they subsist on livestock and fish farming.

Moreover, the Ikaba residents are usually the first to have their villages submerged by flood each year before the rest of the communities in KSC. This means that they incur the most damages in terms of crops and livestock losses that are felt more severe in this area than in any other neighbourhood villages in Kabbe South. Consequently, negatively affecting food availability, accessibility, utilisation and stability.

As earlier stated, owing to the geographical location of the Ikaba community, along the river banks, the residents of Ikaba community fall short of ways to control the hydrological effects resulting from the rise of the river and stream catchment thus negatively impacting food security. Food security is among the seven dimensions of human security defined in the United Nations Human Development Report 1994 (UNHDR). Namely, economic, food, health, environmental, personal, community and political safety (UNHDR, 1994, pp. 24-25). The study concentrated on food security as a human security threat. This meant focusing on four

main dimensions of food security: food availability, food accessibility, food utilisation and food stability. Despite several studies undertaken on floods in general, in the region, the evidence suggests that there are no studies yet undertaken in the Ikaba area focusing on the impact of flood on food security. Therefore, this research gap justifies the continuation of the present study.

### **1.3 PROBLEM STATEMENT**

The prevalent seasonal flood displaces the residents from their native villages' year in and year out. In the process, food security is impacted in terms of crops that are destroyed such as cassava, maize, sorghum and loss of livestock (Nakale, 2020, p.1). According to a special report by FAO (2009, p.3), in the Eastern-Caprivi, now Zambezi region, in 2009, there were approximately 6 000 cattle trapped in the Ikaba area. Apart from symbolising prestige, owning cattle in Ikaba area serve as an economic power and means of livelihood; hence, in the community sense, it contributes immensely to food security (Nakale, 2020, p.1). Besides, grazing land becomes scarce during floods and some cattle, goats, and sheep drown during evacuation or are attacked by crocodiles.

The significant issue is that crocodiles attack and kill cattle daily, those that remain in the floodplains area. Given that the residents of Ikaba community subsist on crop and animal farming, flood affects their livelihood, which is a visible source of food insecurity in the area. Hence, the reason that the residents rely much on the Government Republic of Namibia (GRN) for food relief ("*mulyo*") to sustain their livelihood, which is also provided in insufficient quantities. Understanding the complexity of flooding on food security within the four domains of food security is a vitally important step in finding concerted efforts on food security effects. Therefore, the study assesses the impact of floods on four food security dimensions: food availability, food accessibility, food utilisation and food stability.

### **1.4 RESEARCH QUESTIONS**

The following primary questions were formulated to systematically assess the impact of floods on food security in the Ikaba area.

The main research question is:

I.What is the impact of floods on food security with specific reference to the Ikaba area?

To achieve this question, specific research questions are identified as follows:

- II. How does flood affect the availability of food in the Ikaba area?
- III. How is food accessibility affected by flood in the Ikaba area?
- IV. To what extent is food utilisation affected by flood in Ikaba area?
- V. To what extent is food stability affected in the Ikaba area?

## **1.5 SIGNIFICANCE OF THE STUDY**

The significance of this study can be viewed from two (2) substantial standpoints. These include practical and academic angles. This kind of study could assist in broadening the understanding of the residents of the Ikaba area in general; the findings could further expand their knowledge and experiences about flood-related food insecurity through evidenced research-based findings. In this way, they may use recommendations provided to improve their farming during flood.

Due to their influence in policy crafting, key informants may use the findings to suggest ways in which policies may be suitable to alleviate the effect of flood on food security. The findings may also influence further studies on flood. The study could also provoke further exploration regarding flood and food security in the area, thereby adding to the existing scholarly literature.

## **1.6 DELIMITATIONS OF THE STUDY**

The study was confined to the Ikaba area and key informants only. Furthermore, even though there is always a connection between all seven human security dimensions, the study focused much on food security. Ikaba area was selected for the study because flood has been more prevalent in this area. Therefore, the problem studied was confined to societal concerns in this area because floods have negatively impacted food security.

## **1.7 OUTLINE OF THE STUDY**

The study has five (5) chapters as outlined below:

### **1.7.1 Chapter 1: Background to the Study**

This chapter gives the background and introduction to the research study. It provides insights on how the study was done through the conceptual framework, overall and specific research questions. The chapter further provided the significance, a synopsis of the limitation and scope of the study.

### **1.7.2 Chapter 2: Review of Literature**

The chapter reviews existing literature with the aim of establishing academic support to the present study. The similarity of views expressed, dissimilarity, the gap in knowledge is identified and the findings are compared.

### **1.7.3 Chapter 3: Research Methodology**

This chapter focuses on the description of the study area, the study design, population, sample selection, and size, study methodology (instruments used). In addition, the chapter discusses the data analysis method. Besides, it presents the study's credibility, transferability and dependability and a detailed limitation of the study. Finally, ethical considerations and chapter summary conclude the chapter.

### **1.7.4 Chapter 4: Presentation**

This chapter presents a discussion on interview results on how flood affects food security in the Ikaba area. It focuses on the availability, accessibility, stability and utilisation of food in the Ikaba area. On the other hand, it provides an interpretation of the data in order to make sense of it. Equally to note, the discussion shows how the study relates to extant literature.

### **1.7.5 Chapter 5: Discussion of the results, conclusion and recommendations**

This chapter provides the conclusion of the study which provides a summary and an evaluation of the research questions to determine the extent to which the questions are answered through the methodologies employed. Lastly, the chapter recommends further investigation.

## **1.8 CONCLUSION**

This chapter discussed the introduction, background to the study, the problem statement, the research objectives and the significance of the study in relation to the effect of floods on food security with specific reference to four elements of food security. Furthermore, the chapter discussed the significance of the study, its limitations and its delimitation of the study. The next chapter looks at secondary literature related to the study topic.

## **CHAPTER 2:**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

Several studies have been conducted on the impact of floods on people's livelihood in Africa, the SADC region, and the Zambezi region in particular. This chapter reviews the existing literature on the subject as earlier established in the study's introduction and background. The chapter also examines and discusses the findings of other studies done on the impact of floods on food security. The literature review is done to provide robust academic backing to the study. The first part of this chapter reviews the literature on key concepts. The second part discusses the theoretical framework and empirical evidence as published by different scholars. The discussion is arranged into subheadings, as seen throughout the chapter.

#### **2.2 DISCUSSION OF KEY TERMS**

From the inception of this study, it was clear that certain words would be regularly used with the capability of assuming different times, meanings and contexts. Therefore, to clear these ambiguities that accompany different interpretations, the study discusses the incessant key terms in this study of the impact of flood on food security. To this end, the typical definitions of key concepts are discussed under the subsection as indicated below:

##### **2.2.1 The Security Concept**

###### **2.2.1.1 The traditional definition of security**

The prominent notion of security refers to protecting the state and individuals from external attacks (Smith, 2009, p.16). Similarly, other scholars relate security to the act of preventing civil war by the government or state (Hobbes, 1996; Frederik & Arenas, 2008). In this way, strong military capabilities were the basis for the success of the traditional way of security. Peoples and Vaughan-Williams (2015) noted that the state focused mainly on external war and violence because they were seen as primary threats, while strong military capabilities were the solution to curtail such threats (p.4). Therefore, in the traditional way of defining security, the sovereign state was the referent object.

###### **2.2.1.2 Human Security**

The complete discussion on the impact of flood on food security cannot be realised without a clear picture of what human security entails in general. The UN Resolution A/RES/66/290,

approved the definition of Human Security unanimously on 10<sup>th</sup> September 2012, as "*the right of people to live in freedom and self-respect, free from poverty and misery*" (UN, 2012, p. 2). Generally, the above sentiment could be explained as anything that protects the human species from any kind of threat for continued survival. It implies the condition that allows humankind to undertake in their day-to-day interactions without any sort of constraining factors. It may be mentioned here that human security as a concept is classified into seven main dimensions of security: economic, health, environmental, personal, community, political, and food security, as reflected in the United Nations Development Programme (UNDP, 1994, p.22). The present study focused on food security.

Another contemporary definition of security was provided by Buzan (2014) in the author's book titled, *people state and fear*; almost similarly to UNDP, (1994), the term security is segmented into five security components. The components are political, environmental, military, societal, and economic. It is argued that security's objective is the pursuit of freedom from threat (p.28. In this context, it can be seen that security is a broad concept as it incorporates several human activities).

Human Security diverges from the traditional way of defining security with its supremacy dictated by securing the security needs of people and individuals, not merely the state only (Acharya, 2011, p. 480).

When observing the essential variables that the UN illustrates as essential components of what constitutes human security, it could be noted that the study of floods and their impact on human interaction, especially in relation to food security, is crucial. What has become intriguing is that the definition of human security has changed from a common idea of security that only concentrated on protecting the state and its interests from international adversaries. On the contrary, the contemporary definition embodies a human-centric approach that stresses protection and defending individuals in respect of "*freedom from want*" and "*freedom from fear*" (UN, 2012). In this context, it is clear that human security serves as a guarding principle for fundamental freedoms and protects people from severe and prevailing dangers caused by human making or natural phenomena for which flood is included. Although the focus of the study is food security as a human security dimension, this background offers a clearer understanding of the relationship that exists between the prevalent flood and food security as key variables in this study.

### 2.2.2 Flood

Flood is commonly defined as part of the natural water cycle or a hydrological cycle caused by the unusual presence of water on land to a depth, affecting normal activities (Alderman, Turner & Tong, 2012). It is usually caused by rain that runs off either directly through the river systems or is absorbed into the soil to form groundwater flow later (Heyns, Coetzee, Hoffmann, Mendelsohn, Schneider & Seimons, 2011). Meanwhile, Tanaka, Kiyohara and Tachikawa (2020) define flood as “a state of high-water levels along a river channel or coast that leads to inundation and which is not usually submerged”. As earlier alluded to in Chapter 1, flood is the unusual presence of water on land to a depth, affecting normal activities and it is mainly attributed to the overflowing rivers, swamps, river channels, streams or valleys. The overflow may be caused by heavy rainfall, cyclones or change in climate, causing storms such as hurricanes, high tides, seismic events (tsunamis) or large landslides overflowing with seawater (Tshilunga, 2014, p. 8).

The preceding definition can be well understood by looking at different types of floods. Firstly, fluvial (riverine) flood can be distinguished by hydrological characteristics associated with significant water depths, large proximity covered and long duration of up to months mainly caused by rainfall or snowmelt (Tanaka *et al.*, 2020). To illustrate further, fluvial riverine floods are necessitated by heavy rainfall during summer; for instance, in the Ikaba area, when the Zambezi and Chobe rivers are full, they release water into channels (see the description of the study). These channels distribute water in various parts of Ikaba area and cause floods. Therefore, the flood type in this area can be referred to as fluvial (riverine flood) because of inundation in the area that lasts between 4 to 5 months. The consequence of a fluvial flood is that it causes substantive damage to properties, crops, attract waterborne diseases and cause death (Elameen, 2017). Equally important, it accounts for food insecurity in the affected community.

Secondly, a fluvial flood (flash flood) is, in short, a sudden local flood of great volume and short duration which follows within a few (usually less than six) hours of heavy or excessive rainfall” (Yahya & Ali, 2014). Just like a fluvial riverine flood, heavy rainfall falling in a saturated area account for flash floods (Elagib *et al.*, 2021, p.6). In addition to heavy rainfall, flash floods may occur after debris, dams or artificial dams collapse. This sort of flood may occur in the Ikaba area, especially at the beginning of rainfall. However, it does not cause any substantive damages. This is because significant floods in the Ikaba area are customarily experienced when rivers are full, distributing water through channels that account for spreading water in these areas. Therefore, since flash floods last only for hours, rivers cannot be filled by

such flood types. For this reason, the flash flood has less impact on the livelihood of Ikaba residents.

Lastly, coastal flood (storm surge) is caused by the combination of sea tidal surges necessitated by heavy winds, high upstream river flow or low barometric pressure (Zellou & Rahali, 2019). Thus, the hydrological characteristic may cause storm events, subsequently causing a flood. With this description, it is more understood that this type of flood only occurs in the coastal areas.

### **2.2.3 Food**

In the present study, another definition that warranted mention was food. Food is referring to a nutritious substance that is solid in form and usually taken by humans, animals and plants for growth and maintaining life (Allen, 1990, p. 456). Furthermore, food is a critical determinant for health because the quality and quantity of food consumed affect health (Ostry, 2010, p. 2). This notion presupposes that our interaction as human species depends on the energy that one has. For instance, for one to cultivate maize, cassava, or millet, one needs energy; to engage in any developmental project, one needs energy mentally, physically or emotionally. In academia, any kind of study and its success depends on the availability of energy in the body. This is possible when there is availability, accessibility, utilisation and stability of food. This implies that people cannot carry out various activities without food.

### **2.2.4 Food Security**

Food security has historically been referred to as the overall regional, national or even global food supply and shortfalls in supply and food availability (Riely, Mock, Cogill, Bailey & Kenefick, 1995, p. 2). The noticeable gaps between balancing the supply or availability of food, accessing such food and its utilisation dictated the recent change in the definition of food security in recent time. The term has been broadened beyond the native notion of food supply to include access elements and, more recently, stability. The most widely accepted definition of food security is given by the Food and Agricultural Organisation (FAO, 2017, p.3) in its report on the state of food insecurity'. People are food insecure when they often do not have access to enough safe and nutritious food for normal growth and development of the body and active and healthy life.

Pirani and Arafat (2016, p.2) point out that “food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.

Therefore, in its totality, food security is about equitable access to markets, and distribution of resources within households, among individuals and across communities at all times. Food security is also about viable options and opportunities to take action and decide what the right food is as well as issues of affordability at all times (Conceição, Levine, Lipton & Warren-Rodríguez, 2016). The four food security dimensions are discussed under the headings below.

#### 2.2.5.1 Food Availability

Food availability is achieved when sufficient quantities of food are consistently available to all individuals within a country (Manyullei & Arundhana, 2021). According to this view, such food can be supplied through household production, other domestic output, commercial imports, or food assistance (FAO, 2019, p.5). Therefore, with the above, it could be concluded that food availability is derived from agricultural production, such as cash crops, livestock, fishing and forestry farming. It is achievable by employing food cultivation, ideally sustainable use of natural resources and donations from charity organisations. Important to note from the above sentiment is that food availability is closely intertwined with food supply by the production and distribution of food.

At the same time, the study elucidated that a variety of factors determine food production. These factors may include land ownership and use, soil management, crop selection, breeding management, livestock breeding and management and harvesting time. Given such empirical underpinnings, crop production can be affected by changes in rainfall, temperature, resources, and personnel for agricultural purposes. One contentious implication of high rainfall in this context is that it may cause floods, thus negatively impacting food security. It is worth mentioning here that food availability is necessary to ensure food security, but food availability alone is not a sufficient condition for attaining food access. This underpins food access as an essential pillar to consider when assessing the impact of floods on human security.

#### 2.2.5.2 Food Access

Food access refers to the ability to secure food from the market and to access the means of production (Ghosh & Ghosal, 2021, p. 2570). Purchasing power is critical to food access and this varies in relation to market integration, price policies and temporal market conditions (FAO, 2012, p. 5). Conveniently, Frongillo (2003); Maxwell and Smith (1992) add that food access is guaranteed when households and individuals within a set-up have adequate resources to obtain appropriate quantities of food for a nutritious diet. Along the same lines, Ahmed, Ying, Bashir, Abid, & Zulfiqar (2017) note that access to food depends on income available to the household, income distribution within the household and food prices. Food access includes substantial purchasing power and affordability in the local, community and national market. In

this context, own production with access to inputs, land, credit for purchasing and food technology are essential in determining food accessibility.

The relevance of the accessibility dimension is that it determines the households' status of physically accessing the market. Moreover, in this case, floods may affect the community's access to the market place. Equally important is that even though food access is necessary for food security, it is insufficient to realise food utilisation.

#### 2.2.5.3 Food Utilisation

Food utilisation refers to food preference influenced by culture, food safety, food quality, health status, and consumption patterns (FAO, 2012). Food utilisation is the suitable biological use of food, requiring a diet providing sufficient energy and essential nutrients, potable water and adequate sanitation (Wiranthi, Suwarsinah & Adhi, 2014, p. 18). According to the definition of United States Agency for International Development (USAID, 1986) effective food utilisation depends on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper child care, and illness management. For Bilali, Callenius, Strassner and Probst (2019, p.4), food utilisation is the metabolism of food by individuals. Once a household obtains the food, various factors affect the quantity and quality of food that reaches members of the household.

With reference to the above argument, the food ingested must be safe and enough to meet each individual's physiological requirements to achieve food security. Therefore, when measuring food utilisation, the essential aspects to consider include access to improved water sources and access to improved sanitation facilities (FAO, 2015; World Bank, 2015). In addition, the percentage of children less than 5 years of age affected by wasting and prevalence of anaemia among vulnerable groups such as the elderly, pregnant women and children under 5 years. It is, therefore, imperative to note that in food utilisation as a food security measure, the concern is more on the process of combining nutrients with oxygen to release the energy for the purpose of practical body functions.

Important to note is that food utilisation links well with other pillars of food security and dictate human existence. This implies that food utilisation may not fully lead to nutrition security, inadequate energy, and protein and micronutrient intake without other food security dimensions.

#### 2.2.5.4 Food Stability

According to FAO (2015), food stability is the fourth and most recent food security pillar. This pillar overreaches to the first three food security pillars and can either disrupt or facilitate their

attainment. Food stability refers to the ability to obtain food over time. For a clear illustration, FAO (1997) point out that food insecurity can be transitory or chronic. In other words, food stability may be determined by these prior two variables.

Moreover, in transitory food insecurity, food may be unavailable during specific periods. There are several reasons as to why this sentiment is actually true. For instance, at a primary food production level, disasters, such as floods, droughts, fires or crop destruction by wild animals, and decreased levels of food availability is seen. Likewise, civil conflicts can also decrease access to food over a particular time. This is especially so in countries that has experienced conflict. As a result, these countries are likely to continue to experience food insecurity for a prolonged time (Iddrisu, 2020). This observation supports the general view that, strengthening sustainable food systems becomes complex, even harder, when coupled with a natural disaster such as a flood. Since, during a flood, inhabitants of the flooded area suffer from transitory food insecurity brought by the reduction in food distribution, supplies and market access.

According to Economic Intelligent Unit [EIU] (2016), the transitory food insecurity phase may further be affected by political instability necessitated by government changes. According to this view, the transitional period increases the risks involved with food investment. When this happens, most of the population may suffer from food stability, consequently affecting food security during the transition period. SADC has taken a strong stance on political stability. In fact, Article 5(2)(a) of the Treaty of the SADC, 1992 states that for the region to attain the objective of sustainable development, the harmonisation of political and socio-economic policies is necessary (Barnard, 2014). For the reason that one cannot emphasise sustainable development without political stability, there is no secure food security without political harmonised political and socio-economic policies.

Food stability can also be affected by chronic or permanent food insecurity, defined as a long-term, persistent lack of adequate food (Ecker & Breisinger, 2012, p.4). In this case, “households are constantly at risk of being unable to acquire food to meet the needs of all members” (Ecker & Breisinger, 2012, p. 4). As a consequence, chronic insecurity households are unable to achieve the minimum permissible food requirements over a continued time. Discussions around chronic food insecurity focus on a sudden drop in the ability of residents to produce and access sufficient nutritious food for prolonged periods. This potential reality of food stability is not only concerned with the availability of food during a certain period, but it focuses on the durability and sustainability of food supplies to the households throughout the year.

### **2.2.5 Food Insecurity**

According to FAO (2015), food insecurity is a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for average growth and development and active, healthy life. The report further indicates that food insecurity may be caused by three factors: the unavailability of food, insufficiency of purchasing power or the inappropriate distribution of food to the intended recipients, and the inefficient use of food at the household level. Conversely, food insecurity exists whenever the availability of nutritionally adequate and safe food, or the ability to acquire or use acceptable food in socially acceptable ways, is limited, uncertain, or lost (Gaffney *et al.*, 2019). For Berry, Dernini, Burlingame, Meybeck, and Conforti (2015), food insecurity may be experienced when there is a lack of sufficient nutritious food or consuming a poor-quality diet and result in feelings of stress and anxiety about acquiring food or diet quality. Literally, food insecurity exists when individuals at all levels do not experience food security.

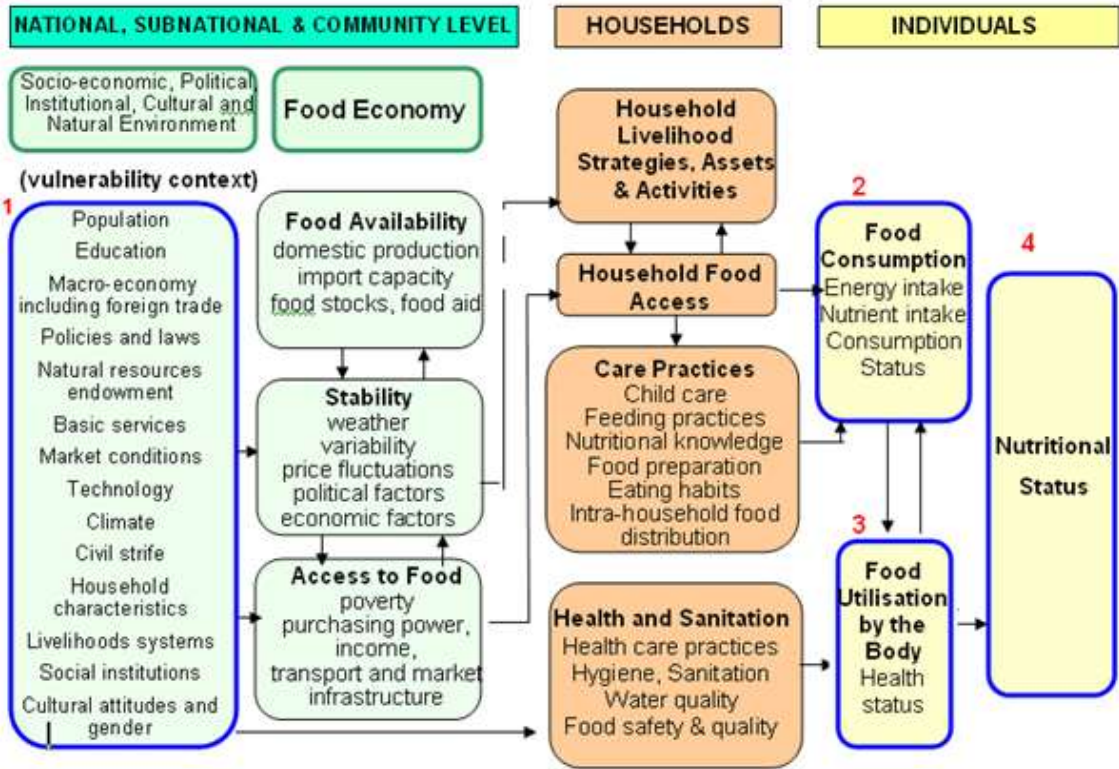
## **2.3 FRAMEWORK ON FLOODS AND FOOD SECURITY**

This study was guided by Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) Conceptual framework on floods and food security. In November 1996, heads of states and governments committed themselves at the World Food Summit "to enable food insecure households, families and individuals to meet their food and nutritional requirements and to seek to assist those who are unable to do so" (FAO, 1997). To achieve the above, governments and other members of civil society were compelled to:

"Develop and periodically update, where necessary, a national food insecurity and vulnerability information and mapping system, indicating areas and populations, including at local level, affected by or at-risk of hunger and malnutrition, and elements contributing to food insecurity, making maximum use of existing data and other information systems in order to avoid duplication of efforts" (FAO, 1997).

In theory, FIVIMS as a framework dictates that any substantial effort to address food insecurity that is necessitated by other factors, including floods, require food security analysis. Therefore, to analyse the existing food situation in the Ikaba area, it is essential to understand issues that negatively impact the residents within the research area. For this framework, the scope of food security starts at national, community, household and individual levels. This meant that assessment of the impact of flood on food security is not only viewed at the household and individual levels but community and national levels as well, as shown in Figure 2.

Figure 1: Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS)



Source: FAO (2017)

The FIVIMS framework highlights a need to consider the underlying socio-economic, political, institutional, cultural, and natural factors as they impact different dimensions of food security (food availability, food accessibility, stability, food utilisation). This natural factor, such as flood, affects care practices leading to a vulnerability in addition to conditions related to health and sanitation. The figure above still illustrates that food consumption is determined firstly by food access at the household level (as determined by relative poverty/incomes, purchasing power, income transfers, as well as the quality of transport and marker infrastructure (FAO, 2017a). This FIVIMS framework shows that the relationship and interaction of the main issues that affect an individual's nutritional status are paramount.

The theoretical framework is fundamental because it answers common questions such as that are food insecure and what their conditions are, and what drives them in those conditions, both in transitory and chronic situations. FAO (2017), observed that it helps identify appropriate entry points to strengthen livelihood, household food security and nutrition. Nutritional outcomes rely on two subcomponents of food consumption (food intake as regards energy and nutrient intake) and biological utilisation of food (dictated by individual health status).

