

**DIET DIVERSITY COPING STRATEGIES AND FOOD ACCESS OF UNEMPLOYED
YOUNG SINGLE MOTHERS WITH CHILDREN UNDER 9 YEARS OF AGE IN
BOTSWANA**

GOMOLEMO TEMBWE

Submitted in partial fulfilment of the requirements for the degree

MASTERS IN HUMAN ECOLOGY

in the

Department of Agriculture, Animal Health and Human Ecology

College of Agriculture and Environmental Sciences

University of South Africa

July 2010

SUPERVISOR: Prof. ELSA ALBERTSE

DECLARATION BY CANDIDATE AND SUPERVISOR

I declare that DIET DIVERSITY COPING STRATEGIES AND FOOD ACCESS OF UNEMPLOYED YOUNG SINGLE MOTHERS WITH CHILDREN UNDER 9 YEARS OF AGE IN BOTSWANA is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

G.TEMBWE(MISS)

20/07/2010

SIGNATURE

DATE

DEDICATION

*DEDICATED TO MY HUSBAND AND MY ADORABLE GIRLS MOTHEO AND REFILWE
TSELAKGOPO*

YOU ARE MY INSPIRATION

ACKNOWLEDGEMENTS

My sincere gratitude and appreciation to the following individuals and organization

- *To my loving husband Boitumelo Ezekiel Tselakgopo .You were my inspiration and motivation*
- *My baby girl s,Motheo and Refilwe*
- *Prof. Albertse my supervisor for her support, knowledge and advice throughout the research.*
- *My mother Nametso Ramasu for believing in me and encouraging and motivating me throughout the research.*
- *To Stacy and Richard for your support and encouragement*
- *My friend Pretty Nkomba-Ntsosa for your dedicated support*
- *My family especially my sisters Mmapula Kealeboga Basimane ,Kesaobaka Tembwe and Letty Ramasu for your love, motivation and support*
- *To the department of Social and Community Development in Gumare for allowing me to work with them*
- *To Gumare Community for giving me permission to work with them*
- *To Peggy Ahrens for the language editing of the research*
- *To the Department of Human Ecology for allowing the study to be possible*
- *And above all, I thank God for making this study a reality*

ABSTRACT

The aim of the study was to investigate the diet diversity, food access and coping strategies applied by single mothers with young children in the Northern Okavango region of Botswana. A qualitative and quantitative survey was chosen as the research design for this study. The study site was Gumare village in rural Ngamiland and the sample included only single female headed households. The questionnaires used were contextualized to reflect the culture, food patterns and specific foods commonly consumed in Botswana.

Three questionnaires were used:

1. A socio- demographic questionnaire to document household size, age, marital status, income and water sources and the indigenous and wild foods that were gathered
2. The international standardized Household Dietary Diversity Score (HDDS) questionnaire to identify the variety of foods from fourteen food groups consumed by households over the previous 24 hours
3. The international standardized Coping Strategies Index (CSI) to determine the coping strategy behaviours of members of the household when faced with food shortages

The socio demographic results of the study showed that female headed households had an average 7.4 members. They were seriously affected by poverty, as 58% of the households had registered under the Botswana Social Welfare programme as destitute. Therefore qualifies to be assisted through provision of food baskets and cash vouchers. The overall results obtained from the household dietary diversity questionnaire showed a diet diversity score of 2.0. This is an extremely low diet diversity value, which indicate a high level of vulnerability to food insecurity and inadequate food access. The foods which were mainly consumed by households were from the cereal food group, reflecting the global situation among the poor who rely on starch- based diets. The intake from dairy products (10%), meats (28%) and Vitamin A rich vegetables (16%) was limited.

Given the limited food variety resulting in severe restriction to food access, coping strategies to address food shortages were employed. These included; relying on less preferred and less expensive food (100%), gathering wild food, hunting or harvesting immature crops (68%),

limiting portion sizes (96%), reducing the number of meals eaten in the day (76%), depending on government food baskets (58%) and reducing overall food intake when the government food basket was not adequate (50%).

It can be concluded that, given the restricted food access and a severely limited diversity in consumed food, extended government welfare assistance is crucial. The findings of this study could be used to guide the Botswana government when formulating new approaches and interventions to address food access and ultimately food security in households in this poverty- stricken area.

TABLE OF CONTENTS

DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENTS.....	iv
ABSTRACT.....	v
LIST OF TABLES.....	xii
LIST OF FIGURES.....	xiii
LIST OF PLATES.....	xiv
LIST OF APPENDICES.....	xv

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND AND MOTIVATION OF THE STUDY.....	1
1.2 PURPOSE OF THE STUDY.....	3
1.3 RESEARCH DESIGN.....	3
1.4 ORGANIZATION OF THE DISSERTATION.....	4

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION.....	5
2.2 FEMALE HEADED HOUSEHOLDS.....	5
2.3 ECONOMIC PROFILE OF WOMEN BOTSWANA.....	6
2.3.1 Women and unemployment.....	6
2.3.2 Government programmes for women.....	6
2.4 HOUSEHOLD FOOD SECURITY.....	9
2.4.1 Household food security in Africa.....	9
2.4.2 Household food security in Botswana.....	12

2.5 HOUSEHOLD DIETARY DIVERSITY.....	13
2.5.1 Introduction.....	13
2.5.2 Measuring dietary diversity score.....	13
2.5.3 Diet diversity and diet quality.....	14
2.5.3.1 Diet diversity and variety.....	14
2.5.3.2 Micro nutrient consumption.....	14
2.5.4 Diet Diversity Score and the nutritional status of women and children.....	15
2.5.5 Diet diversity and socio- economic status.....	17
2.5.6 Diet Diversity income and calorie intake.....	17
2.5.7 Dietary diversity and food access.....	17
2.6 FOOD SOURCES IN BOTSWANA.....	18
2.6.1 Indigenous foods.....	18
2.6.2 Wild foods in Botswana.....	19
2.6.3 Home gardens.....	21
2.7 COPING STRATEGIES.....	21
2.7.1 Introduction.....	21
2.7.2 Coping Strategy Index Tool (CSI).....	22
2.8. SUMMARY OF THE LITERATURE REVIEW.....	23
CHAPTER 3	
RESEARCH METHODOLOGY	
3.1 INTRODUCTION.....	24
3.2 PURPOSE OF THE STUDY.....	24
3.3 OBJECTIVES OF THE STUDY.....	24
3.4 RESEARCH STUDY AREA.....	24
3.4.1 Demographic profile of Botswana and Gumare.....	26
3.4.3 Economic profile of the Okavango and Gumare	28

3.4.2 Administrative profile of Gumare.....	27
3.4.3 Economic profile of the Okavango and Gumare.....	28
3.4.4 Water availability in Gumare.....	28
3.4.5 Communication and electricity in Gumare.....	29
3.5 THE RESEARCH PROBLEM.....	29
3.6 RESEARCH DESIGN.....	30
3.7 SAMPLING.....	30
3.8 DATA COLLECTION METHODS.....	30
3.8.1 Ethical concerns during data collection.....	31
3.9 DATA ANALYSIS AND PRESENTATION.....	32