This section correlates with food utilisation as a food security dimension. This theory shows that effective and efficient food utilisation is attributed to a person's health status, as shown in

the above figure. Besides, the review of this framework suggests that there may be severe consequences where food insecurity problems remain. More specifically, this theory assists in understanding the causes of food insecurity and that the underlying problems are a first step in selecting appropriate food security policy interventions related to flood.

As mentioned beforehand, the realisation of households' food security can only be achieved with efforts at the individual and community level and the national level. In terms of flood effects, the framework represents the actual reality; the crux of the argument is that local communities may have temporal flood coping strategies to reduce the effects of flood on food security. Meanwhile, the attainment of chronic flood coping strategies to address food insecurity is only achievable through central government involvement, given the role they have to play.

## **2.4 EMPIRICAL LITERATURE REVIEW**

### **2.4.1 Historical overview of flood**

#### **2.4.1.1 Global perspectives**

It is undoubtedly that; floods are among the most potent forces worldwide. Human societies globally have lived and died with floods from the very beginning Icaga, Tas & Kilit (2016). It is believed that for the longest time in history, floods have affected people globally since it is estimated that globally there were 539 811 fatalities, 361 974 injuries, and 2 821 895 000 people displaced as a result of floods between 1980 to 2009 (Dambe, 2020, p 18). To this end, approximately 24 billion dollars was spent annually to sue to floods from 2001 to 2011 (Winsemius, Ward, Veldkamp, Jongman, Hallegatte & Bangalore, 2018, p.2). Notably, floods impact livelihood positively or negatively worldwide; for instance, minerals and fertile land are imminent due to floods. On the contrary, loss of human lives, damage to property, air and water pollution and damage to infrastructure are adverse impacts associated with floods (Disaster Management, 2015;).

#### **2.4.1.2 African perspectives**

In Africa, one of the major natural hazards is floods represent, accounting for over 27 000 fatalities during the period 1950–2019 (Tramblay Villarini & Wei Zhang 2020, p.2). According to the 2009 Angola, Namibia, Mozambique and Zambia floods were a natural disaster which began in early March 2009 and resulted in the deaths of at least 131 people and otherwise affected around 445,000 people (Jury, 2010). Africa has shown that there is considerable evidence to suggest that there has been a progression in development in terms of

infrastructure, the economy and overall social development; these developmental projects suffer from lasting long due to annual floods, especially in flood-prone areas. This could be the reason why some scholars (Twumasiwaah, 2016); Halgamuge and Nirmalathas, 2017) argue that despite much-needed progress in Africa, the past decades have seen floods damage or destroy much of the food reserves and infrastructure, affecting millions and killing hundreds of people every year. Furthermore, Mwape (2009) presented an alternative comparative study that states that those flood related fatalities in Africa are associated with economic losses, causing food insecurity to increase each year.

#### 2.4.1.3 Namibian perspectives

In Namibia, floods has been a recurring phenomenon that has impacted the lives of citizens due to torrential rains (Niipare *et al.*, 2020, p.11). There were floods of greater magnitudes in the 1960s. Thereafter, there was a period of observable stability in 1980s and 1990s. However, in the mid-2000s, heavy flooding patterns resumed (Oshana regional council, 2009). It is estimated that in 2009 alone, more than 100 people were killed, over 350,000 people lost their livelihoods, and more than 55,000 were displaced (Niipare *et al.*, 2020, p.1). While the northern regions report being more affected by the flood for many years, the flood of 2009 was considered one of the worst in the history of Namibia (Tshilunga,2014, p.1). During flooding, damaged buildings, homes, schools, and health facilities are affected in the northern area of Namibia (United Nations, 2009).

### **2.4.2 Flood and food insecurity**

Global agreements such as the 1996 World Food Summit [WFS] and the 2000 Millennium Summit have been established to address food insecurity. Focusing on goals and specific targets for collective action in reducing the incidence of hunger and food insecurity in the world (FAO, 1996). Despite these concerted efforts in Africa, there is ample evidence to suggest that several countries still battle food insecurity. The prevalent floods, especially in flood-prone areas, contribute to the widespread occurrence of food insecurity (Ouma & Tateishi, 2014)

Given the fact that economic inequality in Africa still dominates social interactions, as mentioned already, availability of food is not the only concern but access to food in reasonable quantities is also a concern. Besides, food availability on time, food utilisation, and food stability equally pose a threat to food security.

A study on flood and food security by Pacetti, Caporalia and Rullib (2017, pp. 494-495), found that, immediately after a devastating disaster, affected people generally face severe difficulty in receiving an adequate quantity of nutritious food, which causes serious health problems, subsequently contributing to high mortality rates. In reversing the coin, it is undeniable that unhealthy households are less productive and subsequently may struggle to produce food; meanwhile, lack of sufficient food is a sign of food insecurity. The above trajectory translates into food security or insecurity, to some extent, is linked to a healthy body yet a functioning or struggling individual (Benzekri, 2017).

A study conducted by Mwape (2009) on the impact of floods on the socio-economic livelihoods of people highlighted that flood is associated with economic security turmoil. He attributes this sentiment to weak buying power, which is caused by flood damages. Closely related to this view are the study findings by Akukwe, Oluoko-Odingo and Krhoda (2020). Firstly, the reasons for the flood induced food insecurity are associated with the destruction of farmland. Secondly, the disruption of sources of livelihood and a rise in food prices. Lastly, seasonal migration to safer areas significantly affects food availability, accessibility and utilisation (p.127).

Other studies that merit mention are those undertaken by Mugambiwa and Tirivangasi (2018); Means (2018), where it was emphasised that apart from the disease outbreaks, many animals succumb to death as a result of hunger and contaminated grass during flood. To this end, much of the grazing land became submerged, subsequently reducing grazing and habitat land. Thus, a situation that has led to overcrowding, starvation and unhealthy conditions such as diseases hampering farmers from becoming self-reliant (Niipare *et al.*, 2020). This finding shows that achieving food security, capital accumulation through the selling of stocks is pivotal because it fills the gaps of shortage in crop production.

To this end, it is therefore likely that such connections exist between food availability and accessibility as they are closely tied together. Floods undermine farm yields and the national harvest, reducing household and national food availability and the agricultural income derived from crop sales” (Ramakrishna, 2014, p.14). Further, the above scholar opines that flood causes poor harvests that threaten food security and livelihoods from household to national levels. Such an event affects food security to varying degrees according to the extent that the family or nation depends on agriculture for its food and income.

The preceding analysis illustrates that when crop yields are destroyed by flood, grain production such as cereal crops on the agricultural front are reduced. The above coincides with

the research conducted by Tirivangasi (2018), that undertook the study on regional disaster risk management strategies for food security in the Southern African Development Community. The findings review that the prevalent flood in Southern African countries reduces crop yields and affects food security.

Interesting to note from the literature that health is another dimension of human security that floods affect. Even though the focus of the study is not on health as a dimension of human security, there is an inseparable link between food security and health. As indicated earlier, food security comprises four pillars, namely: availability, accessibility, stability and utilisation. The preceding creates another level of argument; for instance, immediately after a disaster, health problems prevail; individuals suffer from physical, physiological, and mental injuries. Conversely, this situation affects food utilisation as one of the pillars compounded in food security for a reason mentioned already. This result provides further support, particularly with the understanding that to achieve food security in the Ikaba area, the food ingested must be safe and enough to meet each individual's physiological requirements.

Paterson (2018) argues that the immobile, sick and aged patients are worst affected during the flood season (p. 1451). He further asserts that problems rapidly arise for those suffering from pre-existing health conditions. This argument relates to World Health Organisation (WHO, 2013), which notes that floods have extensive effects on health, ranging from drowning and injuries to infectious diseases and mental health problems due to the absence of nutritious food. Therefore, in the case of flood-prone areas, assessing the impact of floods on food security becomes an exciting endeavour because health security and food utilisation are linked.

According to a report on assessing the impact of flood and other natural disasters on food security of rural households in areas of Northern Namibia revealed that flood aggravates already poor access to and from flood prone areas during flood season. In light of the above, it is argued that many residents are cut off from having physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs due to lack of transport suitable during floods.

### **2.4.3 Flood and food security**

Despite the human security threat posed by floods, they offer relief to the inhabitants of flood areas. In this regard, Katsuhama (2010, p. 51) observed that flood plains act as cheap transportation corridors for canoe users despite the adverse effects of floods. On the other hand, floods also bring along an abundance of fish that the inhabitants sell to make a living. The above explanation draws attention to the importance of considering the sentiment shared by

Tuwilika (2016). The scholar notes that particular residents willingly reside in flood-prone areas searching for better agricultural opportunities and income from selling agricultural produce and fish (p.113).

The study further found that although flood poses human security challenges to residents, survival within the Cuvelai basin, it provides benefits, including increased harvests and livestock productivity for drier places, recharge of sub-surface water reserves and aquifers, as well as increased fishing activities and income. With regard to income generation derived from fishing as expounded in this study, one may take precautions in this regard when generalising the sentiment to other settings. Essentially, other flood-prone areas are totally cut off from the market places, in this case. Therefore, the sentiment of accelerated income generation may be a misplaced conclusion during the flood season, especially if generalised to all flood-prone areas. However, the former still claims its relevance in some flood-prone areas with access to open markets due to close proximity to a town. Eleutério (2012) notes that in the Netherlands, a significant percentage of the territory is located in flood zones and the attractiveness of these areas generate a significant accumulation of values in floodplains (p.1).

Mendelsohn (2013) explained that river floodplains provide nest benefits to river fishermen. Many rivers houses fish species spawn in aquatic vegetation on floodplains, and the fish larvae feed on the floodplains, consequently providing food to the households in terms of food security and as a source of income to sustain basic human security dimensions. The former and latter can only be valid if flood in that particular area does not hinder access to timely markets to sell fish to generate income. Otherwise, the realisation becomes an unachievable task. In this context, regular annual floods provide abundant water resources to replenish lakes and ponds, which, in turn, support irrigation and fish farming (Mendelsohn, 2013).

Flooded rivers carry minerals and nutrients, which support intensive agricultural production on flood plains (Mwape, 2009, p. 22). From this account, it could be seen that fertile farming land attracts people to flood-prone areas. The choice to reside within a floodplain could be justified given the vital role of ample fertile land for agriculture in sustaining food security, and this may partially explain why people in the Ikaba area still persist in not relocating permanently despite the prevailing annual floods. Like Mwape (2009), Majaliwa, Twinomuhangi and Waswa (2020) maintain that land is a natural resource and a social, economic, and cultural resource that sustains agricultural practices, particularly the one with flood residues. By expanding the significance of land, further noted that the availability of fertile land as a means of production also provides a status symbol to rural occupants (Gartaula *et al.*, 2012). Besides, it determines, to a great extent, a person's standard of living in rural communities.

Importantly, even though the attainment of food security depends on four different pillars, cultivating fertile land due to regular sediment deposition during flood events for food production is the first step to food availability. A study conducted in Zambia by Estrada-Carmona, Attwood, Cole, Remans and DeClerck (2020) indicates that due to this riverine phenomenon, wetlands have been recognized as valuable land areas for food and fodder production since the beginning of agricultural activities. In the final analysis, even though floods have adverse effects on food security outcomes, people are still attracted to persistently reside in floodplains for land ownership and other agricultural purposes.

#### **2.4.4 Determinants of food security and insecurity**

In assessing the impact of flood on food security, it is necessary to study food security and insecurity determinants in flood-affected areas. First, it provides the distinction between what people perceive as food security and insecurity. Secondly, the background provided a clear understanding and the related literature findings linked to the study's outcomes, as shown in Chapter 4 of the present study. Therefore, the next sub-section considers both spatial and non-spatial factors in determining food security and insecurity in floodplain areas.

##### **2.4.3.1 Spatial factors**

For the purpose of this study, spatial factors mean factors that could influence household food accessibility to the affected residents (Pakravan-Charvadeh, Khan, & Flora, 2020). For instance, food access disparities research that focused on differences in food store access by Bordor *et al.* (2010) found that poor access to stores that shelve fresh produce may significantly limit residents' opportunities to purchase and consume fruits and vegetables that are fresh. A similar view could apply in the Ikaba area, where stores are closed during the flood season. This occurs mainly due to transport challenges posed by floods to purchase the needed stock. On the other hand, retail shops that sell vegetables are closed during floods, constraining the households' consumption of a balanced diet Dai and Wang (2011) examined inequalities in spatial accessibility to food and its association with location (urban or rural) and non-spatial factors (socioeconomic). Scholars concluded that food accessibility relates to the person's ability to gain the services of food provided at any given time. A similar illustration is provided by Mabhaudhi, Chibarabada, Chimonyo, Murugani, Pereira, Sobratee, Govender, Slotow, and Modi (2018) in South Africa.

In the study illustrated above, it was found that the ownership of ancestral (fertile) land alone may not necessarily determine food security and easy access to markets to sell produce, but buying other essential food items for a balanced body is equally important. This assertion is

substantiated by Munzhedzi (2017), who offers a practical example by highlighting that the inability of consumers to access food was because they live far from a supermarket or a large grocery store. At the same time, these consumers do not have easy access to transportation. Flood, in this case, could prove to be a stumbling block in terms of offering accessible corridors for transport. The study reported that income inequality in urban and rural areas is ascribed to limited access to food.

In assessing drivers of household food availability in Sub-Saharan Africa based on large piles of data from small farms, Frelat *et al.* (2016) revealed that determining food security in flooded areas without improving market access and that off farm opportunities are remiss of spatial factors contributing to food accessibility. This could be a true reflection of the situation in fragile flood communities that find it hard to access supermarkets and stores that may provide healthy, nutritious food. This potential reality could be the reason as to why the attainment of food security is an unrealised itinerary, hence the reason for food insecurity in the floodplains area.

#### 2.4.3.2 Non-spatial factors

Non-spatial factors were viewed as household socio-economic features affecting food accessibility (Pakravan-Charvadeh, Khan, & Flora, 2020). These include gender, dependency ratio, income, ethnicity, and education in agricultural practices, unemployment rate, age or access to credit (Aboaba, Fadiji, & Hussayn, 2020). When analysing the role of primary factors on food accessibility, there is no doubt that there contribute to food insecurity in the flood affected areas. For example, unemployment as a non-spatial factor, the household's ability to not only affect the generation of income for improved agricultural practices but also hinders access to credit, which negatively impacts food accessibility.

The example given above could be grasped better with Matemilola and Elegbede's (2017) study. The scholars argue that income appears to be the most important determinant of food accessibility since food security relies heavily on having more access food. This implies that access to food mainly depends on an individual's ability to purchase the needed food through income generated.

Another study that agrees with Matemilola and Elegbede (2017) is the study by Siphon and Nolwazi (2021). The study found that larger households with low-income levels are affected mainly by food insecurity, mainly because the larger the household is, the more income is needed to secure food. To this point, it is more apparent that the family status as a non-spatial factor determines the extent to which food security is achieved. For instance, households with

poor status may have poor access to markets necessitated by external forces such as floods and other uncontrolled factors such as primitive land tenure systems. These factors are constraining causes of food insecurity, particularly in rural areas.

While most studies on food security determinants focus on income, markets and availability of land, other scholars relate food insecurity to the use of technology (Gaffney *et al.*, 2019). For example, their study found that practical agriculture in flood areas requires proper use of technology to withstand the environment that may affect food security. Taking from Gaffney *et al.* (2019) study, it is clear that the availability or unavailability of technology determines the extent to which food is secured. The same holds true for flood accommodative areas, given the need for technology in getting a bumper harvest within a short spell. When this is the case, the flood may not impact crop production as the harvest can be done before the fields submerge in water.

It is observable from the literature review that most previous studies on food security as a human security dimension did not take into account the four main dimensions of food security as unified variables to study the impacts of flood on food security. From the literature consulted for this study, a number of research studies have been carried out on flood and food security. Nonetheless, from these studies, it seems there is a lack of studies that distinctively assessed food security by looking at four dimensions as seen in the research objectives of this study, especially in the study area. In addition, it is pertinent to note that studies that focus on all aspects of food security seem essential, as it helps policymakers, administrators, communities affected and other stakeholders to receive contextual information. Therefore, the present study assesses the impact of floods on food security regarding the Ikaba area.

## **2.5 CONCLUSION**

In conclusion, it can be argued that a critical assessment of the impacts of flood on food security shows that there are negative and positive effects associated with floods. However, the adverse effects of floods on food and social interactions outweigh its positive effects or benefits. For instance, as a consequence of flood, individuals often lose their means of survival. To summarise, the chapter reviewed extant literature relating to food security and floods. This was done to provide the academic foregrounding of the study. This was done by analysing security, food, floods, food security and insecurity as the key concepts in the study.

Food Insecurity and Vulnerability Information and Mapping Systems is used as the conceptual framework for the present study. The literature was further extended to explore the relations between four major components of food security (availability, accessibility, stability and

utilisation) and how they are affected by prevalent floods in the floodplains. It comes clear in the literature that achieving food security requires the availability of physical supplies of food accessed by households in adequate quantities at all times for effective body utilisation. Finally, the determinants of food security and insecurity with a close link to four dimensions of food security also inform the study's literature.

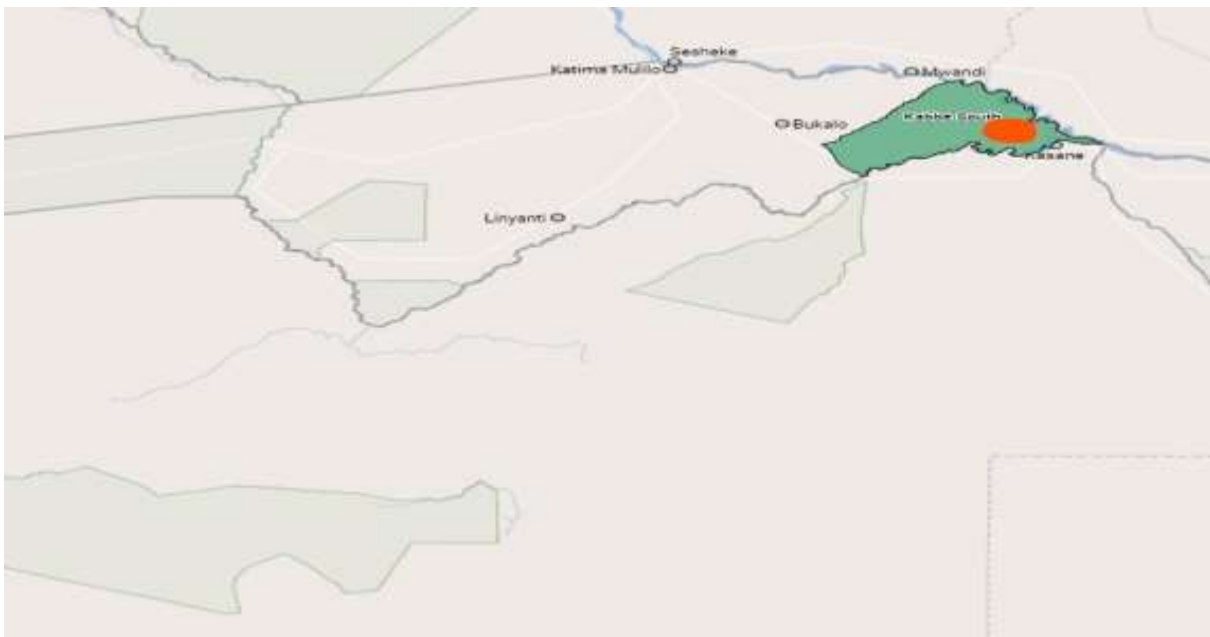
## CHAPTER 3: METHODOLOGY

### 3.1 INTRODUCTION

Chapter two presented and discussed literature related to the study through a conceptual framework and empirical literature. Chapter three presents and discusses the description of the study area, various research philosophies and justifies the philosophy adopted for this study. The chapter further presents the research design and justifies the design used in this study. In addition, the chapter presents a summary by discussing the importance of the Interpretive Phenomenological Analysis [IPA] employed in this study. Equally important, the chapter also presents the sampling strategy, research instruments, and data analysis and trustworthiness establishment. In the same way, a more detailed explanation of research limitations is presented as well as ethical considerations.

### 3.2 DESCRIPTION OF THE STUDY AREA

**Figure 2: Map of the study area**

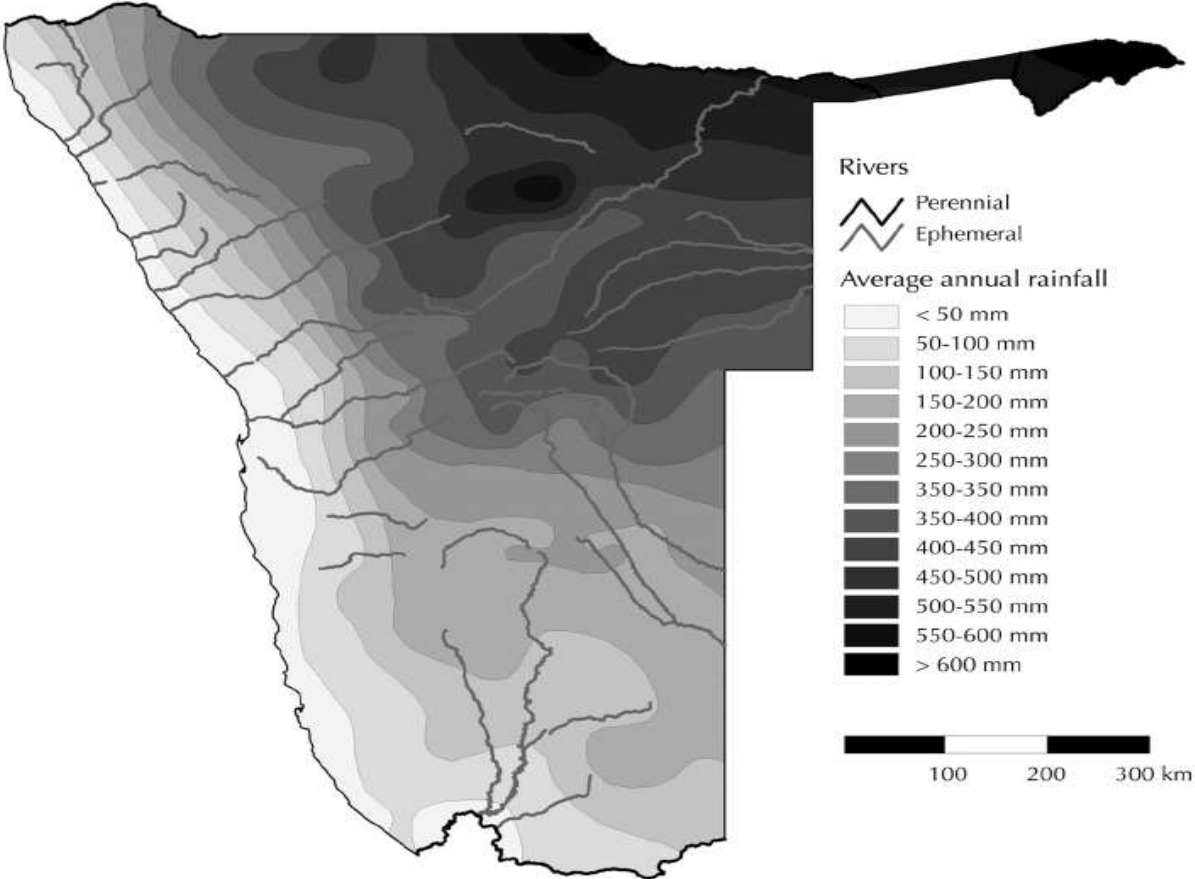


**Source:** <https://www.expertafrica.com/namibia/caprivi-strip/google-map>

The figure above shows the map of Zambezi region, KSC shaded with dark green and Ikaba as a study topography shaded with orange. The study area is located in the Zambezi Region and is in the eastern part of KSC of Namibia. The furthest part of Ikaba area is approximately 145 km east of Katima Mulilo town. The study area approximately covers an area of 1,236 km<sup>2</sup> from 14,785 km<sup>2</sup> of the entire Zambezi region (Likando, 2019). This represents about 8.3 percent of the Zambezi region's land.

Although there are no site-specific climatic data available for the study area, to the researcher's knowledge, the study area could be classified as Warm-summer humid (Dfb) according to the Köppen climate system (Ackerman, 1941). This classification mainly comprises a humid temperate, given the presence of two rivers, a stream and several channels that provide humidity to most of the area, as mentioned prior to this assertion. Therefore, this explanation may justify the clarification of Ikaba area to Dfb.

**Figure 3: Namibian Rainfall Map**



**Source:** (Suhling, Martens, & Marais, 2009)

It can be seen from the map above that the Ikaba area experiences heavy rainfall in summer which accounts for an average annual rainfall of above 600 mm, occurring mainly between September and April the following year. The study topography is among the areas that

experience low evaporation rates compared to other places in the Zambezi Region due to the perennial rivers, swamps, valleys channels and green vegetation. The vegetation is also observed to be chiefly pure grassland that can be seen throughout the year, which livestock in the area feeds on. Patches of bushy and thorny plants (*Mihonzo*) are also commonly seen. In the end, availability of these plants serve as a motivating factor for residents to keep livestock.

As evidenced by the figure above, the study area is vulnerable to floods, exacerbated by high annual rainfall. This literally means that expecting flood in the study area is no new thing due to the Zambezi River overflow (Republic-of-Namibia, 2009). It is a well-known fact that early floods are attributed to several channels, including but not limited to the Makapweka, (Bulila village), Mulalo (Kandiyana village), Nasando (Jojo and Jimu village), Namasoho (Muzii village), Matuma (Nantungu, Mazizi and Kayanga villages), Ilila (Matowa village), Nuni (Nankutwe village), (Mpukano village) Ndalakakama (Itomba and Muyoyeta villages) that opens from the main Zambezi River into the floodplains.

For the above reason, the inhabitants of Ikaba area use dugout canoes (*mikolo*) in the native language with great difficulty to ferry goods and access other places such as town and ferry personnel across the floodplains onto the shore despite the risk associated with a dugout canoe. Another essential point to note is that these channels do not wait for the Zambezi and Chobe rivers to rise to full capacity before they release water. As early as December each year, the channels release water to various places in the area. Therefore, the water from these channels account for early flooding of most fields before the heavy flood wave is experienced in the area.

With regard to cultivation, the residents have most of their fields in the valleys because these areas are presumed to have higher soil nutrients which speed up crop growth. In addition, these places preserve moisture for a reasonable period. For this reason, crops may withstand a prolonged drought as moistures prevail over the heat. On the other hand, when there is a quick rise in water of the Zambezi, Chobe and Kasaya stream, the crops submerge prematurely, leading to food insecurity for the residents of Ikaba that mainly subsist on crop production.

Another socio-economic activity in the area is fishing and cattle farming. Almost all households practice fish farming for survival and income generation not only during the floods but even in the aftermath of the flood season due to rivers and streams that do not get dry despite the prevailing dry period generally between Julys to September each year. Cattle are owned by residents of the area, even though not on a commercial basis. It is estimated that 70%

of households own cattle which they sell to sustain their livelihood. Due to the area's natural habitat, only a few households own goats and pigs in very small quantities.

### **3.3 RESEARCH METHODOLOGY**

#### **3.3.1 Research Design**

The research design refers to the systematic manner that a researcher intends to follow to attain the study's objectives (Kothari & Garg, 2016, p.256). The present study used a phenomenological research design to assess the impact of floods on food security in the Zambezi region, particularly in the Ikaba area. Even though traditionally, the use of a case study is a well-established approach in the qualitative study; however, in this study, the phenomenological research design was best suited, mainly because it presented a detailed analysis of participants' lived experiences about the flood event in the Ikaba area.

The advantage of this particular method was linked to Bliss's (2016, p.1) article on phenomenological research: inquiry to understanding the meanings of people's experiences, where he firstly alludes that phenomenological researchers advance crucial perceptions into how people understand their experiences on floods. Secondly, a substantial practice is established for examining human experiences and for enhancing knowledge for the residents of Ikaba area. Lastly, collecting data in the form of lived experiences serve as a catalyst that validates the study's findings (Bliss, 2016, p.1). This is mainly because a more significant proportion of archived data are prone to manipulation, which can be avoided by gaining insights from present participants.

In light of the above discussion, the approach assisted the researcher to better understand the impact of flood events through the testimony of those residents who have lived through these floods in the Ikaba area of KSC. In addition, key informants have vast information on the subject in question. When little data is known regarding a particular lived experience, the researcher is aware that examining the testimony of those who have lived through experience often yield vital information missed by the quantitative approach. With this knowledge, the phenomenological design was chosen for this study.

#### **3.3.2 Research Approach**

The research approach refers to the method of data collection and data analysis in general and the differences between qualitative and quantitative methods in particular (Du Plooy-Cilliers, Davis, & Bezuidenhout, 2014, p. 31). The qualitative research approach was used for this

study. The choice of the approach is aligned to the fact that inhabitants of Ikaba area are those with a unique set of experiences whose ancestors lived in the area for many decades. This implies that studying food security in the community cannot be readily understood by quantitative procedures, as quantitative processes and related statistics often fail to capture the complexities of human undertakings and experiences adequately.

The qualitative approach was the most appropriate way to understand the experiences of the Ikaba inhabitants. In particular, the focus of the study was to assess the impact of flooding on food insecurity, therefore, to understand and explain through the experiences of respondents, the qualitative method was seen as the most appropriate (Du Plooy-Cilliers, Davis, & Bezuidenhout, 2014, p. 30).

### **3.3.3 The population of the study**

The last census in 2011 indicates that Kabbe Constituency, now divided into KSC and KNC, had a combined population of about fourteen thousand nine hundred and seventy-nine (14 979) people (Mushaukwa, 2019, p. 2). In this study, the population consisted of the entire Ikaba community inhabitants. The area harbours about 84 villages, 4 schools and 2 health centres, a *Khuta* (Tribal Court) with a total projected population of 2064 households (Likando, 2019, p. 6). A sample of 14 households which consisted of 11 to 23 people, was determined from a total of 2064 households. Even though the residents of Ikaba area were the major sample of the study, the key informants were used to get rich information on the impact of floods on food security.

### **3.3.4 Sampling and Sampling method**

Fouché, Strydom, & Roestenburg (2021) associated sampling with the process of selecting individuals from the primary population to participate in the study (Fouché *et al.*, 2021, p. 225). A sample population is a subset of a general population from which data is, collected and analysed to make or reach a valid conclusion in a study (Du Plooy-Cilliers *et al.*, 2014, p. 142). Qualitative data were collected from fifteen (14) households who were purposefully sampled through a focus group from Ikaba community members. Besides, the data was collected through interview schedules from six (6) key informants. For this study, key informants were those that work at the constituency office and are responsible for flood-related issues. The selection of the categories was based on the fact that the responsibilities of key informants are related to floods. The participants were included in the study because the researcher assumed that they possessed information that contributed immensely to the understanding of the impacts of floods on food security.

The following table depicts the sample as initial thought and the actual respondents that participated in the study.

**Table 1: Research Sample Statistic**

INTERVIEW KEY INFORMANTS/ HOUSEHOLDS	ORGANISATION/POSITION	INITIALLY PROJECTED NUMBER OF PARTICIPANTS	THE ACTUAL NUMBER OF PARTICIPANTS
<b>Key informants</b>			
Councillor	Kabbe South Constituency	One (1)	One (1)
Disaster Risk committee	Kabbe South Constituency	Five (5)	Three (3)
Red Cross	Kabbe South Constituency	Four (4)	Two (2)
Sub-Total for key informants		10	6
<b>Households Respondents</b>			
Households	Ikaba Area	Fifteen (15)	Fourteen (14)
<b>Sub Total: Households</b>		<b>15</b>	<b>14</b>

**Source:** (Research data, 2021)

The table above clarifies that the sample size was marginal compared to the projected number of the population of the Ikaba area. Despite the fact that using a big sample is still important in research, scholars such as Morse (2015); Fusch and Ness (2015), postulate that rich data can be collected from smaller participants, especially when the need to use larger sample size becomes irrelevant. This is because data collection methods would be less useful when it does not provide new data, codes, or themes. Nevertheless, the issue of paramount importance in the 21<sup>st</sup> century is the reliability of data collected either from a large group of people or a small representative of the population. In particular, in the academic setting where time is of the essence.

Bearing these points in mind, the researcher, through the assistance of the Area Headman (*Nduna Silalo*), made sure that the eligibility criterion required participants to only those who have been headed by men or women and have been living in Ikaba area for the past 60 or more years. The appointment was made which further confirmed by the head of households on the appropriate time for the FGD. The questions were first posed to the head of households and deliberated further by the members of households as shown in chapter 4.

This was crucial to fill the limitation of this study brought by the small sample size. Encouragingly, due to their flood experiences for several years, they provided the study with the most valuable data that could not have been obtained from thousands of less experienced residents. In addition, within the context of this study, the key informant was a proxy for their associates and experience as Councillor, KSC Disaster Risk Management Committee and Red

Cross. They play a pivotal role in assessing flood impact, providing relief food and initiating flood coping strategies in KSC and the Ikaba area. Due to their constant engagement with the flood-affected community, they have gained vast experience and have become knowledgeable about flood phenomenon.

### **3.3.5 Data Collection Procedure and Data Instrument**

In line with the phenomenological research design, the researcher used an interview guide for collecting qualitative data. Given the restriction on Covid-19 regulations in Namibia that advocate for social distancing and limit social interaction as much as possible, interviews with key informants were conducted telephonically. Meanwhile, others were done through the Zoom platform as opposed to physical one-on-one personal interviews as initially anticipated in the research proposal. Zoom gave a semblance of face-to-face interviews apart from actual physical proximity. As for the households, the researcher managed to conduct interviews with the focus group at the households while maintaining social distancing.

This also meant complying with state of emergency regulations. As elucidated already, the study focused on household heads who have been residing in the area for the past 60 years or more years. Important notes from the interviews were written, and primary data collected were transcribed further. According to Saunders *et al.* (2016, p. 347) the fundamental objective of interviews is to obtain facts and opinions about a phenomenon from people who are informed on a particular issue.

For the reason that the actual study took place after the flood season, the researcher used archived data, especially pictures of crops, fields, animals and the status of villages that were taken in March 2020 during the flood season. Notably, the researcher used observation as a complimentary means of collecting data during and after the flood season. These materials played an essential role in understanding the flood phenomenon and its aftermath on food security in the Ikaba area. At the household level, interviews were conducted in the native language '*Silozi*', which an independent Silozi-English speaking person further translated to avoid bias from the researcher. Meanwhile, critical informants were interviewed in English.

#### **3.3.5.1 Interviews**

Under the following sub-headings, the researcher explained the interview as a tool used to collect data:

#### 3.3.5.1.1 Individual Interview

The researcher used semi-structured individual interviews that contain the components of both structured and unstructured questions. In semi-structured interviews, the interviewer prepared a set of the same questions that all interviewees answered. The interview was conducted at the time and place of the participants' choosing or convenience. A consent letter was designed for the household interview.

The themes or topics of the consent letter pertained to the aim of the research, the ethical research consideration as explained in the ethical research section of this study. Besides, this was used as an introduction tool after verbal articulation of the study purpose. The importance of using interviews as a data collection method lies in the fact that the interviewer is able to collect supplementary information about informant's personal characteristics and the environment, which can assist in interpreting results. Furthermore, the interview's unique characteristic of flexibility allows for posing of additional questions that may require clarification. The interview method also presents the researcher with the opportunity to ask further questions to fully comprehend the data as previously enunciated.

Aside from the benefits associated with an individual and group interview as a data collection method, the study took cognisance of possible limitations of this method. For instance, information provided may be, based on the emotion of a particular individual at the time of the interview. Given this perception, the success of collecting data from individual interviews depends on the respondents' willingness and mood on the day of the interview.

#### 3.3.5.1.2 Reflexivity

Reflexivity refers to the role of the researcher and, possibly, how the researcher may have influenced the credibility of the results presented (Berger, 2015). The selection of the topic comes about as a result of the researcher's interest in the field of security, both national and human security. Aside from being a police officer, the researcher's interest is further advanced by constant quest to learn about security related matters and strategic issues.

Reflexivity is essential because a researcher's position may not always be clear to him or her. Sometimes researchers are unaware of their prejudices and relationships with cultural contexts and settings (Berger, 2015). Thus, continually challenging ourselves to understand and clarify our underlying perspectives is an integral part of rigour in qualitative research. Woven within this understanding, the role of the researcher was to obtain thoughts, experiences and feelings of study participants regarding the impact of the flood on food security. This was not an easy task, as it involved asking people to talk about issues that may be very personal to them. For

instance, these residents at some point have lost their relatives, animals as a result of drowning and diseases have incurred damages to crop fields and faced economic upheaval as a result of the flood.

However, it was essential to collect data for the realisation of the study, the endeavour that the researcher undertook and completed. During data collection, the researcher's primary responsibility was also to safeguard participants and data. In this case, as previously stated the collected data were recorded using a phone recorder, stored in an external drive, retrieved and destroyed after that. The researcher only used the information for the study. Therefore, anonymity and confidentiality could not be out of sight of the researcher. Furthermore, the researcher put effort into avoiding assuming the role of respondents in the study. Hence, the researcher trusted the respondents based on their selection criteria used as espoused in the sampling procedure.

#### 3.3.5.1.3 Negotiating and gaining access to the research site

The researcher was aware of the limitation linked to gaining access to the research site. The possibility existed from the onset that some key respondents and households may not be prepared to engage in additional, voluntary activities because of their busy schedules. It was anticipated that the requests for access and cooperation might have failed to appeal to some of the respondents. To address this, the researcher requested permission to use the ethical clearance letter from the University of Namibia to seek permission from all identified offices.

Importantly, all responsible officials responded positively. These responses assisted the researcher in seeking the willing participation of respondents quickly. This meant a research permit approval from these offices facilitated access to both key informants and households, as most of them demanded such a letter before they even listened further from the researcher. This was in line with Upvall and Hashwani, as cited in Afuh and Eta (2018), who noted that formal consent or permission granted at the top formal organisational level is motivated to allow the gaining of access at the individual and institutional levels.

#### 3.3.5.1.4 Building rapport with the participants

The researcher was cognisant of rapport building from the initial phase of the study. Noting that the ability to connect with participants in a way that creates a climate of trust and understanding could not be overstated. The combined facets allowed the appreciation of other's opinions to understand and accept their feelings. To address the problem associated with rapport, the researcher first introduced flexibility, reassuring, supportiveness, and familiar

elements in encouraging rapport. Secondly, active listening was part of this unique task when explaining the research ethics and how they were addressed.

Thirdly, most importantly, was the issue of being on the same wavelength as participants because the researcher needed to resemble the participant's appearance. For instance, with key informants, the arrangement for zoom interview was a pursuit to ease fear of physical contact of the coronavirus and in compliance with the state of emergency regulations that discouraged the physical meetings.

For the reason that key informants were always dressed in formal attires because of the nature of their work, the researcher also needed to align himself with the official dress code as a way of building rapport. Besides, the researcher was conscious of language usage, the importance of greetings, professionalism, and effective communication more especially when dealing with households. Finally, showing some interest in what the researcher's participant had to say went a long way in making them feel comfortable and valued from the onset; this demonstrated effective ways of creating rapport that yielded remarkable interaction throughout the study. Important to note is that a researcher that fails to understand the importance of rapport with his or her subjects does not only fail to connect with respondents but may unknowingly contribute to the collection of unreliable data during the study compromising the findings of the study to a great extent.

### **3.3.6 Qualitative Data Analysis**

Data analysis involves altering data into convenient themes, patterns and trends to determine the relationship between variables and themes to process the data to meaningful information that can be comprehended (Saunders *et al.*, 2016, p. 480). Furthermore, the analysis aims to process the collected data into meaningful information that can be understood (Saunders *et al.*, 2016). This section explains how the data was analysed. According to Fouche and Delpont (2016), qualitative data refers to non-numeric information such as interview transcripts, notes, videos and audio recordings, images and text documents. Qualitative data analysis can be divided into five categories: content/thematic, narrative, discourse, framework and ground theory analysis (Fouche & Delpont, 2016).

The above may explain why data analysis aims to reduces data to a understandable and interpretable form. The researcher used thematic analysis in terms of qualitative data by beginning with a more detailed and fine-grained analysis of what the respondents stated. This was guided by eight steps of content analysis as stated by Du Plooy-Cilliers *et al.*, (2014). This was done by expanding the analysis with the researcher's interpretation, existing theories and

previous studies on food security. Finally, the researcher presented data findings through report writing (p. 229).

#### 3.3.6.1 Thematic Analysis

The study used thematic analysis to assess the impact of floods on food security. Smith and Firth (2011) describe thematic analysis as an explanatory method by which the researcher reasonably searches through data for the identification of the patterns to describe the issue investigated. Based on the above, the researchers who uses thematic analysis strive to discover what is being said by the participants to extract major themes based on the differences or similarities (Caulfield, 2019). The collected data was transcribed, and themes that emerged as per study's participants grouped and served as the basis to separate viewpoints. To systematically confine to the process, the researcher was guided by six stages of thematic analysis as espoused by (Clarke & Braun, 2016, pp.7-15). First, the researcher familiarised himself with the data by transcribing, reading and re-reading the data. Second, codes were generated methodically throughout the data set. Third, themes were searched by organising codes into potential themes. Fourth, potential themes that emerged were further studied by determining whether themes were related to the analysis's coded extracts (Clarke & Braun, 2016).

In the fifth phase, themes were defined and named throughout the analysis. Lastly, the report was produced, which equally provided opportunities for analysis. In addition to the initial assertion, the researcher observed primary aspects in thematic analysis such as recurrences, descriptions, relationships, variances and resemblances (Ryan & Bernard, 2003). Recurrences entail the repetition of themes and topics in responses from the participants (Ryan & Bernard, 2003, p. 91). Differences and similarities entail that themes are discussed by observing the level of agreement or disagreements in themes (Ryan & Bernard, 2003, p. 91). Without making any personal contact with people, the researcher used this method to examine a wide variety of social phenomena related to flood impact on food security. In this regard, data analysis was an ongoing process for the present study.

#### **3.3.7 Trustworthiness of the study**

The most common criteria for evaluating the trustworthiness of qualitative studies are those proposed by Lincoln and Guba (1994), namely transferability, credibility, conformability and dependability. For the actual study to be true and therefore trustworthy, the researcher ensured that this study met these fundamental criteria as simply put under the following:

### 3.3.7.1 Credibility

According to Strydom, Fouche and Delport (2005), credibility involves establishing that the findings of qualitative research are credible or believable from the perspective of the research participants (p.346). In other words, it was the researcher's responsibility to make sure that the study findings are accurate, mainly by which the data was interpreted. To achieve this, the researcher adopted a critical approach, as explained in the following sentence. The researcher spent a week in the Ikaba area before the actual conducting of data was done for observation. This allowed him to establish and nurture strong relationships that exist between the impacts of flood on human interactions related to food security.

Observing credibility, the researcher further ensured that the primary data collected was the actual replication of the problem being studied. The reason being that when drafting interview questions, the researcher made sure that the questions were aligned to the impact of floods on food security with particular emphasis on food security dimensions, as stated in chapter one. Furthermore, the questions were probing in nature, presenting further questions during the interview process. This assisted the writer to gain more insights and sought clarifications where it was necessary.

### 3.3.7.2 Transferability

Transferability refers to the extent to which the qualitative research findings can be replicated or applied to other contexts or settings in similar situations and with similar research questions (Strydom *et al.*, 2005, p. 346). This research study aimed not to generalize findings to other settings but to allow the readers to have enough information about the characteristics of the selected participants and the natural setting of the study area as explained under the study area description. The endeavour was paramount in relating the experience and congruence of the setting and characteristics with those found in the actual study. To justify the transferability of the findings, it was observed that through the responses of the key informants and households, there were some uniformity and consistency in the responses. This was attributed to participants who took part in the study and their experiences that were merged to be given the criteria initiated by the researcher from the onset of the study.

### 3.3.7.3 Dependability

According to Korstjens and Moser (2018), dependability refers to whether one can track the processes and procedures applied for data collection and interpretation. The researcher used two methods, namely individual and focus group interviews, on obtaining the data. The dependability of this research was ensured by the fact that the researcher described in detail the

research design. Further, the implementation and the operational detail of data collection from key informants and household respondents using interview schedules (interview questions) were assured. It is an audit trail whereby the researcher has elaborated on each process involved in conducting the research instruments and formulating the final themes. For instance, it comes clear that on the selection of the respondents staying in the Ikaba area, the researcher requested *Induna Silalo* (Area Headmen) to assist in identifying prospective respondents.

Strydom (2005, p. 346) suggests that a study must provide its audience with certainty even if it were to be repeated with the same or similar respondents (subjects) in the same (or similar) context, its findings would be similar.

In terms of the present study, the data gathered from the household respondents and from key informants were triangulated with data obtained from observations and therefore, there was visual consistency, links and similarities in the data generated. On this basis, it could be concluded that the study's findings may be dependent on the respondents' experiences on flood-related issues.

#### 3.3.7.4 Conformability

Conformability refers to the extent to which the study's findings could be confirmed or corroborated by others (Korstjens & Moser, 2018). The research further took measures to ensure that the research findings were the results of the ideas and experiences of the participants, rather than the preferences and characteristics of the researcher. To achieve conformability, the researcher ensured that the analysis and coding of the data obtained in the research terrain were based on raw data provided by respondents. The findings and conclusions reported from the study were drawn from the data collected. This was evident from the study's findings as it correlated with previous studies.

### **3.4 LIMITATION OF THE STUDY**

Every study has certain limitations, so it was with this study. No matter how much effort one may put into the study, some extraneous circumstances may create imperfections. As far as research is concerned, failing to acknowledge limitations in any study is a remiss of duty in academic settings. However, it was necessary to exhaust all efforts to ensure that the researcher provided sufficient and relevant discussion of the study by highlighting the limitations experienced within the study. On the other hand, Hindle (2015, p. 2) advises that it is always imperative to try to reduce the limitations as much as possible to increase the credibility of the research study. Therefore, the following limitations were anticipated from the onset:

### **3.4.1 Limitations as a result of the research approach**

Qualitative research design deals with actual reality based on what people perceive. Importantly, the findings were grounded on the insights of participants. As such, in the absence of quantitative data, the study may be only confined to a specific area, as was in this case. In the process, making the generation of the study findings impossible. However, in this regard, there was a strong belief that the study findings could be applied in other settings since the researcher conducted extensive literature that was related to the study to a large extent, and the results seem to merge.

With interviews as a data collection method, it is further known to present a challenge in collecting rich data from numerous participants within a short space of time. This meant only a few participants, both from households and key informants, needed to participate in the study. This research limitation was partially addressed by the use of a phenomenological research design that allowed for the collection of information from people with lived experiences. In addition, Ikaba inhabitants are knowledgeable about the impact of flood on food security because the study targeted households who have been living in the area for more than 60 years.

### **3.4.2 Limitations as a result of the sampling method**

It is difficult to determine the extent to which participants felt free to express their true opinions (Kolthoff, Erakovich & Lasthuizen, 2010, p. 599). The purposive sampling technique has been an example of non-probability sampling, which deals with experience from research to select those assumed to pose the ability to fulfil the study's objectives. However, without a proper review of the participant's background, this can be misleading. The researcher did not scrutinize the participants' ethical backgrounds, which was a limitation. To reduce the impact of this limitation, the researcher used only a few participants who took part in the study. This implied that the method might have marginal effects on the study's findings due to the number of participants.

### **3.4.3 Limitations resulting from the sample size and characteristics**

The study anticipated limitations in terms of time and financial resources. The researcher could not visit each and every village in Ikaba area, given its vastness. The researcher was unable to conduct long-term data collection from as many participants as possible. The sample size is or may be seen as too small. In an effort to minimise the impact of this limitation, a selection criteria were set. Thus, only households headed by men or women who lived in the area for 60

years and above were selected. Although the sample was small, the participants provided information that represented the majority of the resident in Ikaba.

### **3.5 ETHICAL CONSIDERATIONS**

According to Resnik (2015, p.3), research often involves a great deal of cooperation and coordination among many different people in various disciplines and institutions. Ethical standards promote essential values to collaborative work, such as trust, accountability, mutual respect, and fairness. Further,

#### **3.5.1 Informed Consent**

Participating in this current study was voluntary. The researcher informed the participants about the purposes of the study, potential risks and benefits of their participation. At the household level, the researcher introduced himself and requested to see the village Headmen/women or any designated person in their place. It was after the granting of permission that the researcher was able to collect data. The researcher presented the consent form accompanied by a verbal explanation in the native language stating the purpose of the study and the reason for participation (Annexure D attached).

#### **3.5.2 Respect for research participants**

The principle of non-maleficence compelled the researcher to act in ways that did not inflict harm to those that participated in the study. Notably by knowingly or unknowingly subjecting participants or respondents to unnecessary risk. Therefore, the researcher protected and defended the rights of others and prevented harm towards the participants by complying with research ethics from the inception of the study. To be more precise, it was the researcher's primary obligation to create healthy research environment by adhering to the guidelines on COVID-19 in the Namibian context. The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research (1978) was observed as participant ethical conviction was upheld.

#### **3.5.3 Data ownership**

According to Loshin (2012), data ownership refers to possession and responsibility for information. Ownership implies power as well as control. The control of information includes the ability to access, create, modify, package, derive benefit from, sell or remove data and the right to assign these access privileges to others. To this end, the researcher took full

responsibility for the correctness or otherwise of collected data, its management, analysis and interpretation.