CHAPTER 4

RESULTS & DISCUSSION

4.1 INTRODUCTION.....	33
4.2 SOCIO-DEMOGRAPHIC DATA.....	33
4.2.1 Size of household.....	33
4.2.2 Age of mothers and children.....	34
4.2.3 Educational level of mother.....	35
4.2.4 Marital status of mothers.....	36
4.2.5 Household income.....	37
4.2.5.1 Income sources from Government programmes.....	37
4.2.5.1.1 Food baskets and cash vouchers.....	38
4.2.5.1.2 Pensions.....	39
4.2.5.1.3 Drought relief.....	39
4.2.5.1.4 Non-governmental income of households.....	39
4.2.6 Living conditions.....	40
4.2.6.1 Sources of power.....	40
4.2.6.1.1 Fuel for cooking.....	40
4.2.6.1.2 Power sources for lighting.....	41
4.2.6.2 Sources of water.....	42
4.2.6.3 Sources of food.....	42
4.2.6.3.1 Household food gardens.....	42
4.2.6.3.2 Indigenous foods.....	43

4.3 DIET DIVERSITY FOR HEALTH.....	44
4.3.1 Introduction.....	44
4.3.2 Consumption from the food groups.....	45
4.3.2.1 Types of cereals consumed.....	46
4.3.2.2 Consumption of pulses and nuts.....	46
4.3.2.3 Consumption of meat, poultry and fish.....	50
4.3.2.4 Consumption of eggs.....	51
4.3.2.5 Consumption of dairy products.....	51
4.3.2.6 Consumption of fats and oil	52
4.3.2.7 Consumption of vitamin A- rich fruits and vegetables as a source of micronutrients.....	52
4.3.2.8 Consumption of iron rich food.....	54
4.3.3 Dietary diversity and diet quality.....	54
4.3.4 Food access and household dietary diversity.....	54
4.3.5 Summary of household dietary diversity findings.....	55
4.4 COPING STRATEGIES USED IN TIMES OF FOOD SHORTAGES.....	55
4.4.1 Introduction to coping strategies.....	55
4.4.2 Dietary change.....	57
4.4.2.1 Rely on less preferred and less expensive food.....	57
4.4.3 Increased short term food availability.....	58
4.4.3.1 Borrow food, or rely on help from a friend or relative.....	58
4.4.3.2 Depend on a government food basket.....	58
4.4.3.3 Purchase food on credit.....	58
4.4.3.4 Gather wild food; hunt or harvest immature crop.....	59
4.4.3.5 Consume seed stock held for the next ploughing season....	59
4.4.4 Decrease numbers of households members consuming food.....	60
4.4.4.1 Send household members to eat elsewhere.....	60
4.4.4.2 Send household members to beg.....	60
4.4.5 Rationing strategies.....	60
4.4.5.1 Limit portion sizes.....	60

4.4.5.2 Restrict consumption by adults to enable young children to eat.....	60
4.4.5.3 Reduce number of meals eaten in a day.....	61
4.4.5.4 Reduce food intake when the government food basket is not sufficient	61
4.4.5.5 Skip entire day without eating.....	62
4.4.6 Summary of coping strategies.....	62

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS REGARDING SOCIO-DEMOGRAPHIC DATA.....	63
5.2 CONCLUSIONS REGARDING HOUSEHOLD DIET DIVERSITY.....	63
5.3 CONCLUSIONS REGARDING FOOD ACCESS.....	64
5.4 CONCLUSIONS REGARDING COPING STRATEGIES.....	64
5.5 RECOMMENDATIONS.....	64
REFERENCES.....	66

LIST OF TABLES

TABLE 4.1.	FREQUENCY DISTRIBUTION AND AVERAGE HOUSEHOLD SIZE OF THE 50 SINGLE MOTHERS IN GUMARE VILLAGE.....	33
TABLE 4.2.1.	FREQUENCY AND PERCENTAGE DISTRIBUTION OF PARTICIPANT MOTHERS ACCORDING TO AGE RANGE.....	34
TABLE 4.2.2.	FREQUENCY AND PERCENTAGE DISTRIBUTION OF CHILDREN ACCORDING TO AGE IN THE 50 HOUSEHOLDS.....	35
TABLE 4.3.	FREQUENCY AND PERCENTAGE DISTRIBUTION OF EDUCATION LEVEL OF MOTHERS.....	35
TABLE 4.4.	FREQUENCY AND PERCENTAGE DISTRIBUTION OF MARITAL STATUS OF MOTHERS.....	36
TABLE 4.5.	FREQUENCY AND PERCENTAGE DISTRIBUTION INCOME FROM GOVERNMENT SOURCES.....	38
TABLE 4.6.	PERCENTAGE DISTRIBUTION OF WILD VEGETABLE CONSUMPTION.....	53

LIST OF FIGURES

FIGURE 4.1. PERCENTAGE DISTRIBUTION OF NON-GOVERNMENTAL HOUSEHOLD INCOME FOR FEMALE HEADED HOUSEHOLDS.....	40
FIGURE 4.2. PERCENTAGE DISTRIBUTION OF POWER SOURCES FOR COOKING.....	40
FIGURE 4.3. PERCENTAGE DISTRIBUTION OF POWER SOURCES USED FOR LIGHTING.....	41
FIGURE 4.4. PERCENTAGE DISTRIBUTION OF WATER SOURCES.....	42
FIGURE 4.5. PERCENTAGE DISTRIBUTION OF FOOD SOURCES	43
FIGURE 4.6. PERCENTAGE DISTRIBUTION OF INDIGENOUS FOODS.....	44
FIGURE 4.7. FOOD CONSUMPTION FROM 9 FOOD GROUPS.....	45
FIGURE 4.8. PERCENTAGE DISTRIBUTION OF DIFFERENT TYPES OF CEREALS.....	46
FIGURE 4.9. CONSUMPTION OF ANIMAL AND PLANT- BASED VITAMIN A FOOD.....	52
FIGURE 4.10. PERCENTAGE DISTRIBUTION OF HOUSEHOLDS WHICH UTILISED SPECIFIC COPING STRATEGIES.....	57

LIST OF PLATES

PLATE 3.1.	WATER LILIES FROM THE BORO RIVER, A TRIBUTARY OF THE OKAVANGO RIVER.....	20
PLATE 3.2.	MAP OF BOTSWANA.....	25
PLATE 3.3.	GEOGRAPHICAL PROFILE OF OKAVANGO SUB-DISTRICT.....	26
PLATE 3.4.	A HOUSEHOLD STRUCTURE IN GUMARE.....	27
PLATE 3.5.	A CLINIC IN GUMARE.....	28

LIST OF APPENDICES

APPENDIX A.	SOCIO DEMOGRAPHIC QUESTIONNAIRE TO COLLECT THE DEMOGRAPHIC DATA.....	75
APPENDIX B.	HOUSEHOLD DIETARY DIVERSITY QUESTIONNAIRE HDDS CONTEXTULISED: NORTHERN OKAVANGO, BOTSWANA.....	80
APPENDIX C.	HOUSEHOLD COPING STRATEGIES INDEX SCORE QUESTIONS.....	84
APPENDIX D.	LETTER TO THE CHIEF.....	86
APPENDIX E.	LETTER TO THE DEPARTMENT.....	87
APPENDIX F.	LETTER TO THE PARTICIPANTS.....	88
APPENDIX H.	GLOSSARY OF FOODS COMMONLY CONSUMED IN BOTSWANA.....	89

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND AND MOTIVATION OF THE STUDY

In Botswana, rural women have been seriously affected by poverty when compared to men. Women encounter many problems such as unequal access to jobs and high unemployment rates. Cultural values and beliefs have also disadvantaged women, as the idea that they are inferior to men, has been instilled, creating a dependence on males to be the providers of the family. This cultural orientation has caused women to lose confidence and to make them believe that they cannot economically upgrade themselves without the assistance of men (Ministry of Labour & Home Affairs, 2005).

Food security is defined as a situation in which all household members have both economic and physical access to enough, safe and nutritious foods to meet their needs, so that they do not live in hunger or fear of starvation. Food access refers specifically to adequate availability of quality foods for health and wellbeing. It is estimated that 852 million people worldwide live in extreme poverty while 2 billion lack food security. It is also estimated that 6 million children die every day due to starvation (FAO, 2003).

Female-headed families are particularly susceptible to poverty and household food insecurity. Since 70% of households in Botswana are headed by women, household food insecurity remains a critical problem (Ministry of Labour and Home Affairs, 2005). Studies in Botswana show that food security is a major concern especially in female-headed households in rural areas. This is demonstrated by a significant 35% decrease in household food allocation, from 94% in 1993 to 33% in 2002 and 2003 (Kapunda, 2006). Food insecurity remains a critical issue, despite programmes and policies that the government has introduced to address food shortages. Women face problems such as a lack of skills, shortage of finances and a lack of education. When it comes to utilizing programmes designed by the government of Botswana, to equip them with life skills to improve their livelihoods, they are unable to access them. Due to this under utilization of the programmes, the socio-economic status of women has not improved and they still live in poverty (Department of Women Affairs, 1998).

The Arable Land Development Programme (ALDEP) of 1980 is only one of the many failed government programmes which was meant to provide women with agricultural services, through the provision of small

stock and agricultural equipment. However, the government of Botswana has continued to assist women by introducing other programmes such the Labour based Drought Relief Programme, the National Master Plan for Arable Agriculture and Dairy Production (NAMPAAD, the National Strategy for Poverty Reduction (NGPR), the Revised National Policy for Rural Development (NPRD), the Revised National Policy on Destitute Persons and the Citizen Entrepreneurs Development Agency (CEDA) (Department of Women Affairs, 1998).

The difficulty experienced by women in accessing these programmes designed to improve their socio-economic status and reduce poverty, has brought about major set backs. Therefore household food security in female headed households who are unemployed, has become an even bigger problem. An increase in diet diversity within a household necessitates access to foods which are of quality. If diet diversity decreases, food access is compromised. Hence improved access to nutritious and healthy foods directly affects household food security. Changes in a household's food security can be monitored using diet diversity (Hoddinott and Yohannes, 2002).

During periods of food shortages and restricted access to food, households change their daily behaviour to adapt to these critical problems. The function of coping strategies is to assess and monitor behaviour changes in relation to food shortages, by capturing the different strategies that the household employ to deal with poor access to food. A household that uses some coping strategies will indicate that they are susceptible to hunger, while those using severe strategies indicate that they are likely to be destitute and dependent on government welfare programmes. These strategies can include reducing food portions or spending a day without a meal or sending members of the family to eat with neighbours and friends.

This study was conducted in the rural Gumare village in the Northern Okavango area of Botswana. Statistics from the Department of Social and Community Development clearly indicate that, out of 450 destitute families registered in the year 2005 in Gumare village, 300 of them were single women with children (Department of Social and Community Development, 2005). The statistics also revealed that the income of those female-headed households was very low, due to a lack of employment opportunities, which in turn is exacerbated by little or no education of the mothers. This situation has forced single female mothers in Gumare to rely on government welfare programmes, one of which is receiving a monthly food basket.

1.2 PURPOSE OF THE STUDY

The aim of the study was to investigate the diet diversity, food access and coping strategies applied by single mothers with young children in the Northern Okavango region of Botswana in order to deal with food shortages. The specific objectives were:

1. To determine the socio- economic characteristics of households headed by single mothers.
2. To determine the diversity of the diet in female-headed households;
3. To document the access to food in these households; and
4. To document coping strategies used in households headed by single mothers to cope with food shortages.

Ngwenya & Mosepele (2007) have indicated the extent of food insecurity in the Northern Okavango area of Botswana. However, specific data regarding the actual extent of food insecurity, the variety and quality of food for consumption and the coping strategies applied by female-headed households in times of limited access to food, is yet to be determined in Gumare village. The findings of the study could provide recommendations regarding specific actions and changes in policy by the Botswana Government.

1.3 RESEARCH DESIGN

A qualitative and quantitative design was selected as the research design for this study. Three questionnaires were used to collect the data, namely:

- A socio-demographic questionnaire to record the social status and living conditions of the female headed households.
- An international standardised Household Diet Diversity questionnaire (HDDS) to determine diet variety and quality of foods consumed by these households. The data collected by the HDDS measuring instrument were also used as a proxy method to indicate the level of food access.
- An international Coping Strategy Index (CSI) to document the coping strategies applied by these households in times of limited access to food.

1.4 ORGANIZATION OF THE DISSERTATION

Chapter 1: Introduction

The introductory chapter presents a short overview of literature specific to the study which was the motivation for conducting the study. This chapter will also look at the relationship between food access and food security, as well as diet diversity and coping strategies employed by households to manage food shortages.

Chapter 2: Literature Review

This chapter focuses on a review of specific literature studies on diet diversity, food access and coping strategies.

Chapter 3: Methods and Materials

The selected research methodology used in the study is discussed, identifying the study site, the study population, and the sampling methods and procedures.

Chapter 4: Results and Discussion

This chapter focuses on the major findings of the study. The results of the study are also discussed in relation to the findings of other studies.

Chapter 5: Conclusions and Recommendations

The chapter will provide the conclusions that were drawn, and whether the original objectives of the study were addressed and answered. Based on the results of the study, recommendations are presented for future actions and research.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Household food security refers to physical and economic access to food which is nutritious, while improving the health of household members at all times (FAO, 2003). Household food insecurity will inevitably occur if there is inadequate access to enough food for a household to enjoy a healthy life style.

Many female-headed households live in poverty and experience very limited access to food. Hence, these households need to employ many coping strategies to deal with food insecurity.

2.2. FEMALE - HEADED HOUSEHOLDS IN BOTSWANA

According to the Ministry of Labour and Home Affairs (2005), in Botswana, women are more affected by poverty than their male counterparts. In an effort to reduce these disadvantages and reduce poverty, the government of Botswana has implemented policies and strategies that are geared towards addressing the nature of the problem. Women's heavy workload and an unequal access to economic resources and decision-making are some of the issues.

Statistics from the national poverty studies also show that poverty is more severe in rural areas, The Botswana Institute for DEVELOPMENT POLICY analysis estimates that 62% of the very poor single-female headed households live in abject poverty (Perret *et al*, 1996).

Furthermore, a study that was done to document determinants of Rural Household Income in Botswana showed that gender, size of a household and the livestock assets of a household were the major determinants of a household income. It is evident therefore that the gender of the head of a household is closely associated with poverty (Gobotswang *et al*, 2005).

The Department of Culture & Social Welfare (1995) reported that between 1981 and 1991, the proportion of female-headed households in Botswana increased from 45% to 47%, with over half of the households being in the rural areas. The majority of women heading households were unemployed and had no cash-

earning capacity. Therefore, these women had to survive on the lowest of incomes, even though they were expected to provide financially for the family.

2.3. ECONOMIC PROFILE OF WOMEN IN BOTSWANA

2.3.1. Women and unemployment

The Department of Women Affairs (1998) states that female-headed families are more vulnerable to poverty because women are most affected by unemployment. Cultural roles in Botswana restrict women from engaging in income-generating activities such as cattle rearing or learning any skills that can help them to improve their lives. In Setswana culture women are considered as minors, therefore they are allocated duties that are believed to be less strenuous, such as making and selling handicrafts, preparing food and brewing beer. Today these small-scale economic activities play an important role in contributing to the income of the family. According to a study investigating household structure and functioning in Letlhakeng Village in Botswana, women are more involved in economic activities such as beer making, retailing and working for drought relief projects. This has resulted in more women being in control of their family finances. The involvement of women in the different economic activities such as agriculture has clearly affected the traditional unit of families (Mugabe, Gobotswang, & Holmboe-Ottesen, 1998).