### **3.5.4 Integrity and quality**

According to Watts (2008), integrity is honesty and probity within the conduct of qualitative research and underpins ethical practice in all the activities that comprise data collection and analysis. It is characterised by openness and wholeness on the researcher's part and can be understood as a type of 'straightforwardness' or 'moral uprightness' that rejects intentional duplicity and deceit. With this in mind, the researcher realised the importance of integrity to avoid causing harm, seek informed consent and respect participants' views.

## **3.6 CHAPTER SUMMARY**

This chapter outlined the research methodologies, strategies, and design used in the study. Further, procedures, participants, data collection tools and analysis methods were also outlined. Thematic analysis was adopted as the method to analyse data. In other words, the chapter focused on explaining how the study was conducted to answer the research questions on the impact of flooding on food security. The next chapter will present data collected from the interviews as raw information and interpret the information into meaningful contributions (the findings) that ought to be understood even by those who were not part of the study.

## CHAPTER 4:

### PRESENTATION AND DISCUSSION OF THE RESULTS

#### 4.1 INTRODUCTION

In Chapter 3, the methodology of the study was presented. The interview method was identified as the main tool for data collection. Therefore, this chapter will discuss interview results from 6 key informants and 14 households in Ikaba area. The chapter further describes the demographic background of the households. The purpose was to provide a background of the profile of the participants. The responses relating to the participants are also provided. The study assessed the impact of floods on food security in Ikaba areas of KSC. Through the following research questions:

- How does flood affect the availability of food in Ikaba area?
- How is food accessibility affected by flood in Ikaba area?
- To what extent is food utilisation affected by flood in Ikaba area?
- To what extent is food stability affected in Ikaba area?

To achieve the research aim, two sections present and discuss the findings of this study according to research questions. The section presents demographic information, and another discusses the study's findings through research questions related to the objectives in the form of responses.

#### 4.2 RESEARCH FINDINGS

This section presents the data from the key informants and households in collaboration with the thematic analysis findings based on the research questions. Where there was a need, themes similar in meaning were grouped by identifying a common theme for analysis. The emphasis on the information provided is singled out by using quotation marks. In a few instances, a coding system was used.

This section presents the data from the key informants and households views in collaboration with the thematic analysis finding based on the research questions. The presentation of the data is done through codes such as **KI1** that represent the first key informant to be interviewed. Further, **KI2** refers to a second key informant who was interviewed. A similar pattern is used for other key informants. On the other hand, **HH1** refers to the first household interviewed

through the focus group; meanwhile, **HH4**, for instance, represents the fourth household interviewed.

The proceedings above apply to the subsequent households. Where there is a need, themes similar in meaning were grouped by identifying a common theme for analysis. The emphasis on the information provided is singled out by using *italic* and *quotation marks*, mainly if their responses form a short sentence.

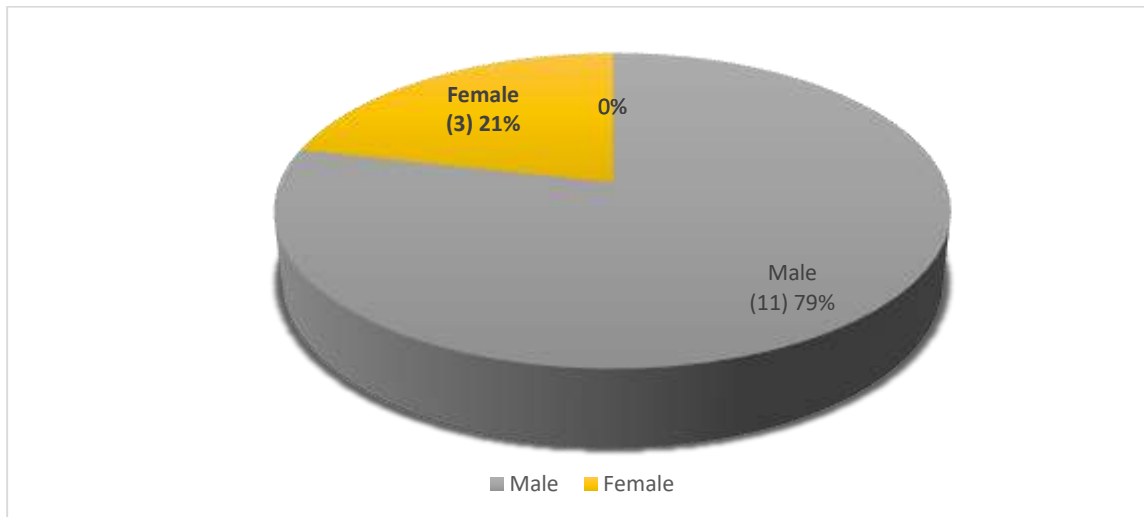
### **4.3 DEMOGRAPHIC PROFILE OF PARTICIPANTS**

Understanding of general characteristics of sampled households will provide a bird's eye view of the general features prevailing in the study area. Notably, it was crucial to determine the socio-demographic characteristics of the heads of households because they are the main contributors to the livelihood of their households. Therefore, an attempt was made to analyse some essential characteristics of the sampled households and key participants. Household demographic information includes gender, age, years residing in Ikaba area, the composition of the households, the means of survival, and pull factors. However, key informant's demographic profiles were not considered necessary for the present study mainly because the inclusion is not mainly on the lived experiences of residing in Ikaba area, but their inclusion was necessitated by their responsibilities related to flood. However, under research methodology, an explanation related to their experience on floods warranted their inclusion in the study. This decision is further justified by the phenomenological research designs adopted in the present study that seeks to explore the participants' lived experiences.

#### **4.3.1 Household composition**

This part presents the participants' demographics in terms of the gender of households. In this study the term gender was used to refer to natural distinctions in features between male and female. The inclusion of gender as demographical data was motivated by the common assumption that males head most households. Proving this assumption may invite further relevant research on gender differences.

#### **Figure 4: Gender of Household Heads**



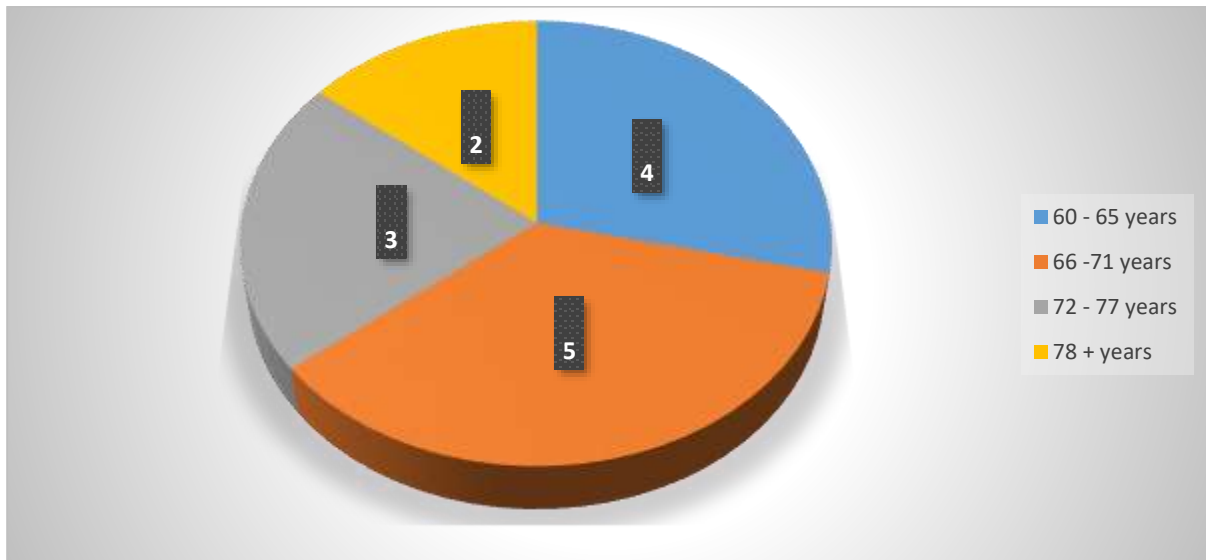
**Source:** Field data by the researcher

It is clear from figure 5 that the demographic distributions are such that out of the fourteen (14) households sampled, 79% were male headed and while three (3) represented households headed by females. This constituted 21 % of the total household participants. This implies that in the Ikaba area, most of the households are mainly headed by males.

#### **4.3.2 The years of residing in Ikaba area for household heads**

When using phenomenological research design, the researcher was compelled to sample participants with lived experiences of flood effects, and this meant the residents of Ikaba area where the study took place provided the best sample. This was despite the inclusion of key informants providing expert advice, especially with coping strategies. Establishing the number of years for participants who resided in the Ikaba area, the researcher ascertained whether those who took part in the study were the ones deemed to have vast information and experience on the flood and its impact on food security. Figure 6 illustrates the years' participants stayed in Ikaba area.

**Figure 5: The years of residing in Ikaba area for household heads**



**Source:** Field data by the researcher (2021)

Firstly, figure 6 indicates that most participants 5(36%) who participated as household heads are those who have been residing in the Ikaba area between 66 to 71 years—secondly, followed by those between 60 and 65 years of residing in Ikaba area. This represented 29% of the total study’s participants. Meanwhile, those between 72 and 77 constituted 21% of the total participants, as figure 6 illustrates. Finally, only 2(14%) participants with 78 and more years contributed to the study, and this symbolises a small percentage of the head of households.

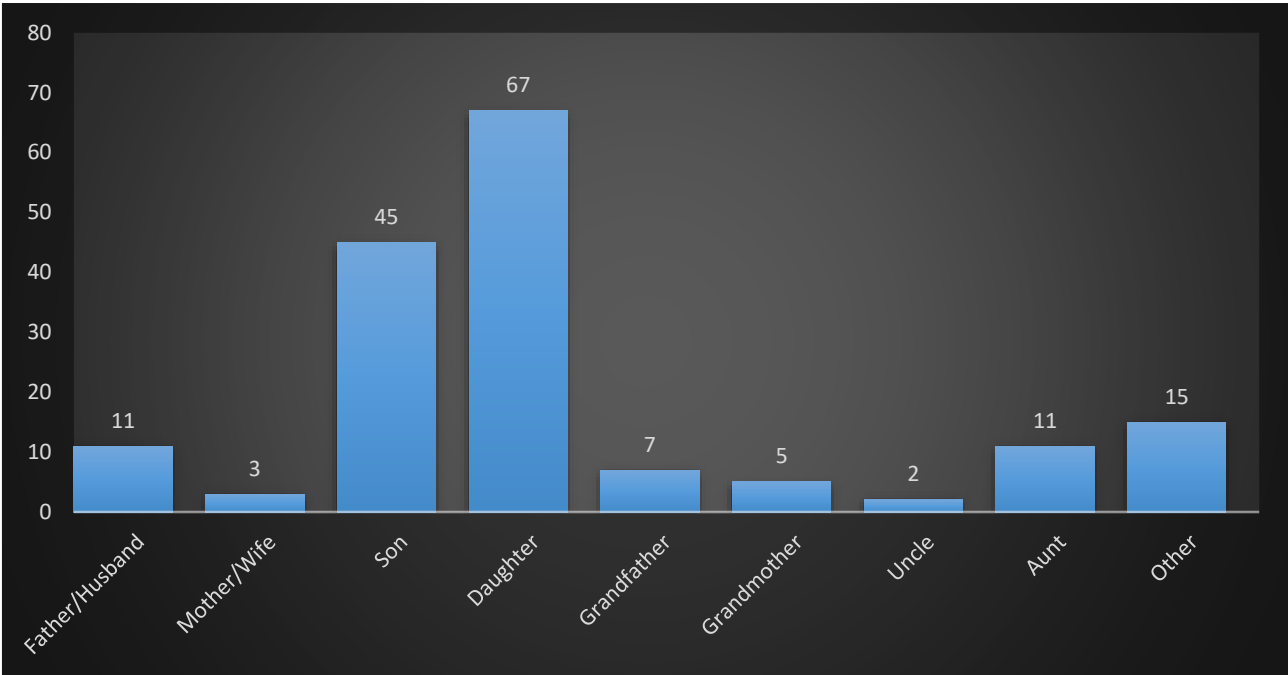
It seems possible that these results are due to what was initially purposefully anticipated to sample households headed by those that are 60 years and above as residents in Ikaba area. The vast experience of these household heads was vital to provide rich information on the impact of floods on food security based on their lived experiences. This is because they could provide rich data for the study, and the choice of the approach was aligned to the fact that inhabitants of Ikaba area are those with a unique set of experiences whose ancestors lived in the areas for many decades, as shown by the result in this case. Such informed decisions may address the gaps resulting in the proportionality of the population and the current sample that was used.

#### **4.3.3 Composition of household members**

The question on the composition of the households was influential in informing the researcher on the households in Ikaba. The revelations of this present characteristic on which the researcher referred to as households apart from the heads as earlier explained. Through this question, one may be interested in researching the impact of flooding on food security in another setting that has a different household composition. It further gave a clear picture of

what sort of participants a researcher dealt with and how the study's findings may be relevant concerning study participants (see Figure 7 below).

**Figure 6: Composition of household members**



**Source:** Field data by the researcher (2021)

Figure 7 shows the composition of members of households who took part as participants in Ikaba area. The highest members constituted of Daughters at 67 while the lowest number was Uncles at 3. On the other hand, Sons were second at 45 while Fathers and Aunties constituted 11. In addition, from the total households that took part in the study. Three (3) households were found to be headed by Women. The figure clearly shows that most households in Ikaba are comprised of daughters followed by sons.

Furthermore, grandfathers and mothers also formed part of the household's composition. The classification of the other 15 implied extended family members such as nieces, nephews, grandchildren and cousins. In analysing the above figure in terms of the composition of the households, some tentative initial evidence suggests that the data collected has positively impacted the study.

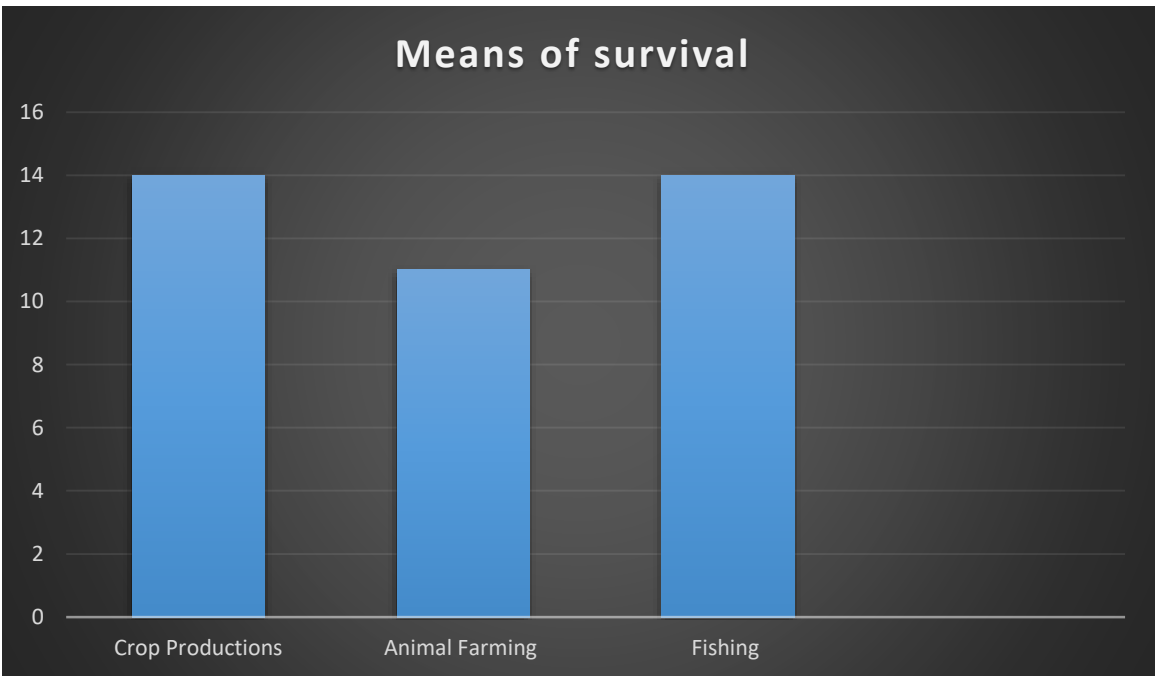
Notably from the study findings is that daughters and sons constitute the majority of the household composition. This is mainly due to the dependence nature of children from their parents. Even though fathers and mothers head the households, their children still form part of the majority of the households. This finding may reflect the reality that (father/mother) as

parents may have more than one child hence, the high number of children in the households. For the grandfather and grandmother forming part of the households in Ikaba is not a surprise, mainly because when they are old enough and need care, they usually seek refuge from their daughters and sons, who happen to be the head of households in this case.

### 4.3.4 The means of survival

A claim for a comprehensive study on food security about floods can only be attained when it is established what the means of survival of the inhabitants of Ikaba are. Therefore, judging and interpreting results as to whether the food availability, accessibility, utilization and stability are affected can only be concluded if these dimensions are linked to what constitutes food for Ikaba residents.

Figure 7: The means of survival



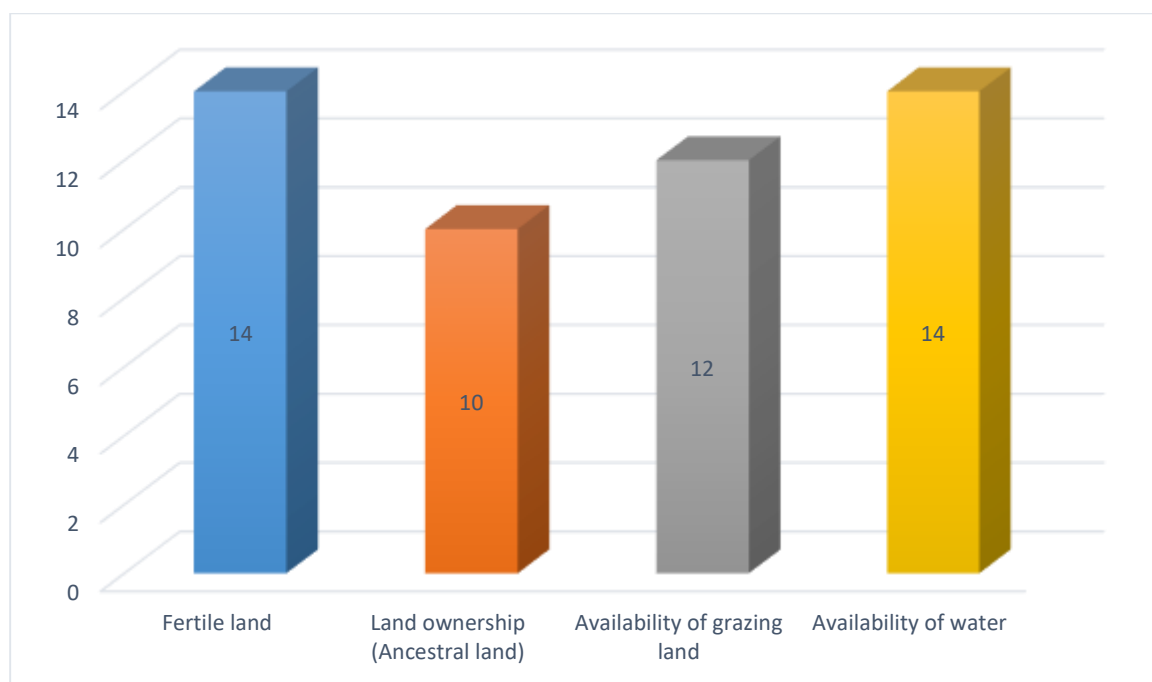
Source: Field data by the researcher

Regarding livelihood sources, all household participants indicated that communities in Ikaba subsist more on crops production (14), such as maize, sorghum and cassava. In addition, fishing and trading were equally mentioned by all (14) participants as the source of livelihood for the households. Furthermore, animal farming is commonly practiced to supplement their livelihoods. A note of caution on the interpretation of the above result is due to the fact that crops production is the primary source of livelihood and food; increased exposure to floods exacerbates their vulnerabilities. Meanwhile, the fish market during flood remains the most significant challenge.

### 4.3.5 Pull factors for residing in Ikaba area

This question ought to find out what attracts the residents of Ikaba community in the area despite the effects that flood has on food security. Not only is the analysis of the pulling factors position the researcher to be aware of the resident's wellbeing, but it assists in recommending strategies that could be useful in this case, taking cognisance of all facets of the livelihood of the residents. Figure 9 below indicates these attractive factors.

**Figure 8: Pull factors for residing in Ikaba area**



**Source:** Field data by the researcher (2021)

As briefly outlined from Figure 9 above, all sampled households 14 (100%) indicated that their persistence stay in floodplains is due to fertile land and water availability. On the other hand, figure 9 still shows that almost all participants 12(86%) stated that grazing land is another factor that attracts them to Ikaba community despite the prevalent annual flood in the area. Lastly, it is observable that 10 (71%) of the participants believe that land ownership has motivated people to settle in the Ikaba area.

The results on fertile land reflect those of who also found Gartaula *et al.* (2012) that fertile land as a means of production also provides a status symbol to rural occupants. In terms of water, it is uncontested that wherever human species resided, water availability is consistently among the first consideration. Because people in Ikaba area have plenty of water throughout the year due to floods, this may explain the resident's persistent willingness to stay in Ikaba area.

The finding mirrors those of the previous study by Tuwilika (2016), which examined that particular residents willingly reside in the areas exposed to flooding in search of better agricultural purposes and income from selling agricultural produce and fish (p.113). The study further found that although flood poses human security challenges to residents' survival within the Cuvelai basin, it provides benefits too. These benefits are not limited to; increased harvest through the availability of land and moisture, livestock productivity, recharge of sub-surface water reserves and aquifers, as well as increased fishing activities and income generation. However, the above realisation is possible only when seasonal floods delays in terms of covering the crops field for bumper harvest.

With this in mind, one may conclude that this may be the reason why farming with cattle is a common practice in the area due to the availability of grazing land. In this regard, they have land that their ancestors lived on for several years. These results, therefore, need to be interpreted with caution; for instance, relocating to another place may affect their possession of the land, crops fields, grazing land and a sense of belonging.

On staying for a prolonged time in Ikaba area, one household head that has been living in the area for more than 78 years provided a further illustration. The participant noted, *“area of KSC in general and Ikaba area, in particular, has experienced the worst flood in 1938, 1948, 1958, 1968, 1978, 1979, 1987,1998, 2004, 2009, 2011 and 2020, but we never left our ancestral land”* noted one participant. What is curious about this result is that for most of the years, every ten (10) years, KSC expects to experience a heavy flood. This also agrees with the observations by Mendelsohn and Roberts (1997:3), which showed that Southern Africa, for which Namibia in general and KSC, in particular, belong, experienced the worst flood in 1958, 1968/9, 1978 and 2009.

#### **4.4 QUESTIONS RELATED TO THE RESEARCH OBJECTIVES**

Having discussed the demographical profile of households, it is imperative to revert to what influenced the study. In this regard, the successful attainment of the study aims largely depended on the research questions and responses thereof, as seen in the following section.

##### **4.4.1 How does flood affect the availability of food in Ikaba areas?**

To determining how food availability affects food security in Ikaba area, it was crucial for the realisation of the study. Since assessing food security in Ikaba area is unrealised without ascertaining food availability. The question was aimed at establishing how flood has affected

the availability of food within the Ikaba community. For this question, the responses are grouped into 3 broad themes that emerged from the analysis as presented below.

### **Theme 1: Damage in terms of crops field**

All participants **HH1, HH2, HH3, HH4, HH5, HH6, HH7, HH8, HH9, HH10, HH11, HH12, HH13, HH14, KI1, KI2, KI3, KI4, KI5** and **KI6** indicated that flood causes food insecurity because it affects food availability through damaging crop fields. (Focus group households interview, June 2021 and Key informants interview, June 2021). Thus, **HH2**, responded as follows; "*sometimes flood damages the crop fields before they are ready to be harvested*". This correlated with **HH3** response, who vividly explained that;

‘it is always a painful experience to witness how the crops get damaged after a substantial amount of energy and money is spent to cultivate, weed, ... and as well as buying seeds. When you plant earlier, you risk ending up harvesting nothing as we all know that maize and sorghum are rain season crops’’. (Interview with household, June 2021).

The issue of crop damages was further stressed by **HH5**:

*“Due to flood water that takes time to dry, some of the crop fields are cleared for cultivation late. Therefore, by the time they are prepared for cultivation, planting and weeding, it may be too late, depending on the flood level”*. (Focus Group Household Interview, June 2021).

**HH4, HH9, HH14, KI1** and **KI2** had a similar sentiment on damages brought by the flood. They illustrated that, to those with uphill fields, sometimes with moderate rain, they harvest and store maize grains during flood season to prepare for a potential food crisis. However, storing food is one solution, but in some instances, the quality of the stored food deteriorates because of humid conditions brought by omnipresent moisture during flood in the process fail to last for a prolonged time. (Focus group households and Key Informants interviews, June 2021).