2.3.2 Government programmes for women

In an effort to address obstacles preventing women from becoming economically independent, the government of Botswana is implementing policies and strategies that are geared towards improving the livelihoods of women. These include addressing women's heavy workload, and unequal access to economic resources and decision-making.

The Citizen Entrepreneurs Development Agency (CEDA) is one of the programmes that have been introduced by the government in order to assist women with low financial status to start their own businesses (Department of Women Affairs, 1998). The Arable Land Development Programme (ALDEP) which was introduced in 1980 and which was meant to provide women with agricultural services, through provision of small stock and agricultural equipments, failed to address poverty amongst women. The government of Botswana made efforts to assist women by giving them 10 % discount preference in financial assistance programmes, by lowering the down-payment in an Arable Land Development Program (ALDEP). The failure of ALDEP did not stop the government of Botswana from introducing other

programmes such as rural training centres (MOA) and women's finance houses, to provide business training or credit respectively for female entrepreneurs. However, 47% of all female-headed households still live in abject poverty (Department of Women Affairs, 1998).

It is evident that women face problems such as a lack of skills, shortage of finance and a lack of education when it comes to utilizing programs to help equip them with life skills needed to improve their lives. As a result of underutilization of these programmes, the socio economic status of women has not improved (Ministry of Labour & Home Affairs, 2005). Another programme, namely the Labour Based Drought Relief programme, was introduced to provide citizens of Botswana with temporary employment during years of drought. The programme is usually targeted at semiskilled and unskilled individuals, who are paid P18 and P24 per day (about R26 and R20) for labourers and supervisors respectively. Even though the programme is meant to aid the community, it is also meant to carry out essential development projects that have been identified by the community, such as building government staff houses, building community halls, connecting water and building traditional kraals. This programme has continued to benefit women as they are the ones who form a majority of the unemployed in the community (Department of Finance and Development Planning, 2007).

The old age pension scheme is another social benefit that was introduced by the government of Botswana in 1996 to cater for citizens who are 65 years and above. The allowance is P180 per month. This allowance is given to Botswana citizens who have a valid National identity card and do not receive an old age pension from another country. These individuals have to be registered with the Department of Social Services. The payment is done through the post office, or through a bank. The allowance is deposited into the beneficiary's bank account or a cheque is sent to the beneficiary's nearest post office (Department of Social Services, 2003).

The Government of Botswana is currently focused on upgrading the agricultural sector to increase food security and to alleviate poverty, especially rural poverty. Between 1990-91 and 1999-2001 there has been an increase in undernourished people. One of these programmes is the National Master Plan for Arable Agriculture and Dairy production (NAMPAAD), aimed at moving from subsistence farming to commercial farming. The National Strategy for Poverty Reduction (NGPR) was adopted in 2003 to supplement the existing strategies to reduce poverty, through developing agriculture and diversifying agricultural products (Jamahiriya, 2008). The Revised National Policy for Rural Development (NPRD) is another programme designed to improve the living conditions of the rural people by providing them with credit for income generation and investment in economic activities to alleviate rural poverty reduction.

A social welfare programme that supplies monthly food baskets and cash vouchers to destitute households is run by the government to address poverty among households. A destitute person is classified as any individual who, due to any form of disability, old age or terminal illness, is unable to engage in economic activities and has a limited or an unreliable source of income, does not own more than 5 cattle and does not have an income exceeding P120 (R135) without dependents or P150 (R170) with dependants. This includes children below 18 years who have no proper care, possibly due to the death or terminal illness of a parent. This policy states that each household is provided with a food basket and a cash payment of P81 (R90) each month. The beneficiaries are assisted with housing costs, funeral expenses at the time of death, medical expenses and educational provisions such as school uniforms for their children. Destitute persons are also exempted from payment for public services such as medical fees, school fees, water charges, service levies and electricity charges (Ministry of Local Government, 2002). Women who are being registered for the welfare programme are in the majority when compared to men. According to the Ministry of Local Government Revised National Policy on Destitute Persons (2002), each household is provided with a monthly food basket containing maize meal, sorghum meal, bread flour, white sugar, beans, cooking oil, beef, iodized salt, minestrone, baking powder, matches, Nespray and tea. Currently there are 5655 beneficiaries who have been registered to receive food baskets in Botswana (Department of Social Services, 2010). Statistics also show that out of 450 destitute families registered in the year 2005 in Gumare Village, 300 were single women with children. This indicates that there is a problem of household food insecurity among single mothers (Department of Social and Community Development, 2005).

Though the Government of Botswana has introduced different strategies and policies that are aimed at ensuring that women have equal access to education, challenges such as social pressures and care of the sick, sexual abuse and teenage pregnancy that expose girls to HIV/AIDS are prevalent and educational opportunities for young women in Botswana remain limited (Ministry of Labour and Home Affairs, 2005).

Given that most of the household in the rural areas are headed by women, they are more involved in the fields and with food collection. According to Ohiokpehai (2003), provision of food to the family in the rural areas in Botswana is usually the responsibility of women. Because so many women do not have any source of income, they rely heavily on gathering wild foods for home consumption and to sell. Wild foods play a vital role as they are both a source of income and food for most households.

In summary, women in Gumare are faced with major economic challenges. In order to address these disadvantages and free women from poverty, in-depth investigations need to be conducted in Gumare to determine appropriate policies and strategies that can be used to address the underlying causes of the problem and present possible solutions.

2.4 HOUSEHOLD FOOD SECURITY

2.4.1 Household food security in Africa

Food security can be defined as a situation in which people suffer from hunger or live in fear of starvation. According to FAO (2003), world wide around 852 million men, women and children are chronically hungry due to extreme poverty, while up to 2 billion people intermittently lack food security due to varying degrees of poverty. In some of the areas of the world people lack basic foods to provide them with sufficient energy and nutrients to lead fully productive lives (Wikipedia, 2007).

The International Fund for Agricultural Development (1999) states that food security implies that household members must have access to enough food at all times. Hence, factors such as migration of the male population, deaths of males in civil wars and family disruptions in many African countries such as Malawi, Zimbabwe, Namibia and Zambia have led to an increase in single female-headed households. Even though these female-headed households are sometimes smaller in size, they have shown that there is high dependency when compared to households headed by both parents. These single women also have fewer possessions and more limited access to resources. It is estimated that in Zimbabwe female-headed households have 30-50% smaller landholdings than male-headed households.

Mugabe, Gobotswang and Holmboe-Ottesen (1998), state that even though the population of most African countries is growing dramatically, food production in Africa has not increased. This lack of available food has a direct link to the high infant mortality rate and the lowest life expectancy rate at birth in Africa when compared to those in other continents. About 70% of the people who live in poverty in Africa are found in the rural areas. However, only 50% of these people produce food, while 30% do not have land to cultivate. This means that many developing countries in Africa are hugely affected by food insecurity, which is difficult to eradicate as these people are unable to access food. Factors such as the high prevalence of HIV/AIDS, civil war, poor governance, frequent droughts and famine also contribute to high levels of food insecurity. Undeveloped agricultural practices that primarily depend on rain fed agriculture worsen food insecurity, because food production is dependent on the weather (Mwaniki, 2006).

Even though food production is very low in Africa, the population increases by 3% every year, contributing to the high food insecurity in Africa, with 43 countries out of 86 falling in the category of high food insecurity. In Sub-Saharan Africa there has been a huge increase in the number of people living in poverty, from 184 billion in 1985 to 216 billion in 1990. The acute status of food insecurity in Africa has resulted in severe hunger among children under five, with 22.5 million children in Africa suffering from malnourishment (Communication for Development Group, 2003).

Food security is an important measurement of household and personal wellbeing. Food insecurity and hunger are undesirable because they can lead nutritional, health and developmental problems in children (Daniels *et al*, 2007). Food insecurity remains a major concern in Africa despite food and other donor assistance that have been given to Africans. It is therefore crucial that food insecurity, equity, peace and security, good governance, education and health issues must be addressed before the achievement of food security becomes possible. Natural resources in Africa must be utilised fully to ensure that the proceeds are invested in achieving food security (Summit on Food Security in Africa, 2006).

Even though food security is a major concern in African rural areas, food security in the urban areas is not well addressed. Policy makers in most African countries often treat it as a political issue. Because policy makers are more concerned with food insecurity in the rural areas, they are unaware of urban food insecurity. This is due to the fact that food security in urban areas is overshadowed by problems such as unemployment, the mushrooming of the informal sector, overcrowding, decaying infrastructure and poor service delivery (Mustafa, Rod & Luc, 2007).

Malnutrition remains a major problem in the world, because each year 35 million women, children and the elderly are at risk for early death. The use of advanced technology that is meant to increase the production of food and its distribution has not been able to control the situation as the number of deaths caused by malnutrition and hunger is still increasing. The problem is not only limited to underdeveloped countries, because it also affects more developed and advanced countries such as Canada and the United States. An estimated 2.5 million people in Canada depend on food banks, while 30 million people in the United States are unable to maintain good health because they cannot provide food for themselves (Mustafa *et al*, 2007).

Over the last 30 years Africa has not managed to reduce food insecurity which has taken over the continent, with 8% of the population suffering from chronic food insecurity, In 2003, 38 million people were affected by acute food insecurity with about 24,000 people dying of hunger every day. It has to be noted that at the beginning of 2003, a total of 39 countries worldwide had extreme food shortages and needed food emergency aid. Twenty five of these were African countries. In order to alleviate food insecurity in Africa, war and political unrest need to be addressed because wars in most African countries such as Angola and Democratic Republic of Congo have interfered with agriculture and as a result affecting food production. Agriculture must be given priority in national budgets with increased funding and the assurance that the community has access to land and credit. It has to be noted that the food crisis that is experienced in Africa is also linked to the high rates of HIV/AIDS infection. People who are infected by the HIV have low productivity and those who have resources, use their resources to pay for medication (Clover, 2003).

Food shortage is of such great concern that food related riots are common occurrences in many African countries. Poor government policies that fail to address food insecurity, low agricultural yields and limited rural development, prove that food security needs to be a major concern in Sub-Saharan Africa (United States Government Accountability Office, 2000). In Sub-Saharan Africa, many and very complicated causes of food insecurity exist, making a decrease in food insecurity almost impossible. These include deterioration in public service delivery (health and education) and increasing debt. This has affected traditional livelihoods of people such as farming, causing extreme vulnerability to food insecurity (International Federation of Red Cross and Red Crescent Societies, 2008).

A very large section of the world population is becoming urbanized rapidly with an increase from 30-47% in Sub-Saharan Africa. This growth of the urban population poses new food security challenges that need to be addressed. Production of food and easy access to food by household's members to achieve food security must be consistent. Because food security in urban and rural environments is not the same, policy makers and planners in urban areas need to take the different scenarios into consideration when designing food security programmes to address the specific needs of the urban poor (Kennedy, 2003).

2.4.2 Household food security in Botswana

Many single female headed households in Botswana are faced with the challenges of impoverishment due to few industries being situated in the rural areas. This in turn means there are few or low paying jobs. Most single mothers have low education levels therefore they are either unemployed or forced to take low-paying jobs. The government of Botswana has developed several programmes aimed at addressing the issue, in order to reduce the risk of poor households that are unable to gain access to food (Department of Women Affairs, 1998).

Kapunda (2006), investigated the patterns of food consumption, food security and poverty in Botswana. The results indicate that there was a 35% decrease in the allocation of household food consumption in 1993-1994, compared to 33% in 2002-2003. The results reveal that, though there is food security at national level, more households in rural areas experience food insecurity, despite the fact that households spend 88% of their income on food items.

Ngwenya & Mosepele (2007) state that to deal with food insecurity, people in the Okavango need to adopt different food security coping strategies. These strategies include cutting down on the number of meals consumed in a day, reducing meal portions, asking for food from relatives, searching for work, gathering wild foods and asking for social grants from the government.

A study on the impact of a seven-year drought on household food security and vulnerable groups in Botswana, indicated that single female headed households were among the vulnerable poor groups which were hardest hit by the seven-year drought (1981-87) and had to depend on the government for handouts. Acquah (2007) showed that during the 2004 drought period in Botswana, there was a severe shortage of food, with people forced to rely on the government for food relief. Some people worked for labour-based drought relief projects, whilst others remained dependent on government. In order to deal with these food shortages, most of the households adopt coping strategies such as relying on neighbours, friends and relatives for food.

It is evident from the different studies that food insecurity is still a major challenge in Africa and Botswana, with rural single female headed households shown to be the most seriously affected. There is therefore a need to implement policies and programmes to address resultant food insecurity.

2.5 HOUSEHOLD DIETARY DIVERSITY

2.5.1 Introduction

The internationally standardized household dietary diversity score questionnaire (HDDS) is a tool to determine the consumption of foods from several food groups. The HDDS is also a proxy measurement for food access and household food security. Consumption of a variety of foods indicates both nutrient adequacy and food access. Dietary Diversity refers to the number of food groups which have been consumed over the past 24 hours, 48 hours or even 7 days. (Arimond & Ruel, 2004).

The Household Dietary Diversity score is measured by adding up the number of food groups consumed within a household as opposed to counting the number of food items consumed by the household. Counting the number of food groups indicates the variety of different foods consumed by the household. This will reveal whether the household has a low or high diet diversity. A diverse selection of foods will ensure good health of the households through the intake of different nutrients from a variety of food (FAO, 2008).

2.5.2 Measuring dietary diversity score

For this study, all foods consumed during the previous 24 hours were recorded using a 14-food-group classification. This is an expanded version of the HDDS of 9 food groups to document foods of special interest, such as Vitamin A and Iron rich foods. The International Household Dietary Diversity Questionnaire was adapted to include food types generally consumed in the Botswana food culture, particularly in the Northern Okavango area (FANTA, 2008). The questionnaire was also adapted to document the types of foods consumed per group within each of the food groups (Appendix B).

For the purpose of this study, the Household Dietary Diversity questionnaire covering fourteen food groups was collapsed into a 9-food-group classification, as recommended by Swindale and Bilinsky (2006). This change enabled the findings from this study to be compared with other studies conducted in South Africa. In the study of Steyn *et al* (2006) in Limpopo, using this 9-food-group classification, it was shown that any diet diversity value below 4 is an indication of a poor variety of foods, reflecting diets with low nutrient quality and possible micro-nutrient deficiencies. Steyn *et al* (2006) suggest that a dietary diversity score above 4 is a good indicator of diet quality.

2.5.3 Dietary diversity and diet quality

2.5.3.1 Diet diversity and food variety

A study conducted in Botswana to determine food diversity showed that a variety of foods is linked to physical and cognitive functioning in older adults. Clausen *et al* (2005) found that the diet of older people, living in rural areas in Botswana, had no variety due to their poor socio- economic status. However, it was also found that those older persons who lived in urban areas and had cattle and higher education, had a greater food variety, which resulted in desirable health outcomes. Increasing the variety of foods in the diet is crucial as it ensures an adequate intake of essential nutrients, resulting in good health.