The above sentiment was clearly explained by **KI3** who stated that *when they plant late, the chances are higher that they will prematurely harvest their crops or end up harvesting nothing at all*. **KI4** thus noted: *“Farming with crops such as maize and sorghum in the Ikaba area has become an unrealised agricultural dream for households to a large degree affecting food unavailability”*.

**Figure 9: Maize crop field in Ikaba area pre-mature submerged in flood water**



**Source:** Field data capture by the researcher (2020)

In establishing the cost estimates of flood damage, the question of how flood affects food security was explored further by the researcher. The researcher aimed at determining the number of hectares a household would need compared to the hectares they are likely to harvest each farming season, particularly for maize as a primary staple food. In this regard, Table 3 illustrates this difference.

**Table 2: Damage estimates for maize crops**

AFFECTED HOUSEHOLDS	NUMBER OF MAIZE HECTARES PLANTED IN 2019/2020 FARMING SEASON	NUMBER OF MAIZE HECTARES PRE-MATURE FLOODED FOR 2019/2020 FARMING SEASON	ESTIMATED VALUE OF LOSSES DUE TO FLOOD
Household 1	5	4.2	N\$27,922.65
Household 2	3	2.2	N\$14,626,15
Household 3	1	1	N\$6,648.25
Household 4	2.8	2.4	N\$15,955.8
Household 5	4	3	N\$19,944.75
Household 6	3.5	3.5	N\$23,268.875
Household 7	6	2.9	N\$19,279.925
Household 8	4.2	4.2	N\$27,922.65
Household 9	2.8	2.4	N\$15,955.8

Household 10	03	00	N\$00.00
Household 11	7.2	5.6	N\$37,230.2
Household 12	0.0	0.0	N\$00.00
Household 13	3.7	3	N\$19,944.75
Household 14	10	4	N\$26,593.00
	<b>Total -51.5 hectares</b>	<b>Total- 38.4 hectares</b>	<b>N\$ 255,292.8</b> <b>Total value of</b> <b>loses</b>

**Source:** Field data by the researcher (2021)

It is almost certain from Table 3 above that almost every household interviewed had planted maize crops to improve food security. To these households that participated in the study, a combination of 51.5 hectares was planted. Only one household **H12** interviewed did not plant maize crops during the stated planting and harvesting season. As it can be established further from the table above that a total number of 38.4 hectares was destroyed due to flood water, representing 75.14% of total losses.

To illustrate this further, according to the Namibian Agronomic Board notice (2021, p.1), a floor (minimum) price for maize grain price is N\$ 265.93 for a 50 kg bag. In comparison, a well-planted hectare could produce more than twenty-five (25) 50 kg bags of maize. When the calculation is based on N\$265.93 per hectare, one hectare with 25 bags of maize may produce N\$ 6648. 25 when sold on the market. The remaining bags of maize, when deducting 25 bags, are presumed to be for consumption. This implies that 51.5 hectares that households planted could have a combined value of N\$342,384, excluding bags allocated for household use. Due to floods, an estimated amount N\$255,292.8 was lost for the 2019/2021 farming season.

On the estimated amount, the cost of weeding, paying for labour and buying seeds are all excluded. The data reported here suggests that there is food insecurity in the Ikaba area mainly caused by annual floods. The findings further suggest that low earnings from the crops affect food availability, especially when residents have to purchase other food items that they are unable to produce on their own.

## **Theme 2: Halted Emergency Food Relief**

**KI1, KI3, KI4, KI5, HH10, HH11** and **HH14** related that the provision of emergency relief food as a means to sustain flood affected communities with food is always hampered by to the difficulties in accessing these areas due to poor terrain, especially when road infrastructure, that

is the means to connect people is inaccessible. **KI3**, in this regard, underscored that *it has been the desire for the central and regional management of Zambezi Region to influence people to move to higher ground from the floodplains, but the residents themselves are unwilling to surrender their ancestral land.* [Key informant interview June, 2021].

In comparison, **KI5** alluded to the fact that *for the reason that those that are cut away by floods, end up opting to remain, [they] are not provided with food relief that would assist in addressing food shortages in the Ikaba area.*

### **Theme 3: Minimal income from livestock**

**HH7, HH8, HH10, HH12, HH13, HH14, KI4** and **KI6** singled out an increase in expenses in terms of medicines for cattle and goats, resulting in a loss in income generated from the trading of livestock. (Focus group households and Key Informants interviews, June 2021).

**HH7** according to this view, *the tertiary part of flooding aftermath is always a health hazard due to water and grass contamination.* [The effect is], *livestock such as cattle, goats and sheep feed on pathogens, and this may result in infecting cattle and goat livers, kidney damage, skin diseases [and] eventual death.*

**HH8** presupposes that; *flood reduces the number of cattle that farmers can sell, and those that are a little bit healthier are sold at a lower price, leaving the community with less income generated from their animals.* [It is a widely held view in the Ikaba community that] *owning livestock symbolises power in the community and is the means to sustain inhabitants of Ikaba community in terms of buying other food necessities ... through the income generated from the sale of livestock.* **HH10** emphasised

(**KI4**) [clarifies]

‘These residents have witnessed a significant loss in cattle dying due to drowning in flood water, especially during the evacuation of a distance covering between 60-70 km from the flooded area to higher ground, usually at KNC. For this reason, cattle farmers in the area are unable to sell more cattle stock to get income that may sustain them throughout the year.

*The dilemma that we face each year is that apart from us losing our cattle during the evacuation, those that normally manage to reach higher ground, not all make it back home after the floods, as explained by HH12.*

As identified in the above paragraph, it is systematically proven that livestock struggle to adapt to dry grass found at relocation places, compared to the evergreen grass in the Ikaba area. This has led to some farmers opting to keep their cattle and graze in the flooded grass. But also, these practices have proven to be a great danger in terms of losing cattle to crocodiles.

Figure 11 beneath shows cattle being evacuated to higher ground during the flood season.

**Figure 10: Herd of cattle being evacuated from Ikaba area to higher ground during flood season**



**Source:** Field picture by the researcher (2020)

**HH14** claimed that:

‘It is well known fact that those who struggle to make a living in the Ikaba area even after the flood season have ended up with less or no cattle at all. This is because the unavailability of food increases when you do not have any cattle or you have few of them’.

For instance, “fields are cultivated using cattle simultaneously; cattle can be sold to buy other food items to address food unavailability” (HH15). This shows that there is a relationship between owning cattle and the capability to plant more hectares of land for food production.

As it was the case in establishing flood damage in terms of the cost of maize as the primary chief crop in the community, the question of how food availability is affected by flood is further explored. This time, the exploration is aimed at determining the loss resulting from farming with cattle, as shown on the table below:

**Table 3: An estimated loss of livestock due to flooding**

AFFECTED HOUSEHOLDS	NUMBER OF CATTLE OWNED IN 2019/2020 FARMING SEASON	NUMBER OF CATTLE DIED FROM 2019/2020 FARMING SEASON AS A RESULT OF RELATED FLOOD CAUSES	ESTIMATED VALUE OF LOSSES DUE TO FLOOD
Household 1	51	9	N\$36000.00
Household 2	39	3	N\$12000.00
Household 3	12	2	N\$8000.00
Household 4	17	4	N\$16000.00
Household 5	51	11	N\$44000.00
Household 6	48	3	N\$12000.00
Household 7	116	18	N\$72000.00
Household 8	83	11	N\$44000.00
Household 9	43	6	N\$24000.00
Household 10	00	00	N\$000.00
Household 11	128	21	N\$84000.00
Household 12	00	0.0	N\$000.00
Household 13	68	7	N\$28000.00
Household 14	154	24	N\$96000.00
	Total of <b>810</b> Cattle	Total of <b>119</b> cattle died	Total losses in value <b>N\$476,000</b>

**Source:** Research data by the researcher (2021)

Table 4 above shows that the households that participated in the study all own cattle, apart from two households. It is still evident from the above table that the households owned a total number of eight hundred and ten (810) cattle during the 2019/2020 farming season. However,

during the period under review, one hundred and nineteen (119) cattle out of 810 died due to floods. This constitutes 15% of the total combined cattle owned by households who took part in the study.

According to the local price, a floor (minimum) price for one herd of cattle is estimated to cost N\$4000.00. Therefore, at 119 cattle, when sold, one would have provided the households with an estimated value of N\$476,000.00. The loss per household is indicated in the Table 4 above. Notably, there is also a strong correlation between the number of cattle owned and the number of hectares ploughed, as shown in Table 3 and Table 4, respectively. In other words, the more cattle one has, the more they are likely to plough several hectares of land. Further, it is established that those that never cultivated any portion of land or cultivated less than half a hectare (**HH10** and **HH12**) appear not to own cattle.

#### **4.4.2 How does flood affect food accessibility during flood season in Ikaba?**

As already illustrated, in determining food security in Ikaba area, food accessibility was a critical component of the present study. This is because one would not come to a conclusion whether people in the Ikaba area are food secure or not without establishing the impacts of flood on the accessibility of food. Thus, the question was aimed at assessing how food is negatively impacted during floods. While food security dimensions guided the researcher, to a large extent, it was noted that a significant contributor to dietary quality lies in access to healthy food at a reasonable cost, available on time and within the community's reach. In this sense, the study established the extent of to which food accessibility is affected by looking at the themes that recurred throughout the dataset.

##### **Theme 1: Transport Network Disrupted**

All participants **HH1, HH2, HH3, HH4, HH5, HH6, HH7, HH8, HH9, HH10, HH11, HH12, HH13, HH14, KI1, KI2, KI3, KI4, KI5** and **KI6** indicated that food accessibility in the Ikaba area is affected during floods due to difficulties in accessing markets for all kinds of food as the area is wholly marooned by water and long stretches of roads are completely delinked. (Focus group households interview, June 2021 and Key informants interview, June 2021).

In clarifying this matter, **HH4** notes:

:

‘Despite the availability of banana boats (ceramic engine driven canoes) and dugout canoes that transport people occasionally to nearby marketplaces, they are too many risks involved

due to overloading. As for banana boats, it is pretty expensive to use; this means [that] in most cases, transport affordability becomes a challenging issue. [In addition], it is difficult to get access to various food items during the flood. We have boats that sometimes transport people to Katima Mulilo, but many people opt to remain behind because of the risk associated with the boats capsizing as a result of overloading’.

**Figure 11: Banana boat as a mode of transport during flood season**



**Source: Field photo by the research (2021)**

The above figure shows one of the modes of transport used by residents of Ikaba to and from nearby areas during floods to ferry residents.

**Figure 12: The Overloaded dugout canoe used as a link to town for the residents of Ikaba during flood**



Source: Field photo by the researcher (2021)

By observing figure 12, it becomes clear that residents of Ikaba area survive with great difficulty accessing outside areas, especially with the significant number of crocodiles, hippos and the risk of the canoe capsizing.

*"We struggle during the flood season to access food when our food stock, mainly maize, gets finished" (HH9) contended. According to KI3 and KI5, flooding impacts food accessibility by physically damaging transport infrastructure and disrupting traffic flow that serves as a means to reach markets for other food commodities. One individual, KI6, stated that "lack of road transport during ... and subsequently after the flood has meant that residents of Ikaba area have become vulnerable to poverty and hunger because of a lack of access to food that can be obtained from market places".*

## Theme 2: Strained buying power

HH1, HH2, HH3, HH5, HH6, HH7, HH8, HH14, KI2, KI4, and KI5 noted that the strained buying power attributed to the lack of selling power. (Focus group household interview, June 2021 and Key informant's interviews, June 2021). *"It is commonly known that for one to be able to buy, he or she should be able to sell some produce"(KI1). Another respondent noted that; "Flood reduces crop production; [this factor] contribute to people's inability to sell more of their produce affecting their ability to acquire other food items " (KI2). In the accounts of the events surrounding strained buying power, HH1 revealed;*

*"Despite the availability of fish brought by flood in the Ikaba area, the fish market becomes difficult to access; therefore, people opt to eat fish instead of selling, sadly weakening our buying power.*

*Those who keep and dry fish to be sold in the aftermath of the flood risk selling them at the lowest price as fresh fish has more value than dry ones. The outcome is that income generated may fail short of our needs, primarily related to food security”.*

**Figure 13: A fisherman removing fish from the net and a young boy with fish ready for consumption**



**Source: Field photos by the researcher (2020)**

Observing from Figure 13, one thing becomes clear, that fish removed from the fishing net are in small quantities mainly because they are intended for household use only. Since during floods, the concern of residents is shifted to a low production of fish necessitated by the fall of marketing and business environment for the fishing industry. As enunciated by the participants, this is also worsened by the fact that from 1st of December to 31st of March, the fish market is generally closed by both Ministries of Fisheries and Marine Resources in Namibia and Zambia. Such a decision is always taken to provide enough time for fish to breed because this time is a breeding period for fish species.

For instance, **HH4**, **HH6**, and **HH7** associated the lack of buying power with unproductive cassava farmland. To illustrate this point, **HH4**, note;

“For example, cassava planted in larger quantities when harvested suffers from the lack of markets. Likewise, farmers in are forced to harvest prematurely due to flood water, and the harvested cassava is pounded into flour for consumption. Despite being planted in larger

quantities: cassava still does not provide reliable source of income due to flood that forces earlier harvesting before it is ready for the market”.

**HH6** provides another clear illustration:

“When we speak about cassava, I am so happy because it is my favourite; when we harvest, we ... consume the roots directly. [Further] some roots are processed into refined flour packed in the 50-kilogram bags which we sell for N\$800.00. We also eat cassava leaves as a [nutritious] vegetable, [meanwhile], the plant tops are fed to cattle or pigs. The realisation of the useful nature of cassava and income generation depends on the particular flood that year. For instance, during ... [optimal] flood season, which takes longer for the fields to be destroyed, the benefits of planting cassava are more. [The opposite] ... [can be said] when a heavy flood is experienced in our area”.

For **HH7** clarified that *"the harvested cassava serves as a surplus food supplement ... but does not last long because of [a] small persistent harvest that contributes less or nothing at all to the household income, especially if the flood is severe that year"*.

**Figure 14: A Man trying to uproot the flooded cassava tubers for consumption**



Source: field photo by the researcher (2020)

By looking at Figure 14 above, it could be concluded that hectares of cassava fields were destroyed due to floods. Thus, it is challenging to obtain surplus cassava for selling to enable the residents to access other food items that could provide for a balanced diet. Similarly, the selling of cassava could prove to be a source of income for sustained livelihood. However, cassava's potential as a source of income is affected by the floods as observed in Figure 14. Evidence of the impacts of floods on livelihood has been evident on the loss of income from the selling of cassava in the Ikaba area, especially during heavy flood seasons.

Given that cassava is one of the most common crops grown in the Ikaba area (see 4.2.1.5), there was a need for the further explorative question on how flood affects the food accessibility by determining cassava loss incurred as a result of flood during the year under study. This is informed by the need to justify the loss associated with floods resulting in food insecurity. The following table shows an estimated loss of household income from cassava production per unit.

**Table 4: Household loss estimates for cassava field due to floods**

AFFECTED HOUSEHOLDS	NUMBER OF CASSAVA UNITS PLANTED IN 2019/2020 FARMING SEASON	NUMBER OF CASSAVA HECTARES AFFECTED BY FLOODS FOR 2019/2020 FARMING SEASON	NUMBER OF BAGS (IN KG)	ESTIMATED VALUE OF LOSSES DUE TO FLOODS
Household 1	0.006	0.004	51,2	N\$40960.00
Household 2	0.004	0.003	38.4	N\$30720.00
Household 3	0.01	0.006	76,8	N\$61440.00
Household 4	0.009	0.008	102,4	N\$81920.00
Household 5	0.003	0.001	12,8	N\$10240.00
Household 6	0.005	0.003	38.4	N\$30720.00
Household 7	0.003	0.003	38.4	N\$30720.00
Household 8	0.009	0.006	76,8	N\$61440.00
Household 9	0.008	0.008	102,4	N\$81920.00
Household 10	0.006	0.004	51,2	N\$40960.00
Household 11	0.009	0.008	102,4	N\$81920.00
Household 12	0.004	0.003	38.4	N\$30720.00

Household 13	0.004	0.003	38.4	N\$30720.00
Household 14	0.005	0.004	51,2	N\$40960.00
Total-14	<b>Total- 0,085</b>	<b>Total-0,064</b>	<b>Total 819,2</b>	<b>N\$ 655360. 00</b>

Source: Research data by the researcher (2021)

To calculate the estimated loss in revenue of cassava, the estimated number of hectares affected by floods was multiplied with 12.8 tonnes. This is because, on world average yield, a hectare of cassava field is estimated to produce just 12.8 tonnes of cassava, according to (FOA, 2013). Further, mathematically a tonne is equal to 1000kg. Therefore 12.8 tonnes equal 12800 kilogram or 256 bags of 50kg of cassava; given that a bag of cassava currently cost N\$800.00 for at local selling price in Ikaba, the number of bags lost as measured in hectares is equivalent to a total value lost per production unit as shown on the table above. As provided in the table above, N\$ 655360. 00 was the projected loss of cassava in the farming season of households. This excludes the key informants and all other residents who did not partake in the study even though they co-exist in the Ikaba area.

#### 4.4.3 Food utilisation during flood season?

As a component of food security, food utilization refers to the way the body makes the most of the various nutrients in the food. Thus, questions designed to determine the state of food utilization in the Ikaba area during flood season elicited several responses. From responses of the study participants, it became clear that assessing the impact of flood on food security from the perspective of food availability and accessibility only is inadequate. Thus, adequate food utilization entails a diet that gives sufficient energy and vital nutrients, clean water, acceptable sanitation, access to health services and appropriate nourishing practices. Based on this, the question of inclusivity played a significant role in determining the food security situation in the study topography. Therefore, the standard view amongst interviewees is summed up as follow:

#### **Theme 1: Insufficient nutritious food**

Insufficient nutritious food is a challenge during flood time in the Ikaba area. This is according to almost half of the participants (**HH3, HH4, HH5, HH6, HH8, HH14, KI3** and **KI4**). (Focus group household interviews and Key informant's interviews, June 2021).

In response to questions relating to the utilization of nutritious food by residents of Ikaba during the flooding season, **HH3, HH6, HH14** and **KI3** pointed out that due to a decline in

income attributed to floods, the consumption of nutrition-rich food, such as fruits, vegetables, and other source of a balanced diet are always affected adversely.

This observation confirms information provided by **KI4** who said; *“lack of a balanced diet in the area has been among the contributing factors to malnutrition, especially in children under the age of 14 due to a decrease in micronutrient deficiencies”*.

## **Theme 2: The health status of food**

In this regard, all participants apart from **HH2**, **HH6**, **HH12**, **KII**, and **KI6** were so concerned with the health status of food consumed and water used during flood time. [Focus group household and Key informant’s interviews, June 2021]. In their own version, they argued that it is infrequent to consume food free from contamination subsequently posing health risks.

**HH7** and **KI1** disclosed, for instance, that; *“some residents drink flood water that is readily contaminated, some are unable to procure disinfectant tablets to clean the water, and they opt to drink water in its usual state and use it for a variety of household chores”*.

Thus, it is predicted that food utilisation for a healthy body is unachievable. This has been a notable reason why there are cases of people suffering from intestinal inflammation (dysentery) that is commonly causing death due to unclean water in areas **HH7** and **KI1** illustrated clearly.

**HH11** acknowledged that *“in some cases when cattle and goats graze in floodwater that is contaminated, they may contract communicable diseases that will ultimately affect people who end up eating the meat, which leads to such people to contract diseases as well”*.

**HH13** comprehensively noted that:

“At the beginning of the flood season, you may get one or two shops that sell few fruits, but when the flood has reached its climax, usually by February to March, no one ... [trades] in fruits and vegetables. For the reason that the market supply chain is disrupted, people only depend on small quantities of food that is produced. [Meanwhile], for those households with breadwinners that are over 60 years and receive government grants, there is a bit of a relief. Even if this is the case, [exorbitant] high transport fees for ferrying residents to and from Katima Mulilo affects the usability of the meagre N\$1300.00 pensioners' grant they receive. This will mean that we will be

consuming ... food that does not meet a balanced diet for a prolonged period ... [which is another setback in terms of achieving food utilization]”.

#### **4.4.4 Food stability during flooding time in the Ikaba area?**

Questions regarding food stability in Ikaba were also posed to respondents. The importance of food stability cannot be overemphasised. Food stability generally refers to the ability to obtain food over time. In the context of Ikaba area residents, determining food insecurity compelled the researcher to look at how stable is the food supply in the area. The following were the opinions of the respondents.

##### **Theme 1: Food supply chain disruption**

The majority of the participants believed that food stability for the community of Ikaba area is not achieved (**HH1, HH2, HH4, HH5, HH6, HH8, HH11, HH13, KI3** and **KI6**). (Focus group households and Key informants interviews, June 2021). They cited the disruption in the food supply chain and lack of food retailers in the area.

While explaining how food stability is affected, **HH1** distinguished food supplies during and after the flood in the research topography:

“As things stand, achieving food stability is an unrealised dream of both stakeholders that are involved. [In addition] even under normal circumstances, accessing the food market is difficult. From here to Katima Mulilo, it is 135 KM. with regards to transport fares during flood time, a person is charged between N\$200.00 to N\$250.00 depending on which part of Ikaba one is coming from. This entails that one spends between N\$400. 00 and N\$500.00 just for the transport fare. Due to the distance and transport fees ... from here to town, accessing nutritious food on a daily basis has been difficult even after the floods”.

In determining how floods affect food stability, **HH4, HH8, HH13,** and **KI6** had similar views, and they attributed food instability to the absence of local retailer’s shops that provide all kinds of macro nutritious food. According to them, the food supply chain is not readily available during floods and for the reason that these balanced diet food items are not accessed by everyone; this poses a serious threat to food stability.

##### **Theme 2: Inconsistent availability of food**

**HH1** took issue with the contention that:

“With income available, we usually buy food grains such as sorghum and maize from Magumwe in Zambia, where they have a steady harvest almost every year in terms of maize production. These maize grains help us to supplement our small produce. However, during the flood, means of income generation are scarce, procuring other food items becomes a difficult task”. [Focus group household interview, June 2021]

**HH2** offered a distinctive explanation for the inconsistent food availability as the factor that affects food stability. “*Frequent flooding of the area results in crop damages and losses, affecting the availability of the staple crops and thus threatening household food security on an annual basis*”.

**Figure 15: Resident of Ikaba with a small portion of harvested cob of maize from a 4.2-hectare field**



**Sources: Field photo by the researcher (2021)**

“For example, from July to October, we have plenty of fish that we sell. Due to the availability of good grazing land, our cattle produce more milk than we sell in Zambia and Katima Mulilo. Road transport sustains these activities, but sometimes, it is hard to feed the family apart from drought relief food that cannot sustain a person for an extended period, especially during flood, noted (**HH3**). [Focus group household interview, June 2021]

The result may also be due to what **HH4** posited:

“From December to March each year, when the Ministry of Fisheries in Namibia and Zambia halt the selling of fish for because it is a breeding reason, this also affects food stability. Besides, during the rainy season, road transport is disrupted, that it takes time for one to travel to the desired place for acquiring food commodities. [This implies that], one may have the income to buy the foodstuff [needed] for the required nutrients of the body, but fail to reach to the market places due to poor road infrastructure that is mainly in shambles during the rainy season. In the end, the repercussion of food instability for the households in the Ikaba area is exacerbated’’. [Focus group household interview, June 2021].

### **Theme 3: lack of access to Agri-loans**

Half of the respondents **HH2, HH5, HH6, HH13, KI2, KI3** and **KI5** cited the lack of access to funding, especially agricultural loans, which could assist farmers in improving farming activities in the community as a reason for unrealised food stability.

In **HH3**’s epistemological reasoning:

“Lack of access to funding through loans lessen the capability of farmers to produce crops throughout the year, consequently, affects food stability in the area’’. [For instance], if the residents had access to an irrigation system, they could clear the land, cultivate and plant crops in some places that get dry earlier. [Further], we have one island alongside the Zambezi River, referred to as Mukoma; it covers many hectares and could be an ideal place for farming if farmers in the Ikaba area are provided with ... and agricultural assistance. It can feed not only Ikaba inhabitants but the entire Zambezi region’’.

**HH13** expressed absolute certainty by stating that:

“Most of us, if not all of us in the Ikaba area, depend on rain-fed subsistence agriculture for food and jobs by cultivating and weeding crop fields to get income. This dictates that the nature of our harvests is sorely dependent on climate change. [However], the implication[s] could be addressed if the populace would have access to funding that would allow for irrigations of fields, procuring

tractors for ploughing, improving soil nutrients by using fertilisers and employing more workers and in return, creating more jobs for residents and improving the level of income’.

In the absence of using high tech agricultural equipment, the rainy season may not be a viable option for residents of Ikaba area, noted (**KI2** and **KI5**). [Key informants’ interviews, June 2021].

#### **4.4.5 Improving food security during floods**

Suggestions on how to improve food security during flood was a critical part of this study. Therefore, questions designed to elicit responses in this direction were asked to the respondents.

##### **Theme 1: Concerted stakeholders’ efforts**

All participants **HH1, HH2, HH3, HH4, HH5, HH6, HH7, HH8, HH9, HH10, HH11, HH12, HH13, HH14, KI1, KI2, KI3, KI4, KI5** and **KI6** highlighted stakeholders’ involvement as an important strategy that surpasses any other strategy in alleviating the impacts of flood on food security. [Focus group household and Key informant’s interviews, June 2021]. To emphasise this issue, **HH1** stated that *“the GRN and NGOs as the role players can allocate more funds and resources towards alleviating the impact of flood on food security”*.

From those that participated in the study, a considerable number of the participants **HH4, HH6, HH11, HH12, KI1, KI2, KI5** and **T16** pointed out that successful implementation of all planned activities in Ikaba, especially those related to addressing food security caused by flood, requires funding and more resources.

To clarify further, **KI2** bemoaned that *funding, which comes from the GRN is barely enough*. *“Inadequate financial resources are also an obstacle”* emphasised by (**KI5**).

In clarifying the role of stakeholders, **HH6**, broadened this notion by noting that *“it is through stakeholder[s]’ involvement that the identification of the problem faced in alleviating the impact of floods on food security can be identified quickly and the institutionalisation of remedy”*.

##### **Theme 2: Construction of permanent road infrastructure**

According to **HH3, HH7, HH10, KI3** and **KI4**, central government should embark on the construction of bridges and robust road infrastructure in the flood-prone area.

**KI3** provided a practical example when noting that “a good example is that of 45 km Mongu-Kalabo road in Zambia that was built in floodplains that still link residents to access markets during floods. This means that they can sell their cash crops to town even during floods”.

**Figure 16: Mongu-Kalabo road in Zambia linking the flood-affected community to markets**



**Source: [allafrica.com](http://allafrica.com)**

### **Theme 3: Construction of a diversion canal**

According to **KI3**, **KI4** and **KI6**, the water discharge from the Zambezi River in the Ikaba area is much higher as compared to the carrying capacity of wetland in the area. Therefore, constructing a diversion water canal in some places could reduce the risk of crop fields and villages being submerged.

### **Theme 4: Early maturing varieties**

More than half of the participants **HH1**, **HH2**, **HH3**, **HH4**, **HH6**, **HH7**, **HH10**, **HH14**, **KI1**, **KI2**, **KI4** suggested introducing early maturing varieties of crops that can be harvested before flooding. [Focus group household and Key informant’s interviews, June 2021].

By way of illustration, **HH1**, noted that;

“Early maturing cassava, for instance, that can be harvested earlier than our local cassava varieties, could be introduced in the area so that before floodwater submerges the fields, residents have harvested their cassava. [Consequently], thereby reducing the vulnerability of cassava farmers to floods in terms of food insecurity. They may seem cheap, but a large sum needs to be invested by the GRN and the private sector to be realised. [This is so], as residents need to be taught how to plant these new cassava varieties”.

*“Planting rice varieties in Ikaba with a gene that can adapt in water for a prolonged period could sustain food security in terms of availability and stability. This gene prototype of rice would provide the means to sustain their livelihoods”* **KI2** explained.

**KI4** pointed out the need for the issues above, another said:

“For the GRN to have green schemes in the area, especially rice and sugar plantations. These varieties can withstand water and productivity is higher in the flooded area. Therefore, once there are GRN green schemes, they will necessitate an improvement in road infrastructure to Ikaba. In return, not only will this create jobs for the residents but, their income, food accessibility ... to the market place and food stability could improve drastically. Consequently, this will address food insecurity associated with lack of sustained transport network affected by floods”.

**KI4, HH6, HH7** and **HH10** argued that much of the government's attention has been on relocating residents of Ikaba to higher ground permanently. However, such efforts are inadequate because they are not intended to address the problem of food security in the would-be relocated areas.

**HH10** emphasised that *Mukoma* is an example of an island that may be considered by the government to set up green scheme projects for crop farming such as maize or rice. Once realised, this could also mean employment for the residents for the entire year and in return, serve as a stable source of income. Likewise, the latter will almost certainly lead to improved food security even during the flood season.

**KI5** engaged with the discourse by elaborating, as shown below:

“A recommendation for a feasibility study should be instituted to assess *Mukoma Island* if it is an ideal place for farming purposes and invite investors to set up projects that may create jobs for the

residents. In addition, lodges could be set up to employ the locals for a constant income generation. The process, in its entirety, will contribute towards addressing persistent food insecurities in Ikaba’.

### **Theme 5: Allocation of Boats**

For **HH5** and **KI3**, some of the issues related to failure to access markets could be addressed if the GRN provides boats to the local population that could be used to transport people from the flooded area to market places at least twice a week. [Focus group household and Key Informant interview, June 2021]. Meanwhile, **KI3**, added, *“these boats may be funded and maintained by the GRN just to make sure that there is food accessible throughout.*

It seems possible that the above theme as presented by participants may serve as a pivotal solution. When residents are made aware that the GRN provides transport in the form of boats during the flood season, they may try to save their income generated from farming activities. There is a strong possibility that the provision of transport may also serve as a motivating factor for sustained and reasonable savings. Such thinking may be informed by knowing that the money generated can be used to buy food items even during floods due to the availability of transport.

### **Theme 6: Livestock fodder and medicines**

**HH13**, **HH15** and **KI6** informants suggested that GRN should help farmers with cattle feed and medicines to vaccinate their cattle during floods to avoid loss of livestock that is attributed to water-borne diseases and lack of food nutrients in the grass [Focus group household and Key Informant interviews, June 2021].

### **Theme 7: Proximity of Millers**

By way of illustration, **HH8** offered an adequate explanation:

“The maize milling companies are located in Katima Mulilo only. It is suggested that at least one milling company should set up a branch at Luhonono, a place close to the Ikaba area. This is mainly [because] efforts to achieve food security are enhanced when crucial millers and retailers are within ... proximity of locals. [In the end], some income may be saved that could have been used for transport to the markets’.

### 4.3 Discussion of the findings

Regarding the demographic profile of participants, the household's socio-demographic characteristics are determined because they are the main contributors to the livelihood of their households and have a broader understating of flood and how it affects food security in Ikaba. Households demographic information includes gender, age, years of residing in Ikaba area, the composition of the households, the means of survival, and pull factors. Firstly, on gender composition, for the 14 households sampled, 11 were men; meanwhile, only 3 households are headed by women. This implies that in Ikaba area, most of the households are mainly headed by males. The predominantly stereotype may partly explain such observation of men's supremacy over women and the generalised belief that men are more capable of heading homes than women. Secondly, the age of the household heads formed part of the demographical characteristics of the participants. For this characteristic, the study found that 6 of the heads of the household who took part in the study are between the age range of 60 to 65. On the contrary, 4 participants are between 66 and 70 years of residing in Ikaba area.

Lastly, 3 household heads are over 71%. It seems possible that these results are due to what a researcher initially purposeful anticipated to sample households headed by those that are 60 years and above as residents in Ikaba area. The vast experiences of these household's heads were vital to provide rich information on the impact of flood on food security based on their lived experiences. Such informed decisions may address the gaps resulting in the proportionality of the population and the current sample that was used. Thirdly, in terms of years of residing in Ikaba area, for household heads, 5 who of household heads have been residing in the Ikaba area between 66 to 71 years. In the second place, 4 household's heads lived in Ikaba area between 60 and 65 years. On the other hand, 3 household's heads are between 72 and 77 years of staying in the Ikaba area, while 2 are over 78 years.

From this comparative analysis, it could be concluded that all participants had necessary experiences as they were all 60 and had more years as residents of Ikaba areas. As explained in research methodology, when justifying a small sample size for the study, it is necessary only to use the residents of Ikaba with more flood phenomenon experiences. This is because they could provide rich data for the study, and the choice of the approach is aligned to the fact that inhabitants of Ikaba area are those with a unique set of experiences whose ancestors lived in the areas for many decades, as shown by the result in this case. As earlier alluded, key informants were not selected as more knowledgeable than households in providing information about the flood for key in this study. But their involvement was more on the mitigation strategies based on their respective offices as a counsellor, disaster risk management committee members and

red cross of Namibia in KSC. It is, therefore, likely that such connections and decisions validate the study findings.

Equally, on the household's demographic profile, the study also looked at the composition of household members. The study results reveal that the households consist of fathers, mothers, sons, daughters, uncles, aunties, fathers and mother-in laws. In addition, from the total households that took part in the study. Notably from the study findings is that daughters and sons constitute the majority of the household composition. This is mainly due to the dependence nature of children from their parents. Even though fathers and mothers head the households, their children still form part of the majority of the households.

This finding may reflect the reality that (father/mother) as parents may have more than one child hence, the high number of children in the households. For the grandfather and grandmother forming part of the households in Ikaba is not a surprise, mainly because when they are old enough and need care, they usually seek refuges from their daughters and sons, who happens to be the head of households in this case. Fourthly, the means of survival was considered as the demographic profile of the households, and the study revealed that maize, sorghum and cassava are commonly the staple food for the Ikaba resident. In addition, fishing and selling fish forms part of the indigenous language practices of Ikaba residents in pursuit to address food insecurity.

Equally, animals farming is more practices for meat or sale of milk produced. The primary sources of food were found to be their production, followed by fishing. A note of caution on the interpretation of the above result is due here since crops production is the primary source of livelihood and food; increased exposure to floods exacerbates their vulnerabilities. Meanwhile, the fish market during flood remains the most significant challenge.

In the first place, the pulling factors attract people to stay and reside in the Ikaba area despite the prevailing flood. The study found out that people reside in Ikaba area due to fertile land and water availability. The results on fertile land reflect those of those who also found Gartaula *et al.* (2012) that fertile land as a means of production also provides a status symbol to rural occupants. Water is another source of attraction for residents to reside in the research area. It is uncontested that wherever human species resided, water availability is consistently among the first consideration. Because people in Ikaba area have plenty of water throughout the year due to flood, this may explain the resident's persistent stay in Ikaba area.

Another reason why people are attracted to stay in Ikaba area despite prevalent flood by the availability of grazing land. With this in mind, one may conclude that this may be a reason why

farming with cattle is a common practice in the area due to the availability of grazing land. However, the study still found that land ownership motivates people to settle in the Ikaba area. In this regard, they have land that their ancestors lived in for several years. These results, therefore, need to be interpreted with caution; for instance, relocating to another place may affect their possession of the land, crops fields, grazing land and a sense of belonging. The finding mirrors those of the previous study by Tuwilika (2016), that has examined as seen in the literature that particular residents willingly reside in the areas exposed to flooding in search of better agricultural purposes and income from selling agricultural produce and fish (p.113).

The study further found that although flood poses human security challenges to residents' survival within the Cuvelai basin, it provides benefits. These benefits are not limited to; increased harvest through the availability of land and moisture, livestock productivity, recharge of sub-surface water reserves and aquifers, as well as increased fishing activities and income generations. However, the above realisation is possible only when seasonal flood delays in terms of covering the crops field for bumper harvests.

On staying for a prolonged time in Ikaba area the study found that in KSC in general and Ikaba area, in particular, has experienced the worst flood in 1938, 1948, 1958, 1968, 1978, 1979, 1987,1998, 2004, 2009, 2011 and 2020, but the residents never left their ancestral land. What is curious about this result is that in most cases, every ten (10) years, KSC expect to experience a heavy flood. This accords with the observations by Mendelsohn and Roberts (1997), which showed that Southern Africa, for which Namibia in general and KSC, in particular, belong experienced the worst flood in 1958, 1968/9, 1978 and 2009.

On how does flood affect the availability of food in Ikaba area? one of the important finding of the study is that food security is affected by the damaged crop fields due to floods. This is so because the strained capacity to acquire food needed is primarily attained by producing crops in larger quantities. This result of the study agrees with the findings from the literature by FAO (2019:5). Consequently, food availability can be supplied through household production or domestic output, commercial imports, or food assistance. Therefore, from the study result, the timing of farming activities is an essential food security remedy. The evidence from this study suggests that maize harvest suffer due to early rainy season and late drying up of water in the crop fields. These conditions partly explain why food availability is a concern for residents of the Ikaba area. This further means that by the time the next flood submerges the fields, the crops are not ready to be harvested which consequently, affect the food availability and livelihood of residents of the Ikaba area in general.

While food may be available during flood, household consumption patterns or the consumption of higher-value food items such as vegetables, fruits and other vital food items is limited by floods due to inaccessible road network to marketplaces. This suggests that food availability is essential when it comes to access to other kinds of foods. A decline in consumption of other types of food leads to food insecurity. These findings correlate with the study by (Ouma & Tateishi, 2014).

Regarding damages associated with maize crops, the current study found that for the households who participated in the study, an average of N\$255,292.8 was lost during the 2019/2021 farming season due to flood water. The findings further suggest that low earnings from the crops affect food availability, especially when residents had to purchase other food items that they were unable to produce on their own. Food availability is also affected by government's decision to halt the emergency food relief programme.

In halting the food relief programme during the flood season, the government tried to persuade the residents to permanently relocate to higher grounds and abandon their ancestral land. Subsequently, there is nothing to supplement local supply, and this affects food quantities. Interestingly, the data reported here appear to support the assumption that residents of Ikaba prefer to reside in their area of birth due to the sense of belonging and land ownership. Furthermore, the analysis was based on the fact that despite the halting of food relief programme to the affected community; the people do not appear ready to abandon their ancestral land.

The results reveal that food availability is also affected by the inability of some residents to generate more income from the dispose of their livestock due to poor markets during the floods. Furthermore, the unhealthy status of livestock exacerbates this due to poor nutrition necessitated by waterborne disease or dry grass in the evacuated places. Therefore, owning cattle in the Ikaba area is accompanied by some loss each year, depending on the magnitude of the flood. Moreover, the trend has affected farmers' income generation from their livestock.

It can be seen that by far the availability of food does not only depend on food production but generating income to buy other food items. This finding supports that of Nakale (2020), who states that cattle contribute immensely to food security through trading. However, flood affects income generation associated with livestock trading. Therefore, a possible interpretation of the relationship of the results may be that even though flood's negative impacts, such as loss of cattle and crops, are more severe during the flood, food insecurity resulting from flood is not limited during flood season but its impact is felt in the event of the aftermath of the flood. Based on the study findings, it can be concluded that the phenomenological research design

employed in the study provided valuable insights into how Ikaba inhabitants understand their experiences on flood.

What stands out from this study is the loss that is associated with cattle during the flood. For instance, from households that took part in the study, the findings reveal that they had a combined 810 herd of cattle during 2019/2020, and 119 from the total cattle died due to floods with an estimated combined value of N\$476,000.00.

However, this cost estimate must be interpreted with caution because the estimated value of loss excludes costs involving cattle herders' payment, medicines, and supplementary nutrients. If those were included, the current value could be much higher.

In analysing how food availability is negatively impacted by flood in the Ikaba area, one can clearly underscore the fact that food availability depends mainly on the local production, including individual production, trading of agricultural products such as maize grains, cattle trading and GRN food relief programme. What emerges from the results reported here is that, in the Ikaba area, the evidence suggests that the supply of food in terms of quantity and quality to provide adequate energy and micronutrients to the inhabitants on a sustainable basis is an unachievable endeavour. This is due to less productive farming activities linked to the prevalent flood. Therefore, if food availability declines locally, one may expect food prices to increase as well. As for the losses in terms of crop production and cattle, there is enough evidence to indicate that each household suffers a loss due to flood affecting food availability. By pointing out that food availability is affected during floods, the research question on how food availability in the Ikaba area is impacted during flood was answered.

The other study objective was to establish how does flood affect food accessibility in Ikaba. With respect to the impact of floods on food accessibility, the study found that flood disrupts transport networks. Further, canoe and *banana boats* used as means of transport fail to resolve the challenge of accessing the marketplace for food commodities. During floods, households cannot purchase food on time because of the loading capacity of canoes and *banana boats* and the high risk of capsizing makes the matter worse. Unreliable transport networks make it difficult to obtain food commodities from the outside market during the prevalent flood. In the same way, the evidence presented is similar to that found in a study by USDA (2009), which concluded that floods disrupt the transport systems of affected areas.

This result adds to a growing body of evidence, as suggested by Paterson (2018) that accessibility to a balanced diet is always predominant in flood-prone areas due to failure of accessing the marketplace on time. Another essential point to note is that transport systems

such as roads are valued not only for their cost-effectiveness and reduced travel time, but also for their readiness. In this way, this ensures that food is accessed for the residents of Ikaba, in the process, addressing some challenges hampering food security. Additionally, the prevalence of floods affects the supplies of food causing food insecurity. Effective transport networks underpin economic activities because it enables the movement of goods and people of Ikaba area.

Another important finding is that the buying power of inhabitants is significantly reduced during flood time. This is due to several factors. Firstly, the absence of the selling of fish reduces the income of residents whose major occupation is fishing. The problem is further compounded by four months of the closure of fish due to breeding. In this way, the purchasing power of residents of Ikaba weakens considerably due to shortfalls in income-generating activities. Secondly, poor production of cassava and maize means poor harvests and low income for residents who depend on farming as a means of generating income. Thirdly, the loss of cattle during flood means less income generated from the disposal of livestock tamed in the Ikaba area. It is apparent from the study that residents do not use crop variants that can withstand flood.

Ahmed *et al.* (2017), argue that during floods local residents of the area find it hard to generate income for various reasons. One of the most noticeable findings of this study is that the problems of planting cassava are the seasonal flooding of the fields. This is because the growth stage of cassava is most susceptible to flooding in Ikaba area. One pertinent finding of the study was the extent of loss that farmers in Ikaba area related to maize and cassava are concerned. The farmers incur substantial losses in value despite efforts made to produce maize and cassava in large quantities. Therefore, based on the information provided under this discussion on food accessibility, it can be cited here that the study's second research question was achieved.

With regard to food utilisation during the flood season, the study found that there was always a lack of adequate nutritious food and clean drinking water that ought to provide the essential nutrients to the body. Lack of adequate nutritious food contributes to poor health and greater susceptibility to other diseases affecting the health of residents. Especially when the residents are unable to access a variety of food commodities needed for optimum healthy body function. The study's findings further validate the study by FAO (2015), which found that access to improved water sources and access to improved sanitation facilities are crucial components in the realisation of food utilisation.

In most cases, the health status of food is poor because of the water used, which is contaminated with several detergents. This has a negative bearing on the effective utilisation of food, considering that effective utilisation of food is realised when the body makes the most use of the various nutrients in the food. On the other hand, food utilisation is affected by the direct use of contaminated water and by eating contaminated meat from animals that die of waterborne diseases or lethal grass. Overall, this study reinforces the idea that harmful grass consumed by livestock, when eaten by humans, negatively impacts the proper biological use of food in the body, affecting food utilisation.

Further, this still harmonises with common literature, which shows that access to improved water sources and improved sanitation facilities are determinants of food utilisation when measuring food utilisation. Otherwise, food utilisation can be affected by the prevalent diseases (World Bank, 2015). In analysing the extent to which food utilisation is affected, the findings of this study suggest that floodwater in the Ikaba area carries residues, raw sewage, oil, or chemical waste, making water unsafe to cook and prepare food. This evidence further means that contaminated food bears worrisome nutritional risks that undermine health, particularly in the most nutritionally vulnerable household members with high nutrient requirements. This presupposes that the ability of households to absorb and effectively use the nutrients ingested for normal body functions is affected. To this end, the question related to food utilisation was reasonably answered.

In determining to what extent food stability is affected in Ikaba area during the flood season, as previously noted, food stability refers to the ability to obtain food over time. The disruption of food supply chain during flood accounts for food instability. This may explain their relative persistence in overcapacity when they ferry themselves from the Ikaba area to nearby towns to buy some basic necessities. The mere fact that a bag of maize meal takes many days before it is delivered to the households, food stability in this way is affected considering that inhabitants are food insecure due to inadequate access to food. Furthermore, findings indicate that inconsistent food availability is also linked to straining the capacity of the residents to achieve food stability in the study area.

This result provides some tentative initial evidence that with income, food grains such as sorghum and maize can be bought elsewhere, with a steady harvest of maize production. Such an opportunity would supplement and sustain the local population in terms of food stability to achieve food security. The preceding discussion draws attention to the importance or role of income generation in procuring other food items in the Ikaba area. Equally important to note is that food stability is affected by crop damages and losses. This implies that if farmers could

harvest in bulk, they could keep some of their harvests to use throughout the year. In this way, they can improve food stability as a food security dimension affected by flood.

Transportation also emerged in the study as a contributing factor to food instability. A possible explanation for inconsistency in food availability leading to food instability in the Ikaba area may be due to a lack of adequate and reliable transport. Transport systems are supposed to link the inhabitants to the marketplaces during floods, not only in the aftermath. As a result, most activities that generate income, such as the dispose of cattle, milk, and other agricultural products, come to a complete stand still, translating to a decline in household income. With this conclusion, it is undisputed that when the source of income is cut off, purchasing food for extended periods, especially those acquired by trading, becomes an impossible activity, consequently affecting food stability in particular and food security in general.

The study results still suggest that the lack of access to Agri-loans of most inhabitants of Ikaba area, which could assist farmers in improving farming activities, is another conspicuous challenge to food stability. Lack of access to funding through loans may be due to the terms and conditions usually required by Agribank in terms of collateral that rural residents of Ikaba may not be able to meet. Since credit has a pivotal role in addressing farmers' financial limitations to invest in farm activities, increasing productivity and improving technologies. Besides, the data gathered here appear to support the assumption that credit accessibility is essential for improving the quality and quantity of farm products to increase farmer`s income, especially the rural population of the Ikaba community, many of whom earn poor wages across all agricultural activities. With no or limited access to credit, achieving food stability in Ikaba area is impossible, hence, increasing food insecurity. This and other factors already discussed demonstrate that the question which aimed to determine how food security is affected during floods in the Ikaba area was substantially verified.

In ascertaining of what could be done, to improve the food security impact caused by flood in Ikaba community. Stakeholders' efforts were found to be critical to finding solutions that can ameliorate the effects of flood in relation to food security in the Ikaba area. This literally means that efforts to address food insecurity should not be left to the government alone but be the collective responsibility of all stakeholders such as NGOs, Red Cross, charity organisations, researchers, policymakers, the business fraternity and private individuals, NGOs and private persons should invest in and team up with state authorities to realise food security for the residents of Ikaba. On the other hand, early maturing varieties of crops are found to be one of the ways to secure food. There are several possible explanations for these results. Firstly, Ikaba area experiences a prevalent flood, as mentioned, and this implies that there is always abundant

water during flood time. Flood water may be a remedy to address food shortage, especially by planting crop varieties such as rice, sugar cane and flood resistant cassava that adapt to the flood environment.

It was found again that availing several boats to the residents may, to some degree, reduce the impact of floods on food security. It seems possible that the above suggestion, as presented by participants may serve a pivotal purpose. It could be that when residents are aware of the fact that during flood season, the GRN provides transport in the form of boats, they may try by all means to save their income generated from their farming activities throughout the years only to use it during flood time. These findings partly explain the fact that available transport could serve as a motivating factor for sustained and reasonable savings. Furthermore, such thinking may be informed by knowing that the money generated can be used to buy food items even during floods due to the availability of transport.

The study also found that livestock feed and medicines could be one of the solutions for local people to attain food security. For the reason that they lack sustained income generation, they are unable to buy cattle feed and medicines to vaccinate their cattle during flood to avoid loss of livestock. A possible interpretation for this result is that farmers in the Ikaba area are subsistence farmers who feed themselves on their harvest and sell off their livestock. This, in general, implies that the inability to afford supplements for their livestock to withstand flood effects contributes to the loss associated with floods. GRN assistance in this regard may serve as a burden relief and could prove to be a value-added practice during flood.

#### **4.5 CHAPTER SUMMARY**

This chapter presented empirical evidence and discussed the results of the study after the interaction with respondents and key informants. The chapter started with the biographical information (gender, ages of the households, and years of residing in Ikaba, household composition and the means of survival of the participants. Importantly, the thematic analysis used in the study was outlined, the researcher strived to uncover what was being said by the participants thus enabling an extract of significant themes. Regarding the definition of food security as defined in chapter two, the result of the study showed that there is prevailing food insecurity in Ikaba area exacerbated by perennial floods. In summary, these results show that all four food security dimensions are affected by floods as seen in this chapter.

Furthermore, the results in this chapter indicate that the study participants were those with lived experiences, as anticipated in the previous chapter. The next chapter, therefore, moves on to discuss the findings presented in this chapter. Then, further, summarise the entire study, conclude, and make recommendations based on this empirical study.