Ruel (2008) indicates that there is no clear understanding of the measurement of diet diversity. Some findings indicate that most of the dietary diversity studies use this method of counting food groups to indicate low and high dietary diversity and from that determine the nutritional status of the household. Diet diversity, as a proxy measurement of food access and thus food security is found to be an acceptable method for these two reasons. Even though dietary diversity is accepted as an excellent measuring tool to reflect food security within households, more research needs to be conducted to harmonize measurement approaches and indicators and develop new approaches that can be used to improve dietary measurements (Ruel, 2008).

A study conducted in eleven countries (Ruanda, Zimbabwe, Nepal, Peru, Nepal, Mali, Malawi, Haiti, Ethiopia, Colombia, Cambodia and Benin) confirms that a healthy diet for children is related to diet diversity. Poverty in households in these countries is related to poor diet diversity. These households rely mostly on staple foods such as cereals. The mental and physical development of children in households with low food variety, are negatively affected, because dietary diversification is closely related to normal growth of children (Arimond & Ruel, 2004).

2.5.3.2 Diet diversity and Micro-nutrient consumption

About 150 million of children have died in Africa due to malnutrition while others are suffering from developmental problems such as cognitive, physical and psychological defects (Daniels *et al*, 2007). To determine the impact of malnutrition on children and identify those who have been severely affected, the Dietary Diversity Score has been identified as a reliable indicator. Dietary diversity is based on food

groups consumed rather than on food items. It is thus able to provide insight regarding nutrients of special interest such as Vitamin A and iron to be documented.

Vitamin A is highly concentrated in foods such as fish liver oils, red palm oils, beef, liver, egg yolk, butter, cream, carrots, dark green leafy vegetables (rape, spinach, chomolia), yellow vegetables and fruits (carrots, peaches). If an individual does not consume enough vitamin A there is a larger likelihood to suffer from night blindness, drying of the whites of the eyes and the cornea. Eventually, if these conditions continue, it can result in death (Berkow *et al*, 1999).

Even though diet diversity is seen as a good strategy to improve micro-nutrient deficiencies, many challenges exist such as the bioavailability of micro-nutrients in the food, the allocation of food within the households, the availability of foods in certain seasons and preference for certain foods. Different strategies need to be adopted to address factors that lead to unavailability of micro-nutrients (Winichagoon, 2008).

2.5.4 Diet diversity and the nutritional status of children

According to Berkow *et al* (1999), malnutrition is one of the major causes of death and poor health among children worldwide, primarily caused by inadequate or improper food intake or the inability of the body to absorb or break down nutrients, especially during illness when the body needs more nutrients to boost immunity. Malnutrition is very common in developing and underdeveloped countries, especially among families affected by a lack of food security.

In this particular study, single mothers with children under the age of 9 years were selected as a sample group since these children are at the early stages of development. Up to this age children can be seriously affected by malnutrition and therefore greater care needs to be exercised to provide a diverse diet. In Botswana, poor food intake among children has resulted in prevalence causes of malnutrition that is now a major health problem. Data from the National Nutrition Surveillance System conducted in 1993, recorded a 14.3% prevalence of underweight children and this shows a decrease when compared to study conducted in the same year by Marupula (1993), which showed a rate of 14.6%. Malnutrition is a problem in Botswana where 25.8% of children are affected by stunting, while 4.5% are affected by wasting (Maruapula, 1993).

To address malnutrition among children, the Government of Botswana has put in place different strategies such as a programme for providing Health and Nutrition Education. This programme has the potential to improve child feeding practices in households and through the clinics, to do growth monitoring, to conduct immunization, and to control gastric diseases. However, it has to be noted that some of these strategies have made no nutritional impact, due to the large variety of factors related to malnutrition, such as inadequate food intake, diseases, low household food security, poor child care and protection, and the absence of essential services, including education, health, housing and sanitation (Maruapula, 1993).

Child nutrition is a crucial aspect of child development and health, with poor nutrition contributing to many diseases such as diarrhoea and conditions such as malnutrition. A shortage of financial resources at household level is a factor that compromises children's health. It is crucial that studies be done to determine the extent at which children under the age of 9 years are affected by food insecurity.

Even though malnutrition is found all over the world, Botswana has a high rate of malnutrition, especially amongst children. Low birth-weight babies lead to higher rates of under nutrition, protein energy shortages and stunting. Moreover, in Botswana, 15% of under-fives attending child welfare clinics are affected by under nutrition, which causes 9 % of the deaths among children in Botswana. The immediate causes of under nutrition in Botswana are inadequate food intake and childhood diseases such as diarrhoea, but the major underlying causes include poor access to food, low purchasing power, difficult access to basic services, improper sanitation and inadequate childcare and protection (Ohiokpehai *et al*, 1993).

According to Steyn *et al* (2006), many children in South Africa have a limited dietary variety that primarily include cereals, tubers and roots. This affects the children's nutrient intake as their diets lacked micro-nutrients such as calcium, iron, zinc and folic acid.

A study by Mugabe, Gobotswang and Holmboe-Ottesen (1998), that looked at the rapid socio-economic transformation in Botswana, revealed that there is a 18.5% occurrence of malnutrition among children. A shortage of financial resources and poor nutrition at household level are factors that compromise children's health.

Shortages of food can easily lead to malnutrition in a household and there is therefore a need to identify the underlying factors or causes. These could be the use and management of resources and the economic and political status of a country. The available resources such as land in a community and how

it is utilized is another important factor that can lead to food insecurity. There has to be available resources that can be utilised to produce food.

2.5.5 Diet diversity and socio- economic status

Studies have shown that diet diversity is closely associated with the households' socio- economic status, as most of the households with higher socio-economic status have a wider selection of food and thus diet diversity and improved health status (Arimond & Ruel, 2004). Improved diet diversity and health status among economically better households are present in Botswana (Clausen *et al*, 2005).

2.5.6 Diet diversity, income and calorie intakes

Hoddinott and Yohannes (2002), report that there is a definite relationship between dietary diversity, and the various indicators of household food consumption and food availability. When dietary diversity increases, there is a significant increase in the total consumption of calories.

Diet diversification is a crucial component when it comes to improving health status in a household, because a diet that has been diversified with fruits and vegetables will benefit individuals through decreasing their chances of contracting deficiency diseases and chronic diseases of lifestyle. The fruits and vegetables in diversified diets will provide the body with Vitamin A and Vitamin C (Johns, 2001).

2.5.7 Dietary diversity and food access

Household dietary diversity score is a proxy measurement for food access. Hence, in households with a low value for diet diversity can indicate restricted food access, exposing them to be vulnerable to food insecurity. As a result of poor food access, these households have to use many coping strategies to deal with food shortages (Arimond & Ruel, 2004).

Dietary diversity can be used to monitor changes in household food security status and specifically to monitor the success of interventions that have been used to address household food insecurity. When dietary diversity increases, there is a significant increase in food accessibility; consequently, when diet diversity is low, food access is compromised (Hoddinott and Yohannes, 2002)

It is evident that a shortage of food in a household can result in low diet diversity and a lack of food accessibility which will affect food consumption patterns (Savy *et al*, 2006). Household dietary diversity is

influenced by accessibility of food, with varying dietary diversity available at the beginning and the end of the ploughing season. Savy *et al* (2006) show that when there is a period of cereal shortage in Africa, dietary diversity is at its lowest.

2.6. FOOD SOURCES IN BOTSWANA

2.6.1 Indigenous foods

In many groups, the food that is preferred by a community is influenced by the culture and beliefs of a particular group of people (Mugabe, Gobotswang, & Holmboe-Ottesen, 1998). Indigenous foods are foods which are commonly consumed by communities and those to which households have a traditional attachment. Cultural beliefs significantly affect eating habits. The Bayeyi, Bambukushu, Batawana and Baherero tribes in the North Western part of Botswana eat food such as Osopa. (Bogopa, Bradon & Mohango, 2006). Maere (sour milk) and millet are other examples of their indigenous foods.

Ontario (2001), explains that in many parts of the world, people are being forced to abandon their traditional ways of life for economic and political reasons. Unfortunately, this often means that they also lose their indigenous knowledge and skills.

Research in Ghana has shown that consumption of indigenous vegetables is crucial as it plays a significant role in household food security (Musinguzi *et al*, 2006). It is also evident that women are unable to grow indigenous vegetables due to limited resources. However, if poor families are educated on the importance of the traditional vegetables and are encouraged to grow traditional vegetables, food security can be addressed as many families will benefit hugely from them as a source of income and as food (<http://www-wds.worldbank.org/servlet/main?menuPK>).

Musinguzi *et al* (2006) suggest that indigenous crops are unpopular amongst people in Ghana, because, when compared to other foods which are not indigenous, people in Ghana prefer to grow commercial crops that ensure a reasonable income. Clearing of indigenous bush for cash crop production has also affected availability of indigenous foods. Furthermore, there is a lack of awareness regarding the nutritive value of indigenous foods, because most households regard indigenous to be less nutritious. As a result, households need to realise the value of indigenous foods to improve their livelihoods.

Even though indigenous foods can play an important role in income generation and subsistence, many indigenous leaf vegetables and fruits in Africa have disappeared. Various factors such as the introduction of exotic vegetables and clearing of bush as well as modern technologies are to blame. Furthermore, many of the indigenous vegetables are drought resistant and are able to flourish in the harsh conditions of Africa (Adebooye & Opabode, 2004).

Many South African communities have been dependent on indigenous crops such as cowpeas and groundnuts, which are well adapted to the harsh conditions prevailing in specific communities. Many households do not consume indigenous foods as they regard these as food for the poor and as a result, knowledge of the nutritional benefits of the foods is lost. The adoption of western culture has not improved the situation (Van Vuuren, 2006). Cultural preferences for food also play an important role as certain foods are chosen because of cultural preferences, affordability and the influence of education. Loss of indigenous knowledge can compromise the nutritional status of indigenous people (Kuhnlein & Receveur, 1996).

The disadvantages of economic, environmental health and social conditions that surround the rural people, compromises their health, resulting in stunting, micronutrient malnutrition and diabetes. Since indigenous people are aware of food insecurity they should be able to address it within their communities. Remedies include access, preservation and purchase of quality indigenous foods. Different planting, harvesting, preparing and preserving methods to conserve food are routinely used during the periods when food is in short supply (Kuhnlein *et al*, 2006).

2.6.2 Wild foods in Botswana

Many households are dependent on wild foods which they collect from the forest for subsistence or income generation. Wild food in the Gumare area is gathered from May to August and it can be either consumed by the household and or sold to the local community. These vegetables include products such as Tswii (water lily) which is harvested in the delta and nuts from trees such as Mongongo, and the baobab tree and Mowana fruit are all harvested. It has to be noted that most of these vegetables and fruits are seasonal, hence are found in abundance mostly during rainy seasons. The results of this study reflect data collected in October and November when most of the wild fruits were not available.

Even though many households rely on wild foods to deal with food shortages, these wild foods are slowly disappearing due to Botswana's negative environmental changes.

<http://www.botswanaembassy.or.jp/culture/body5.html>

Wild vegetables are highly nutritious and can reduce hunger and provide an inexpensive source of food with many required essential nutrients. Wild vegetables such as marathus (*Amaranthus thunbergii* and *A.hybridus*), black jack (*Bidens Pilosa*) and gallant soldier (*Galinsoga Parviflora*) are available in South Africa and found in abundance in from August to October (Modi *et al*, 2006).

Common wild vegetables which are found in Botswana are Thepe (pigweed), rothwe (single-leafed-cleome), Delele (*Corchorus*), and Monyanku (wild, striped cucumber) (Chengeta & Matlhare, 2000). Thepe is one of the common wild vegetables known in this area and it has been consumed by people in Gumare for generations and is commonly found in fertile soil such as that in animal kraals. When Thepe is dried, it can be stored for more than a year, providing access all year round (Department of Social Services, 2008).

The people of the Okavango District in Botswana are well known for their original use of Tswëii (water lily). The water lily has been used as a source of income and food for generations by the community, many women, who are not employed, gather Tswëii and sell it cooked or raw to tourists (Plate 3.1).



(WATER LILIES)



(WATER LILY FLOWER)

Plate 3.1 Water lilies from the Boro River, a tributary of the Okavango River.

The Bakalaka, Batswapong, Babirwa and Bangwato are different ethnic groups who live in other areas of Botswana, but have similar consumption of wild foods. Phane, a caterpillar that is found in North-central parts of Botswana in Mophane trees is mostly eaten by these ethnic groups. Groundnuts, Marula nuts and melon seeds form a major part of the diet of the Bakalaka, Batswapong and Bangwato, who live in the same area (Bogopa, Brandon & Mohango, 2006).

In Botswana, since ancient times, the Basarwa tribes have survived on hunting and gathering, depending primarily on wild foods. The relocation of essentially nomadic tribes meant that they were moved to areas where they could access services such as clean water, health care services and education. Unfortunately this movement has had a negative impact on those peoples' food security.

2.6.3 Home gardens

According to Bio-intensive Approach to Small Scale Household Food Production (1993), home vegetable gardens can play a significant role in poor households, providing foods at far lower cost. If vegetable gardens are utilized, households will have access to nutritious foods that will provide iron, vitamin A, vegetable protein, fibre and energy. Availability of food gardens to households improves their food production and consumption.

2.7 COPING STRATEGIES

2.7.1 Introduction

Coping strategies are the activities that enable households to deal with food shortages. These include, among others, reducing the number of meals, borrowing food from neighbours, sending household members to eat elsewhere and reducing meal portions. Diet diversity can be applied as a proxy measurement for food access and therefore, when there is low food access several coping strategies can be employed to deal with food shortages. Households, who lack food access, are more likely to use various strategies to cope with food shortages. It is important to note that cultural practices and beliefs of the households play a major role in defining the kind of strategy that can be adopted to address food access (Maxwell & Caldwell, 2008).

The relationship between household diet diversity score and coping strategies is that a household, which has low diet diversity, always uses more coping strategies in order to deal with lack of food access and food shortages. Coping strategies are an indication of the vulnerability of a family, because households that are poor and likely to be destitute use more coping strategies, clearly indicating their vulnerability to hunger (Maxwell & Caldwell, 2008). To adapt to food shortages Maxwell *et al* (2003) declares that a shortage of food requires a change in people's behaviour. The different strategies that can be used by households to deal with food insecurity include changing the food in the diet, reducing food portions, spending a day without a meal or sending members of the family to eat in their neighbours' households. It has to be noted though, that when households reduce the number of meals they become more vulnerable to dangers of malnutrition if this strategy is applied over long periods.

2.7.2 Coping Strategy Index Tool (CSI)

The Coping Strategy Index (CSI) is used to assess and monitor behaviour changes in relation to food shortages, by capturing the different strategies that the household employ to deal with poor access to food. The Coping Strategy Index can also be used to assess the impact of food aid on households during emergency food shortage periods and to identify those households who are more in need of emergency food aid (Maxwell *et al*, 2003).