## **CHAPTER 5:**

### **SUMMARY AND CONCLUSION**

#### **5.1 INTRODUCTION**

This chapter concludes the study. It presents a brief summary of previous chapters, evaluates the research questions, and makes recommendations and conclusions based on the adopted research methodology and analysed data. The present study assessed the impact of floods on food security in the Ikaba area of KSC. The issue of food insecurity will continue in the area for a long time to come if necessary measures are not taken to prevent flooding or reduce its effects on the people who reside in the area.

#### **5.2 SUMMARY OF THE CHAPTERS**

Chapter one of the study discussed the impact of floods on food security. It was revealed that recurrent flood is particularly a serious threat to people of Kabbe Constituency, where widespread poverty and limited government support to address the problem of floods has resulted in the loss of lives and destruction of means of livelihood. It came out clear in the study that floods, as natural disasters, are difficult to predict in the context of Kabbe Constituency in particular and Namibia in general due to poor planning, limited knowledge and expertise, poor technology and early warning system. Moreover, the problem is expected to intensify in the region as a result of climate change. The chapter further presented the preliminary background that showed that floods destroy the environment, cause damage to property, destroy crops, cause animal diseases and result in food insecurity regarding food stability, accessibility, availability and utilisation. The chapter further revealed that flood impacts individuals and communities and has social, economic, and environmental consequences. The consequences of floods, both negative and positive, vary greatly depending on location, the extent of flooding, and the community's vulnerability.

Chapter two reviewed extant literature in relation to the impact of floods on food security. The first part of this chapter reviewed the literature on key concepts. The outcome of the review shows that security has two main components. The first perspective relates to the protection of the state from internal and external threats. This is also what is generally referred to as the traditional security view. The second perspective refers to the protection of individuals against fear from harm and fear from want. It was revealed in the chapter that state and human security are mutually constituted and reinforcing. Therefore, when individuals in a state are protected against fear from harm and fear from want, the state is equally protected and vice versa.

Basically human security places emphasis on the right of people to live in freedom from poverty and misery.

In addition, the chapter clarified the concept of food insecurity as a situation that exists when people lack access to sufficient amounts of safe and nutritious food for normal growth, development and active, healthy life. It was clear in the chapter that flood is usually caused by rain water that either directly through the river systems or when water is absorbed into the soil to form groundwater flow later. Technically, it was described in the literature as part of the natural water cycle or a hydrological cycle caused by the unusual presence of water on land to a depth, which affects socio-economic activities. The relevance of FIVIMS conceptual framework on flood and food security which was the foundation of the study was also discussed. For this framework, the scope of food security encompasses national, community, household and individual levels. Extant literature shows that the first three levels of the framework relates to food availability in the form of production and distribution. In comparison, household-level implies that all individuals should have physical and economic access to food to maintain an active and healthy lifestyle. It also implies that when residents in urban areas are secure in terms of food and those in rural areas are food insecure, the country experiences food insecurity.

Chapter three discussed the description of the study area, and various research philosophies and justified the philosophy adopted for this study. The chapter further presented the research design and warranted the design used in the study. In addition, the chapter presented a summary by discussing the importance of the interpretative phenomenological analysis (IPA) employed in this study. Equally important, the chapter presented the sampling strategy, research instruments, data analysis method, and trustworthiness establishment. In the same way, a more detailed explanation of research limitations was presented as well as ethical considerations.

Chapter four focused on the impact of floods on food security, with a specific focus on four pillars of food security, availability, accessibility, utilization and stability in the Ikaba area. The empirical findings in this study provide a new understanding of the fact that achieving food security for all at all times remains a challenge for Ikaba residents. Where food insecurity exists, there are severe consequences. Even though the concerns over food insecurity have attracted the Namibian central government, hence the reason for providing flood relief, this seems to be a temporal solution. In this chapter, it became clear that achieving food security through the four pillars has been disappointing in the Ikaba area. What has become obvious in this study is that it is important to understand the causes of food insecurity when one is to

address food insecurity. The prevalent flood is the main source of food insecurity in the study area.

While water resources and fertile land availability are positive reasons residents cite in staying in the study area, achieving food security by looking at the four main dimensions of food security is marred by seasonal floods in the study area.

### **5.3 EVALUATION OF RESEARCH QUESTIONS**

In the first chapter of this study, the research questions were linked to the aim of the study in order to guide the study. Thus, in the sections that follow, the research questions are tested to determine the extent to which they were answered.

#### **5.3.1 Demographic discussion**

The following demographic characteristics of Ikaba households were recorded:

Households headed by men constituted a most significant, about 79%, compared to 21 % of total household participants regulated by females. Secondly, the average age of household heads was between 60 and 73. Of these, those between the range of 60-65 accounted for 50% of the total household head. Meanwhile, the remaining 50% was shared between those in the age categories of 66-70 and 71 and above, respectively. Thirdly, the majority of participants who participated as household heads are those who have been residing in Ikaba area for 66 to 71 years. For key informants who participated in the study, they worked in their respective offices for more than three years. The composition of household members in Ikaba includes extended family members; however, it is dominated by daughters and sons, who account for 67% of the setting. Furthermore, Ikaba residents subsist more on crop production such as maize and cassava as well as trading of fishing and livestock production. The community is attracted to the Ikaba area despite the seasoned flood primarily due to the ancestral land ownership, fertile land for cultivation and grazing land availability, and water availability throughout the years.

#### **5.3.2 How does flood affect the availability of food in Ikaba area?**

This question was aimed at assessing how flood affects the availability of food in Ikaba areas. The findings revealed that due to damage to crops field during flood caused by premature harvest, food availability is affected. Further, food availability is still affected by minimal income obtained from livestock, disturbed fish markets due to flood and halted GRN food relief programmes. This is mainly because the population depends on crops, fishing and trading of

livestock. The above objective was achieved as initially determined by pointing out that food availability is affected during flood.

### **5.3.3 How does flood affect food accessibility in Ikaba?**

In determining food security status in Ikaba area, this objective intended to determine how food accessibility is affected during flood season in Ikaba. In the present study, it has been found that access marketplace for all kinds of food as the area is wholly marooned and long stretches of roads are completely delinked is among the most significant challenges affecting food accessibility. Therefore, in the final analysis, the study's second objective was achieved in the final analysis.

### **5.3.4 To what extent is food utilisation affected by flood in Ikaba area?**

The question was aimed at establishing the extent to which food utilisation is affected during flood season. The study points out that insufficient nutritious food has become a recurring trend in the community. More specifically, during and immediate aftermath of flood, the residents suffer a lack of nutritious foods that provide all essential nutrients of the body due to the inaccessibility of open markets and retail shops. On the other hand, food utilisation was found to be affected mainly because of the health status of contaminated food and water with high health risks. While water is essential for residents' survival in Ikaba, floodwater carries residues, raw sewage and chemical waste that are likely to affect the body function, consequently, food utilisation. As anticipated from the onset, there is food insecurity in Ikaba area; this objective confirms such prediction.

### **5.3.5 To what extent is food stability affected in Ikaba area during the flood season?**

The question was to determine how food stability affected is affected during and aftermath of flooding in Ikaba area. While food supply chain disruption is seen to be affecting food stability, the study has also found that the lack of food retailers in the area affects food stability. The study further reveals that a large proportion of the population depends on cultivation falls under marginal and small farm categories. These farming households need credits regularly to meet and mitigate the challenge posed by flood by producing on a large scale and planting flood variety crops. Failure to access Agri-loans due to the lack of collateral in case of default has been seen as a stumbling block, consequently affecting the stability of food produced. The foregoing account indicates that the objective of the study was achieved.

### **5.3.6 What can be done to improve the food security impact caused by flood in Ikaba community?**

The question was necessitated to recommend interventions that may ameliorate food security in Ikaba area. At the same time, construction of the permanent road infrastructure, construction of diversion canal, planting of early maturing varieties, improved access to cheaper loans are measured to ameliorate food security. Appropriate involvement of consented stakeholders is required to realise the mitigation measures to the core. More importantly, these measures should not be viewed in isolation from one another. Instead, they should be appropriately integrated. Given the above narration, the objective of the study was also achieved.

## **5.4 RECOMMENDATIONS**

Recommendations are divided into long, and short-term solution, including recommendations for future research as follow.

### **5.4.1 Immediate or short term solutions to food security**

Stakeholders' efforts were found to be critical to finding solutions that can ameliorate the effects of flood in relation to food security in the Ikaba area. This literally means that efforts to address food insecurity should not be left to the government alone but be the collective responsibility of all stakeholders such as NGOs, Red Cross, charity organisations, researchers, policymakers, the business fraternity and private individuals. , NGOs and private persons should invest in and team up with state authorities to realise food security for the residents of Ikaba. On the other hand, early maturing varieties of crops are found to be one of the ways to secure food. There are several possible explanations for these results. Firstly, Ikaba area experiences a prevalent flood, as mentioned, and this implies that there is always abundant water during flood time. Flood water may be a remedy to address food shortage, especially by planting crop varieties such as rice, sugar cane and flood resistant cassava that adapt to the flood environment.

It was found again that availing several boats to the residents may, to some degree, reduce the impact of floods on food security. It seems possible that the above suggestion, as presented by participants, may serve a pivotal purpose. It could be that when residents are aware of the fact that during flood season, the GRN provides transport in the form of boats, they may try by all means to save their income generated from their farming activities throughout the years only to use it during flood time. These findings partly explain the fact that available transport could serve as a motivating factor for sustained and reasonable savings.

Furthermore, such thinking may be informed by knowing that the money generated can be used to buy food items even during floods due to the availability of transport. The study also found that livestock feed and medicines could be one of the solutions for local people to attain food security. For the reason that they lack sustained income generation, they are unable to buy cattle feed and medicines to vaccinate their cattle during flood to avoid loss of livestock. A possible interpretation for this result is that farmers in the Ikaba area are subsistence farmers who feed themselves on their harvest and sell off their livestock. This, in general, implies that the inability to afford supplements for their livestock to withstand flood effects contributes to the loss associated with floods. GRN assistance in this regard may serve as a burden relief and could prove to be a value-added practice during flood.

#### **5.4.2 Long lasting solutions to food security**

It became apparent in the study that the construction of permanent road infrastructure would ease the burden that is linked to failure to access the marketplaces for the trading of goods. The findings of this study suggest that the construction of permanent road infrastructure such as bridges in floodplains linking Ikaba area with Katima Mulilo town could be a significant step toward the attainment of food security in the study area. The facility could provide a solution to residents in terms of food accessibility. Consistent with the literature, this research finding validates the fact that when food accessibility is improved, food availability and food utilisation as well as food stability become attainable (WFS, 1996).

The study further noted that there is a need for the construction of a diversion canal. A possible explanation for these results may be that a water canal could reduce the hydraulic hazard in terms of floodwater duration, water level, water velocity or flood arrival time and exacerbate flood velocity. From this result, it is clear that additional resources need to be allocated to assist the residents and should thus be accelerated and concentrated. Therefore, funding can be diverted towards various goals, the construction of a diversion canal, good road infrastructure to link the residents throughout the year for the realisation of food accessibility and stability.

An equally important discovery is an unexplored island (*Mukoma*) that may be a solution to food insecurity in the area if appropriately used. Moreover, this would mean that they can be plenty of food at all the time when this situation prevails, food availability and food stability as a pillar for food security could be addressed. Another finding drawn from the study is that there are no maize millers in the Ikaba area. On the other hand, the shortage of millers in the Ikaba can be addressed by encouraging farmers and the business community to set up their milling companies. This implies that for a small bag of maize flour, one needs to travel even

during flood. On this basis, the study found that there is a need for several maize milling firms to operate in the Ikaba area.

### **5.4.3 Future research**

There is ample room for further progress in conducting a study on a comparative analysis of the impact of the flood on the food security of Ikaba and Nakabolelwa communities of KSC. This could be an ideal study to complement the current one. Another researcher may conduct an explorative quantitative study on the damages associated with flood in Ikaba area. Apart from damage values, submerged crop fields and livestock were dying by flood, as determined in this study. Another study would explore values in terms of direct and indirect costs such as clearing the fields, cultivation and weeding. While for livestock, payment of cattle headers, vaccination, cattle kraal maintains as a result of flood to mention but few. Further research could be conducted on the role of stakeholders in addressing food security in Ikaba area. The study had certain deficiencies which can be addressed in future research is to be conducted on food security. A similar sponsored non-academic study may be conducted in a research topography specifying a period. This is because academic study suffers from limited time, therefore affecting a researcher to conduct a study with more participants.

## **5.5 CONCLUSION**

In this chapter, the evaluation of the research questions was done; recommendations and the summary were highlighted. It can be attested that the objective of the study was achieved. The concern for food insecurity has attracted wide attention from planners, policymakers and scholars across the world. Hence, the increased number of publications in the field. As discussed in various sections, it is clear from the study that floods negatively affect the food security of people of the Ikaba community. Before this study, evidence of study on food security with the intent to look at four dimensions was purely anecdotal. The above was a key strength of the present study. The empirical findings in this study provide a new understanding of the fact that achieving food security for all at all times remains a plausible challenge for Ikaba residents. It could be concluded that where food insecurity problems remain, there are severe consequences. Even though the concerns over food insecurity have attracted the Namibian central government, hence the reason for providing flood relief food, this seems to be a temporary position.

The study revealed that achieving food security through the four pillars has been disappointing. What has become an appellant in this study is that it is important to understand the causes of food insecurity when one is to address food insecurity. For this study, the prevalent flood is the

main source of food insecurity in the study area. While plenty of water, fertile land availability is encouraging reasons for staying in the study area. At the same time, achieving food security by looking at the four main dimensions of food security is marred by seasoned flood in the study area.

## REFERENCES

- Aboaba, K., Fadiji, D., & Hussayn, J. (2020). Determinants of food security among rural households in Nigeria: USDA food insecurity experience based measurement (forms) approach. *Journal of Agribusiness and Rural Development*, 56(2), 113-124. <https://doi.org/10.17306/J.JARD.2020.01295>
- Acharya, A. (2011). *Human Security*. In: Bayles, J., Smith, S., & Owens, P. 2011. *The globalization of world politics: an introduction to international relations*. 5<sup>th</sup> ed. Oxford: Oxford University Press.
- Adelekan, I. (2011). Vulnerability assessment of an urban flood in Nigeria: Abeokuta flood 2007. *Journal of the International Society for the Prevention and Mitigation of Natural Hazards*, 56(1), 215-231. DOI: 10.1007/s11069-010-9564-
- Ahmed, U.I, Ying, L., Bashir, M.K., Abid, M., Zulfiqar, F (2017) Status and determinants of small farming households' food security and role of market access in enhancing food security in rural Pakistan. *PLoS ONE*, 12(10): doi.org/10.1371/journal.pone. 0185466
- Akukwe, T I. Oluoko-Odingo, A.A. & Krhoda G. O. (2020). Do flood affect food security? A before-and-after comparative study of flood-affected households' food security status in South-Eastern Nigeria. *Bulletin of Geography. Socio-economic Series*, 47(47): 115-131. doi .org/10.2478/bog-2020-0007
- Alderman, K., L. R. Turner, and S. Tong (2012), Floods and human health: A systematic review, *Environ. Int.*, 47, 37–47, doi:10.1016/j.envint.2012.06.003.
- Alicia, B.A. (2012). *Flood forecasting modelling for the Búzi river basin in Mozambique*. doi: 10.13140/RG.2.1.2603.7928
- Allen, R.E., ed. (1990). *The concise oxford dictionary of current English*, 8<sup>th</sup> ed. United States of America: Oxford University Press.
- Babbie, E.R. (2016). *The practice of social research*, (14<sup>th</sup> ed). Belmont: Thompson Woodsworth.
- Barnard, M. (2014). SADC's response to climate change-the role of harmonised law and policy on mitigation in the energy sector. *Journal of Energy in Southern Africa*, 25(1):26–32.
- Bashir, M.K., Schilizzi, S & Pandit, R. (2012). The determinants of rural household food security in the Punjab, Pakistan: an econometric analysis. Retrieved from <https://ageconsearch.umn.edu/bitstream/126035/2/WP120008.pdf>
- Benzekri, N.A., Sambou, J.F., Diaw, B., Sall, E.1., Sall, F., Niang, A, Ba, S., Guèye, N.F.N., Diallo, M.B., Hawes, S.E., Seydi, M. & Gottlieb, G.S. (2017). The dimensions of food insecurity and malnutrition among people living with HIV in

- Senegal, West Africa. *AIDS Care*, 29(12), 1510-1516. doi: 10.1080/09540121.2017.1338652
- Berger, R. (2015). Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qualitative Research*, 15(2), 219–234, doi:10.1177/14687941468
- Berry, E. M., Dernini, S., Burlingame, B., Meybeck, A., & Conforti, P. (2015). Food security and sustainability: Can one exist without the other? *Public Health Nutrition*, 18(13), 2293–2302. <https://doi.org/10.1017/S136898001500021X>
- Bezuidenhout, R., Cronje, F. (2014). *Research matters qualitative data analysis*. Junta & Company Ltd. Cape Town.
- Bilali, H., Callenius, C., Strassner, C., & Probst, L. (2019). Food and nutrition security and sustainability transitions in food systems. *Food Energy Security*, 8(2), 154 <https://doi.org/10.1002/fes3.154>
- Bliss, L. A. (2016). Phenomenological Research: Inquiry to Understand the Meanings of People's Experiences. *International Journal of Adult Vocational Education and Technology*, 7(3):13. doi: 10.4018/IJAVET.2016070102
- Bordor, J.N., Rice, J.C., Farley, T.A. Swalm, C.M & Rose, D. (2010). Does Aggregate Availability of Key foods from other stores offset the relative lack of supermarkets in African-American Neighbourhoods? *Journal of Preventive Medicine*. 51(1):63-75. doi: 10.1016/j.ypmed.2010.04.009
- Bryman, A.& Bell, E. (2015). *Business research methods*. Oxford: Oxford University Press.
- Buzan, B., Waeber, O & Wilde, J. (1998). Security: a new framework for analysis. London: Lynnee Reinner.
- Carletto, C., Zezza, A. & Banerjee, R. (2013). Towards better measurement of household food security: harmonizing indicators and the role of household surveys. *Journal Global Food Security*, 2 (2013): 30-40.
- Caulfield, J. (2019). *How to do thematic analysis*. Retrieved from <https://www.scribbr.com/methodology/thematic-analysis>
- Chenje, M., & Johnson, P., (Eds.). (1994). *State of the environment in Southern Africa*. Johannesburg: Penrose Press.
- Clarke, V. & Braun, V., 2016. Thematic analysis. *The Journal of Positive Psychology*, 12(3):297-298
- Conceição, P., Levine, S., Lipton, M. & Warren-Rodríguez, A. (2016). Toward a food secure future: Ensuring food security for sustainable human development in Sub-Saharan Africa, *Food Policy*, 60(2016) 1–9. <https://doi.org/10.1016/j.foodpol.2016.02.003>

- Creswell, J. (2013). *Qualitative inquiry and research design: Choosing among five approaches*, (3<sup>rd</sup> ed). Thousand Oaks, CA: Sage.
- Creswell, J. (2013). *Qualitative inquiry and research design: choosing among five approaches*. 3<sup>rd</sup> ed. Thousand Oaks, CA: Sage.
- Dai, D.& Wang, F. (2011). Geographic disparities inaccessibility to food stores in South Western Mississippi. *Environment and Planning B: Planning and Design*, 38(4), 659–677.
- Dambe, N. (2020). Riverine flooding using GIS and remote sensing. (Master thesis, University of Cape Town). Retrieved from [https://open.uct.ac.za/bitstream/handle/11427/31738/thesis\\_ebe\\_2020\\_dambe\\_natalia.pdf?sequence=4](https://open.uct.ac.za/bitstream/handle/11427/31738/thesis_ebe_2020_dambe_natalia.pdf?sequence=4)
- Dey, B. & Singh, R.B. (2006). *Natural Hazards and Disaster Management*. Dehli: Central Board of Secondary Education.
- Disaster Management. (2015). Youtube Video. [Online] Retrieved from <https://www.youtube.com/watch?v=itf0GTVYe8g> [Accessed 2 November 2017].
- Du Plooy-Ciliers, F., Davis, C. & Bezuidenhout, R.M. (2014). *Research matters*. Landsdowne: Juta.
- Ecker, O & Breisinger, C. (2012). The food security system: A new conceptual framework. *International Food Policy Research Institute*. pp. 1–14.
- Economist Intelligence Unit. (2016). *Food sustainability index. The economist intelligence unit*. Retrieved from <http://foodsustainability.eiu.com>.
- Elagib, N.A., Al Zayed, I.S., Saad, S.A.G., Mahmood, I.M., Basheer, M., & Fink, A.H. (2021). Debilitating flood in the Sahel are becoming frequent. *Journal of Hydrology*, 599. doi.org/10.1016/j.jhydrol.2021.126362.
- Elameen, I.H.E. (2017). Minimization of flash flood water using GIS based water harvesting. (Master thesis, Sudan University of Science and Technology College of Graduate Studies). Retrieved from <http://repository.sustech.edu/bitstream/handle/123456789/18438>.
- Eleutério, J. (2012). *Flood risk analysis: impact of uncertainty in hazard modelling and vulnerability assessments on damage estimations*. (PhD thesis, University of Strasbourg). Retrieved from <https://tel.archives-ouvertes.fr/tel-00821011/document>
- Estrada-Carmona, N., Attwood, S., Cole, S.M., Remans, R. & DeClerck, F. (2020). A gendered ecosystem services approach to identify novel and locally-relevant strategies for jointly improving food security, nutrition, and conservation in the Barotse Floodplain. *International Journal of Agricultural Sustainability*, 18(4), 351-375. doi: 10.1080/14735903.2020.1787618

- FAO. (1996). *World Food Summit Technical Background Papers*. Rome: FAO Retrieved from <http://www.fao.org/3/w3548e/w3548e00.htm>
- FAO. (1999). *Food Insecurity and Vulnerability Information and Mapping Systems*. Retrieved from <http://www.fao.org/docrep/004/AB990E/ab990e05.htm>
- FAO. (2009). FAO global information and early warning system on food and agriculture world food programme. <http://www.fao.org/docrep/012/ak334e/ak334e00.htm>
- FAO. (2015). The state of food insecurity in the world [Internet]. Rome: Food and Agriculture Organization of the United Nations; 2015 [cited 2016 Jan 12]. Available from: <http://www.fao.org/hunger/en/>
- FAO. (2017). The future of food and agriculture: Trends and challenges. Retrieved from: <http://www.fao.org/3/a-i6583e.pdf>.
- FAO. (2019). The state of food and agriculture 2019. Moving forward on food loss and waste reduction. Rome. Retrieved from <http://www.fao.org/3/ca6030en/ca6030en.pdf>
- Fincham, J.E. (2008). Response Rates and Responsiveness for Surveys, Standards, and the Journal. *American Journal of Pharmaceutical Education*, 72 (2) 43. doi: 10.5688/aj720243
- Food and Agricultural Organisation. (2001). *The State of food insecurity*. Retrieved from <http://www.fao.org/3/Y1500E/y1500e02>.
- Fouché, C. B., Strydom, H. & Roestenburg, W.J.H. eds. (2021). *Research at grass roots*. 5<sup>th</sup> ed. Pretoria: Van Schaik.
- Frederik, J & Arenas, M. (2008). From homer to Hobbes and beyond: aspects of 'security' in the European tradition globalisation and environmental challenges. 3. doi:10.1007/978-3-540-75977-5\_17
- Frelat, R., Lopez-Ridaura, S., Giller, E., Herrero, M, Douxchamps, S., Djurfeldt, A.A., Erenstein, O., Henderson, B., Kassie, M., Paul, B.K., Rigolot, C., Ritzema, R.S., Rodriguez, D., Van Asten, P.J.A. & Van Wijk. M.T. (2016). Drivers of household food availability in sub-Saharan Africa based on big data from small farms. *Proceedings of the National Academy of Sciences Jan 2016*, 113(2), 458- 463. <https://doi.org/10.1073/pnas.1518384112>
- Frongillo, E.A. (2003). Understanding obesity and program participation in the context of poverty and food insecurity. *Journal of Nutrition*, 133 (7):2117-2118.
- Fusch, P. I., & Ness, L. R. (2015). Are we there yet? data saturation in qualitative research. *The Qualitative Report*, 20(9),1408-1416.
- Gaffney, J., Bing, J., Byrne, P.F., Cassman, K.G., Ciampitti, I., Delmer, D., Habben, J, Lafitte, H.R., Lidstrom, U.E., Porter, D.O., Sawyer, E., Schussler, J.J., Setter, T., Sharp, R.E., Vyn, T.J., & Warner, D. (2019). Science-based intensive agriculture:

- sustainability, food security, and the role of technology. *Global Food Security*, 23 (2019), 236-244. doi: 10.1016/j.gfs.2019.08.003.
- Gartaula, H., Niehof, A. & Visser, L. (2012). Shifting perceptions of food security and land in the context of labour out-migration in rural Nepal. *Food Sec.* 4, 181–194 (2012). <https://doi.org/10.1007/s12571-012-0190-3>
- Ghosh, M. & Ghosal, S. (2021). Climate change vulnerability of rural households in flood-prone areas of Himalayan foothills, West Bengal, India. *Environment, Development and Sustainability*, 23, 2570–2595 <https://doi.org/10.1007/s10668-020-00687-0>
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage Publications, Inc
- Heyns, P., Coetzee, M., Hoffmann, K.H., Mendelsohn, J., Schneider, G., & Seimons, W., (2011). *Groundwater in Namibia: an explanation to the Hydrogeological Map. Windhoek, Namibia: MAW and framework for use in the monitoring and evaluation of food aid programs.* Arlington, VA: food and nutrition technical assistance project. Retrieved from [https://pdf.usaid.gov/pdf\\_docs/Pnacg170.pdf](https://pdf.usaid.gov/pdf_docs/Pnacg170.pdf)
- Hobbes, T. (1996). *Leviathan* Oxford: Oxford University Press.
- Icaga, Y., Tas, E. & Kilit, M., (2016). Flood inundation mapping by gis and a hydraulic model (HEC RAS): A case study of Akarcay Bolvadin Subbasin, in Turkey. *Acta Geobalcanica*, 2(2), pp. 111-118.
- Iddrisu, S. (2020). Impacts of conflict on food security in Bunkpurugu district of north-eastern Ghana, the moderating role of humanitarian aid. *International Journal of Latest Research in Humanities and Social Science*, 03(11). Retrieved from [www.ijlrhss.com](http://www.ijlrhss.com).
- Idrisa, Y.L., Gwary. M.M. & Shehu, H. (2008). Analysis of food security status among farming households in Jere local government of Borno State, Nigeria. *Journal of Tropical Agriculture, Food, Environment and Extension*, 7 (3): 199-205.
- Jury, M. R. (2010). Flood-producing cloud bands over the Kalahari Desert. *Theoretical and applied climatology*, 102(3), 367-378.
- Katsuhama, Y. (2010). *Capacity building for flood management in developing countries under climate change.* (PhD thesis, Colorado State University). Retrieved from [https://mountainscholar.org/bitstream/handle/10217/39102/2010\\_Summer\\_Katsuhama\\_Yoshihiro.pdf?sequence=1](https://mountainscholar.org/bitstream/handle/10217/39102/2010_Summer_Katsuhama_Yoshihiro.pdf?sequence=1)
- Korstjens, I. & Moser, A. (2018). Series: practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, 24(1):120-124. doi: 10.1080/13814788.2017.1375092

- Kothari, C. R., & Garg, G. (2016). *Research methodology: methods and techniques*. (4th ed.). New Delhi: New age international publishers.
- Likando, J. (2019). Flood report in Kabbe South Constituency. Unpublished councillor's report. Zambezi region.
- Lobell, D.B., Burke M.B., Tebaldi C., Mastrandrea M.D., Falcon W.P. & Naylor R.L. (2008). Prioritizing climate change adaptation needs for food security in 2030, *Science*, 319(5863):607–610. <https://doi.org/10.1126/science.1152339>
- Loshin, D. (2002). *Rule-based data quality*. In *Proceedings of the 2002 ACM CIKM International Conference on Information and Knowledge Management November 4-9, 2002, McLean, VA, USA*. 614-616.
- Mabhaudhi, T., Chibarabada, T., Chimonyo, V., Murugani, V., Pereira, L., Sobratee, N., Govender, L., Slotow, R. & Modi, A. (2018). Mainstreaming underutilized indigenous and traditional crops into food systems: A South African perspective. *Sustainability*, 11(1), 172. doi:10.3390/su11010172
- Mahmood, S. & Shaikh, K (1991). Food Poverty and its Causes in Pakistan. *The Pakistan Development Review*, 30(4):821-834.
- Majaliwa, R.M. Twinomuhangi, R. & Waswa, H. (2020). Spatio-temporal flood trends and settlement choice in flood-prone areas: a case study of Lubiji micro-catchment, Kampala City. *International Journal of Environmental Studies*, 77(3) 480-491. doi: 10.1080/00207233.2019.1686910
- Manyullei, S., & Arundhana, A.I. (2021). Analysis of household food security based on the proportion of food expenditures and energy consumption in flood-prone areas in Wajo District. *Open Access Macedonian Journal of Medical Sciences*, 9(E), 241–245. <https://doi.org/10.3889/oamjms.2021.587>
- Mashebe, P.M. (2015). *Impact of flood on rural livelihoods of people residing in flood-prone areas: the case of Luhonono community In the Zambezi region of Namibia*. (Master thesis, University of the Free State).
- Matemilola, S., Elegbede, I. (2017). The challenges of food security in Nigeria. *Open Access Library Journal*, 4 (2017),4185. doi.org/10.4236/oalib.1104185
- Maxwell, S. & Smith, M. (1992). Household food security: A conceptual review. In S. Maxwell and T. R. Frankenberger (Eds.), *Household Food Security: Concepts, Indicators, Measurements*. New York, NY: International Fund for Agricultural Development and United Nations Children's Fund.
- Means, T. (2018). *The types of flood events and their causes, viewed 15 August 2018*, Retrieved from <https://www.thoughtco.com/the-types-of-flood-events-4059251>.
- Mendelsohn, J. (2013). *Profile and atlas of the Cuvelai-Etосha Basin*. Windhoek: Research and Information Services of Namibia. Retrieved from [https://www.researchgate.net/publication/263546666\\_A\\_profile\\_and\\_atlas\\_of\\_the\\_Cuve](https://www.researchgate.net/publication/263546666_A_profile_and_atlas_of_the_Cuve)

- Mendelsohn, J. & Roberts, C. (1997). An environmental profile and atlas Caprivi., s.I. : Directorate of Environmental Affairs. Retrieved from <http://theeis.com/elibrary/search/19059>
- Mitiku, A, Fufa, B., & Tadese, B. (2012). Empirical analysis of the determinants of rural household's food security in Southern Ethiopia: The case of Shashemene District. *Basic Research Journal of Agricultural Science and Review*, 1(6), 132-138,
- Modirwa, S & Oladele, O.I. (2012). Food security among male and female-headed households in Eden District Municipality of the Western Cape, South Africa. *Journal of Human Ecology*, 37(1):29-35. doi.org/10.1080/09709274.2012.11906446.
- Molnar, J. (1999). Sound policies for food security: the role of culture and social organisation. *Review of Agricultural Economics*, 21(2): 489-498. Retrieved from
- Morse, J.M. (2015). Data were saturated. *Quality Health Research*. 25(5):587–8.
- Mugambiwa, S.S. & Tirivangasi, H.M. (2017). Climate change: a threat towards achieving sustainable development goal number two” (end hunger, achieve food security and improved nutrition and promote sustainable agriculture) in South Africa. Jamba. *Journal of Disaster Risk Studies*, 9(4), 1–6. <https://doi.org/10.4102/jamba.v9i1.350>
- Munzhedzi, S. (2017). *Perspective for SADC climate change adaptation Southern African Development Community (SADC)*. Retrieved from <https://www.sanbi.org/sites/default/files/documents/documents/ltas-factsheet-1.pdf>
- Mushaukwa, A. (2019, October 31). Ikaba residents resist proposed conservancy. *NewEra*. Retrieved from <https://neweralive.na/posts/ikabaresidents-resist-proposed>
- Mwape, Y.P. (2009). *An impact of flood on the socio-economic livelihoods of people: a case study of Sikaunzwe community in Kazungula district of Zambia*. (Master, mini-dissertation, University of Free State, South Africa).
- Nakale, A. (2020). Kabbe farmers lose crops to flood. Retrieved from <https://reliefweb.int/report/namibia/kabbe-farmers-lose-crops-flood>.
- Nakale, A. (2013, 9 August 2013). President divides Kavango into two. *New Era*. Retrieved from [allafrica.com](http://allafrica.com).
- Namibia Statistics Agency. (2019). Namibia 2011 Population and Housing Census Main Report. Retrieved August 23, 2019 from: <https://nsa.org.na/page/publications/>
- Namibian Agronomic Board. (2021). *White maize staggered grain price for 2020 marketing season*. Windhoek, Namibia.
- National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. (1978). *The Belmont report: ethical principles and guidelines for the protection of human subjects of research*. Washington, DC: US Government

Printing Office. Retrieved from <http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.htm>

- Niipare, A., Jordaan, A. & Siyambango, N. (2020). Flood impacts in Oshana region, Namibia: a case study of Cuvelai river basin. *Journal of Geography and Geology*, 12(1),1-24. doi:10.5539/jgg.v12n1p8
- Ochieng J. (2012). Value and importance of informed consent to researchers at Makerere University. *Ann Tropical Medicine Public Health*, (2012)5:16-9 <https://www.atmph.org/text.asp?2012/5/1/16/92872>
- OECD. (2010). *Flood risks, climate change impacts and adaptation benefits in Mumbai an initial assessment of socio-economic consequences of present and climate change induced flood risks and of possible adaptation options*. Retrieved from [http://www.oecd-ilibrary.org/environment/flood-risks-climate-change-impacts-and-adaptation-benefits-in-mumbai\\_5km4hv6wb434-en](http://www.oecd-ilibrary.org/environment/flood-risks-climate-change-impacts-and-adaptation-benefits-in-mumbai_5km4hv6wb434-en)
- Ostry, A. (2010). *Food for thought: the issues and challenges of food security*. Retrieved 7 August 2020 <http://www.phsa.ca/NR/rdonlyres/C3E70150-66FF-48E1-B2F1-45BB8>
- Ouma, Y.O., & Tateishi, R. (2014). Urban flood vulnerability and risk mapping using integrated multi-parametric AHP and GIS: Methodological overview and case study assessment. *Water*, 6(6), 1515–154
- Pacetti, T., Caporalia, E., Rullib, M.C. (2017). *Flood and food security: A method to estimate the effect of inundation on crop availability*. 110: 494-504 (2017). <https://doi.org/10.1016/j.advwatres.2017.06.019>
- Pakravan-Charvadeh, M.R., Khan, H.A. & Flora, C. (2020). Spatial analysis of food security in Iran: associated factors and governmental support policies. *Journal of Public Health Policy*, 41, 351–374. <https://doi.org/10.1057/s41271-020-00221-6>
- Paterson, D. L. Wright, H. & Harris, N.A. (2018). Health Risks of Flood Disasters. *Clinical Infectious Diseases*, 67(9): 1450–1454. doi.org/10.1093/cid/ciy227
- Pirani, S.I. & Arafat, H.A. (2016). Interplay of food security, agriculture and tourism within GCC countries. *Global Food Security*, 9 (2016), 1–9. <https://doi.org/10.1016/j.gfs.2016.05.002>
- Ramakrishna, G. (2014). Impact of flood on food security and livelihoods of IDP tribal households: the case of Khammam region of India. *International Journal of Development and Economic Sustainability*. 2. 11-24.
- Resnik, D. B. (2015). What is ethics in research & why is it important? *National Institute of Health*. Retrieved from <https://www.niehs.nih.gov/research/resources/bioethics/whatis>. Riely, F., Mock N., Cogill B., Bailey L.& Kenefick E. (1995). *Food security indicators*. Rome. Retrieved from <http://www.fao.org/News/1999/img/SOFI99-E.PDF>

- Ryan, G. W. & Bernard, H. R. 2003. Techniques to identify themes. *Field methods*, 15(1), 85-109.
- Sakyi, P. (2012). *Determinants of food accessibility of rural households in the Limpopo province: South Africa*. (Master thesis: Gent University, Belgium). Retrieved from <https://lib.ugent.be/fulltxt/RUG01/001/894/520/RUG01-001894520>
- Saunders, M., Lewis, P. & Thornhill, A. (2016). *Research Methods for Business Students*, (7<sup>th</sup>ed). Pearson Education Limited.
- Sipho, M. & Nolwazi, M. (2021). *Food insecurity, food insecurity determinants and coping strategies in the urban space – the experience of low income households of Msunduzi in Mbabane*. Retrieved from <http://dx.doi.org/10.2139/ssrn.3880393>
- Strydom, H., Fouche, C.B. & Delpont C.S.L (2005). *Research at grassroots for social sciences and human service professions*, (3<sup>rd</sup>). Van Schaik publishers
- Suhling, F., Martens, A., & Marais, E. (2009). How to enter a desert - Patterns of Odonata colonisation of arid Namibia? *International Journal of Odonatology*. (12): 287-308. doi:10.1080/1887890.2009.9748346.
- Tanaka, T., Kiyohara, K., Tachikawa, Y. (2020). Comparison of fluvial and pluvial flood risk curves in urban cities derived from a large ensemble climate simulation dataset: A case study in Nagoya, Japan. *Journal of Hydrology*, 584(2020). <https://doi.org/10.1016/j.jhydrol.2020.124706>.
- Tanner, M. (2005). *The importance of the annual Nile flood for the Nile river valley civilisation*. Wellington: Mark Tanner. Retrieved from <http://marktanner.com/niletrip/importance-of-Nile-river-flood.html>
- The Government of the Republic of Namibia. (2009). *Post Disaster Needs Assessment*. Retrieved from <http://www.met.gov.na/files/files/Namibia%20flood%20Post%20Disaster%20Needs%20Assessment%202009>.
- The Republic of Namibia. (2009). *Flood Post-Disaster need assessment*. Windhoek: Republic of Namibia.
- Tirivangasi, H.M. (2018). Regional disaster risk management strategies for food security: probing Southern African Development Community channels for influencing national policy. *Journal of Disaster Risk Studies*, 10(1), doi. 10.4102/jamba. v10i1.468
- Tramblay, Y., Villarini, G., & Zhang, W. (2020). Observed changes in flood hazard in Africa. *Environmental Research Letters*, 15(10). Doi:10.1088/1748-9326/abb90b/meta
- Tshilunga, S. E. (2014). A study of the 2011 floods on human security in Namibia (Master's thesis), The University of Namibia, Namibia. Retrieved from <https://repository.unam.edu.na/bitstream/handle/11070/830/tshilunga2014.pdf?sequence=1&isAllowed=y>

- Tuwilika, S. (2016). Impact of flood on rural livelihoods of the Cuvelai Basin in Northern Namibia. *Journal of Geography and Regional Planning*, 9(6):104-121. Doi: 10.5897/GRP2015.0536
- United Nation Development Report. (1994). *Human Development Report 1994: New Dimensions of Human Security*. Retrieved from <http://www.hdr.undp.org/en/content/human-development-report-1994>
- United Nation. (2012). *Resolution adopted by the general assembly*. Retrieved from <http://www.un.org/humansecurity/sites>
- United Nations Development Programme. (1994). Human Development Report 1994: New Dimensions of Human Security. Retrieved from <http://hdr.United Nations Development Programme.org/sites/default/files/reports/255/hdr>.
- United States Department of Agriculture. (2009). *Access to affordable and nutritious food: measuring and understanding food deserts and their consequences*. Retrieved from <https://www.ers.usda.gov/webdocs/publications/42711/12716>
- USAID. (1986). *Draft interim guidelines for fy 1986 p.l. 480 Title II Development Project Proposals (February 1995)*. Retrieved from [www.gaia.info.usaid.gov/humresponse/ffp/ffp.htm](http://www.gaia.info.usaid.gov/humresponse/ffp/ffp.htm)
- Vaughan-Williams, N. (2015). We are not animals!" Humanitarian border security and zoopolitical spaces in Europe. *Journal of Political Geography*, 45:1. doi:[10.1016/j.polgeo.2014.09.009](https://doi.org/10.1016/j.polgeo.2014.09.009)
- Watts, J. H. (2008). *Integrity in qualitative research*. In: Given, Lisa M. ed. *The Sage Encyclopaedia of Qualitative Research Methods*, Thousand Oaks, California: Sage Publications.
- Winsemius, H., Ward, P., Veldkamp, T., Jongman, B., Hallegatte, S. & Bangalore, M., Global (2018). *Exposure analysis on floods/drought and poverty*. Retrieved from [https://www.worldbank.org/content/dam/Worldbank/document/Climate/Climate%20and%20Poverty%20Conference/D1S3\\_WINSEMIUS\\_slide\\_deck\\_poverty\\_WB.pdf](https://www.worldbank.org/content/dam/Worldbank/document/Climate/Climate%20and%20Poverty%20Conference/D1S3_WINSEMIUS_slide_deck_poverty_WB.pdf)
- Wiranthi, P. E., Suwarsinah, H. K. & Adhi, A.K. (2014). Determinants of household food security: a comparative analysis of eastern and western Indonesia. *Indonesia Journal of Agriculture Science*, 15 (1): 17-28.
- World Bank. (2015). *World Databank*. Retrieved from <http://databank.worldbank.org>.
- World Health Organisation (2013). *Floods in the WHO European Region: health effects and their prevention*. Retrieved from <http://www.euro.who.int/en/health-topics/environment-and-health/Climate-change/publications/2013/floods-in-the-who-european-region-health-effects-and-their-prevention>

Yahya, F. & Ali, A. (2014). Fragile landscape: impact and consequences of May 2014 flash-flood disaster in the Aqaba Area. *Southern Jordan. Research Journal of Environmental and Earth Sciences*. 6 (2014), 451-465. doi: 10.19026/652 57.

Zellou. B, & Rahali, H. (2019). Assessment of the joint impact of extreme rainfall and storm surge on the risk of flood in a coastal area. *Journal of Hydrology*, 569:647–665.[https://doi.org/ 10.1016/j](https://doi.org/10.1016/j).

## APPENDIX A: FOCUS GROUP QUESTIONS FOR THE HOUSEHOLDS

### ASSESSING THE IMPACT OF FLOOD ON FOOD SECURITY IN THE ZAMBEZI REGION: A CASE STUDY OF THE IKABA AREA

#### 1. GENERAL QUESTIONS

1.1 As the household head please indicate your gender in the space below:

GENDER	MARK
Male	
Female	

1.2 As the household, head please mark your age range in the space as provided.

AGE	MARK
60-65	
66-70	
71 and above	

1.3 As the household head, for how long have you been living in the Ikaba area? please mark the year range in the space as provided.

THE YEARS OF RESIDING IN IKABA AREA	MARK
60-65	
66-71	
72-77	
78 and above	

1.4 What is the composition of your households? for example son, daughter or uncle.

.....  
.....  
.....

1.5 What are the means of your survival in Ikaba area?

.....  
.....  
.....  
.....

1.6 Which factors motivate you to reside in Ikaba area?

.....  
.....  
.....  
.....  
.....

**2. QUESTIONS RELATED TO THE IMPACT OF FLOOD ON FOOD SECURITY**

2.1 The contemporary definition of security includes the subset of Human Security. UN refers to Human Security as “*the right of people to live in freedom and self-respect, free from poverty and misery.*” Human security as a concept is classified into seven main dimensions of security: economic, food, health, environmental, personal, community, and political. World Food Summit (WFS) (1996) food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

2.1.1 Food availability addresses the “supply-side” of food security and is determined by the level of food production, stock levels and net trade. How does flood affect the availability of food in Ikaba areas?

.....  
.....  
.....  
.....  
.....

2.1.2 Food accessibility is an adequate supply of food that mainly depends on the income of the household, expenditure and market place. How is food accessibility affected by flood in Ikaba?

.....  
.....  
.....  
.....  
.....

2.1.3 Utilization is commonly understood as the way the body makes the most of the various nutrients in the food. To what extent is food utilisation affected by flood in Ikaba area?

.....  
.....  
.....  
.....  
.....

2.1.4 Even if one' food intake is adequate today, one is still considered to be food insecure if he or her inadequate access to food periodically. To what extent is food stability affected in Ikaba area during flood season?

.....  
.....  
.....  
.....  
.....

2.1.5 What do you think can be done to improve the food security impact caused by flood in Ikaba community?

.....  
.....  
.....

.....  
.....

Thank you for your participation.

## APPENDIX B:

### INTERVIEW SCHEDULE FOR KEY INFORMANTS

#### ASSESSING THE IMPACT OF FLOOD ON FOOD SECURITY IN THE ZAMBEZI REGION: A CASE STUDY OF THE IKABA AREA

##### QUESTIONS RELATED TO THE IMPACT OF FLOOD ON FOOD SECURITY

The contemporary definition of security includes the subset of Human Security. UN refers to Human Security as “*the right of people to live in freedom and self-respect, free from poverty and misery.*” Human security as a concept is classified into seven main dimensions of security: economic, food, health, environmental, personal, community, and political. World Food Summit (WFS) (1996) food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Food availability addresses the “supply-side” of food security and is determined by the level of food production, stock levels and net trade. How does flood affect the availability of food in Ikaba areas?

.....

.....

.....

.....

.....

Food accessibility is an adequate supply of food that mainly depends on the income of the household, expenditure and market place. How is food accessibility affected by flood in Ikaba?

.....

.....

.....

.....  
.....

Utilization is commonly understood as the way the body makes the most of the various nutrients in the food. To what extent is food utilisation affected by flood in Ikaba area?

.....  
.....  
.....  
.....  
.....

Even if one' food intake is adequate today, one is still considered to be food insecure if he or her inadequate access to food periodically. To what extent is food stability affected in Ikaba area during flood season?

.....  
.....  
.....  
.....  
.....

2.1.6 What do you think can be done to improve the food security impact caused by flood in Ikaba community?

.....  
.....  
.....  
.....

Thank you for your participation.

## APPENDIX C:

### PERMISSION LETTER FROM THE INSTITUTION

University of Namibia, Private Bag 13301, Windhoek, Namibia  
542 M&Suzanne Ndengeyewa Avenue, Pioneerpark  
☎ +264 61 206-2111, URL: <http://www.unam.edu.na>



11<sup>th</sup> May, 2021

Dear Sir/Madam

#### REQUEST FOR PERMISSION TO CARRY OUT RESEARCH

Research is an integral part of postgraduate studies at the University of Namibia (UNAM). It is carried out in partial fulfilment of the requirements for the award of Postgraduate degrees. Against this background, I write to kindly request your permission to allow **Mabuku Kennedy. K** (Student number: 218337384) who is completing his/her Master of Security Studies (MASSS) degree at the School of Military Science, UNAM, carry out studies in your facility.

The titled of the study is, *ASSESSING THE IMPACT OF FLOODS ON FOOD SECURITY IN THE ZAMBEZI REGION: A CASE STUDY OF THE IKABA AREA* the student will use the interview to collect data from stakeholders in the border areas under your control. The data collected will be used specifically for academic purposes and will be passed on to a third party in accordance with research ethics and UNAM's confidentiality policy.

It would be highly appreciated if your good office would facilitate the student's study by granting him permission to carry out his study in your organisation. I thank you for your continued support and kind consideration of our request.

Yours Sincerely

A handwritten signature in blue ink, appearing to read "R. Obinna", is written over a light blue circular stamp.

**Dr. Iroanya Richard Obinna**  
Acting Associate Dean  
School of Military Science  
University of Namibia, Windhoek

## APPENDIX: D

### PERMISSION LETTER FROM IKABA TRIBAL COURT

Ikaba Tribal Court

Ikaba area

18 May 2021



Dear Mr. Mabuku

APPROVAL LETTER ON THE REQUEST TO CONDUCT RESEARCH STUDY IN IKABA AREA OF KARBEE SOUTH CONSTITUENCY ASSESSING THE IMPACT OF FLOOD ON FOOD SECURITY IN THE ZAMBEZI REGION: A CASE STUDY OF THE IKABA AREA

1. Greetings to you Mr. Mabuku
2. Your request to undertake the study titled **ASSESSING THE IMPACT OF FLOOD ON FOOD SECURITY IN THE ZAMBEZI REGION: A CASE STUDY OF THE IKABA AREA** is granted.
3. We appreciate you choosing Ikaba area and we hope you will provide the findings of the study to the us and explain the findings in order to find solution to food scarcity in Ikaba area during flood.

Yours Sincerely

Ben Likando (Area Headmen)

Herbert Njenjema (Secteryary)

## APPENDIX: E

### ENGLISH PROFESSIONAL EDITOR CERTIFICATE

27 October 2021

**RE: CONFIRMATION CERTIFICATE FOR PROOF READING AND EDITING**

This letter serves as proof that a Thesis titled

**"ASSESSING THE IMPACT OF FLOODS ON FOOD SECURITY IN THE ZAMBEZI REGION: A CASE STUDY OF  
THE IKABA AREA**

By  
KENNEDY KAUMBA MABUKU

218337384

was proof read (past tense) and edited according to international set standards of written English. Mistakes were identified and corrected; comments were noted for further clarity of meaning.

Yours in Education

Earle Sinvula Mudabeti



Lecturer of English (Unam)

Head of Department: Language Centre (Communication and Study Skills in English)

Consultant in ELPP National Project, Consultant in Minute taking and Public Presentation

Consultant in Proof reading and editing of Master's thesis and Doctoral dissertations

(B.ED in English) Namibia, Unam, M.A (Applied Linguistics) Virginia, U.S.A. Old Dominion University

Email: [mudabeti@yahoo.co.uk](mailto:mudabeti@yahoo.co.uk) Contacts: +264 81 281 2001