The Coping Strategy Index (CSI) is a set of questions dealing with the type of strategies used and the level of use of, for example, from once a day to never. The coping strategies can be classified in to four major categories:

1. changing the household's diet by consuming less preferred or expensive food.
2. using short-term strategies to increase food supplies, such as borrowing, purchasing on credit, begging or consuming wild foods, consuming immature crops or even seed stock
3. reducing the number of people in the household that they have to feed by sending some of them to eat elsewhere, such as sending children to eat with their neighbours
4. Reducing the portion size of meals within the households or favouring certain household members or even to skip eating for a whole day (Maxwell *et al*, 2003).

In Botswana it is evident that many households experience low food access and food insecurity, and use different coping strategies to provide daily food for all household members. A study in Chobe District

showed that 22.4% of households cut down on meals, 18.7% borrow food or cash and 8.2% reduce the size of food portions (Mugabe, Gobotswang & Holmboe-Ottesen, 1998).

Different researchers have shown that coping strategies play an important role in helping households which experience food access to deal with food shortages, such that in Swaziland over 60% of people rely on some kind of coping strategies to combat food shortages (Plus News, 2009). Similarly in Zimbabwe, 96% of households also prefer to use selected strategies (Urban Food Security Assessment Report, 2008).

2.8 SUMMARY OF THE LITERATURE REVIEW

Inadequate household food security is directly influenced by low access to food, consequently, those households that do not have sufficient access to food, will reflect a diet of low diversity or variety and less nutritional quality. To deal with inadequate food availability, households are forced to employ different coping strategies to obtain enough food, such as consuming inexpensive foods, borrowing or relying on friends and relatives, sending household members to eat elsewhere or to beg for food, gathering or hunting, reducing the size of food portions and restricting food for adults in order for young children to eat.

The focus of this research was on coping strategies, diet diversity and household food access among unemployed young single mothers with children under 9 years of age in Botswana.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the methods and materials that were used to achieve the objectives of the study. An overview of the study area, Gumare, Botswana is included to place the research site in context of the research. Both qualitative and quantitative research methods were used to collect data.

3.2 PURPOSE OF THE STUDY

The aim of the study was to investigate diet diversity, food access and coping strategies applied during periods of food shortages by single mothers with young children in the Northern Okavango region of Botswana.

3.3 OBJECTIVES OF THE STUDY

1. To determine the socio- economic characteristics of female-headed households
2. To determine the diet diversity in single female-headed households
3. To document the access to food in these households
3. To document coping strategies used in households headed by single mothers

3.4. RESEARCH STUDY AREA



PLATE 3.2 Map of Botswana

The study was conducted in Gumare, a rural settlement in the Northern part of Ngamiland District, within the Eastern part of Okavango Sub-District. The Okavango Sub-District is in the Northern part of Botswana within the Ngamiland District. The area is one of the remotest areas in Botswana, where cultural practices are still dominant when compared to other parts of the country. The District covers the North Western part of Botswana and its northern and western boundaries form part of the international boundary between Botswana and Namibia (Plate 3.2 & Plate 3.3).

Ngamiland District is subdivided into two administrative districts; Ngami (services provided from the tourist headquarters Maun) and the Okavango (headquarters in Gumare – 250 km northwest of or 3 hours driving from Maun).

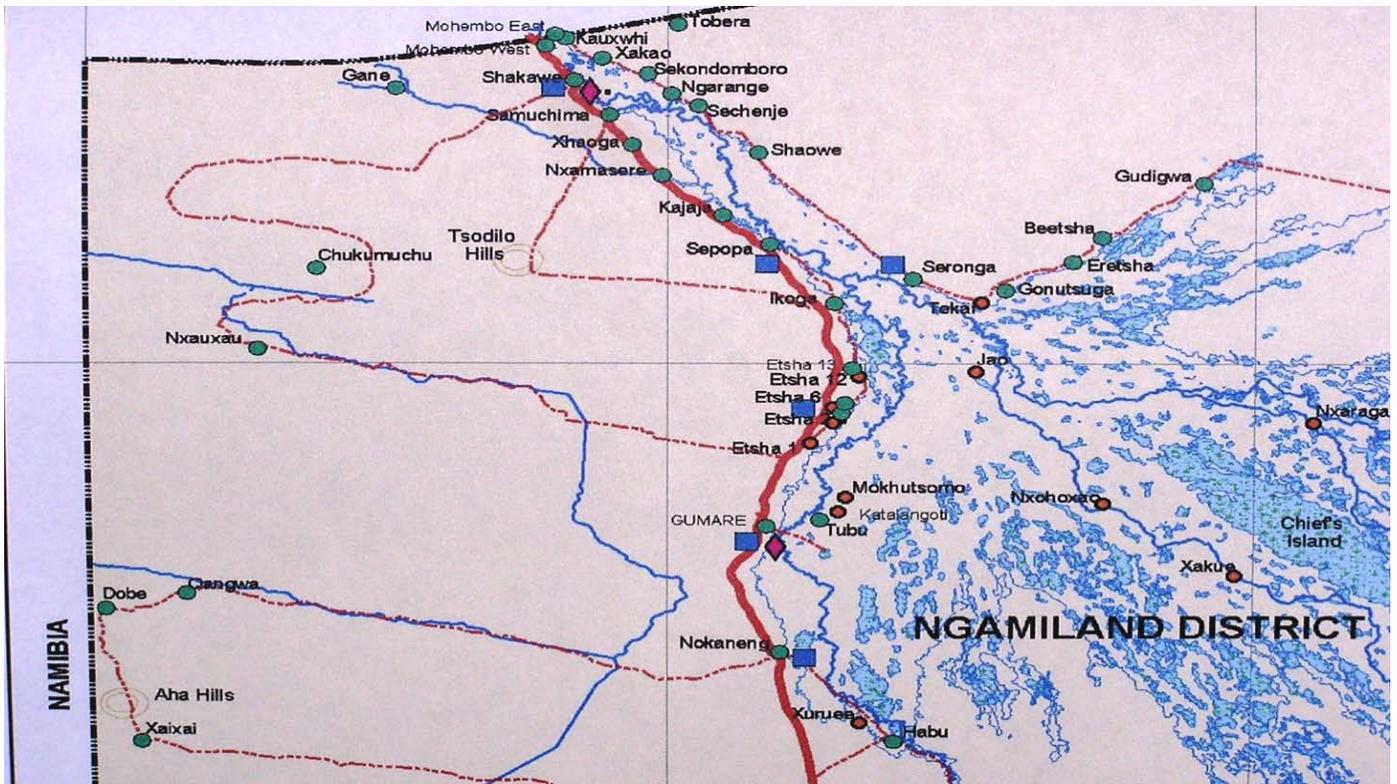


PLATE 3.3. Geographical profile of Okavango sub- district showing Gumare

The 2001 census shows that the population of Ngamiland district is now 124 712 (2001 *Population and Housing Census*.) The Okavango Sub-district (Ngamiland West) has a population of 49 642, comprising 40 percent of the total population of Ngamiland and 0.03 % of Botswana. Gumare village has a population of 7478 in 1559 households. The Batawana, Bayei, Baherero, Bambukushu, Banoka (River Bushmen) and the Bakgalagadi are the different tribes that live in the Okavango area. Most of these people reside along the rivers, which they use for subsistence fishing, to water livestock and for crop cultivation, with the major crops being millet and sorghum (Ministry of Local Government, 2009).

3.4.1 Demographic profile of Botswana and Gumare

The 2001 census indicate that the population of Ngamiland district is now 124 712. The Okavango Sub-district (Ngamiland West) has a population of 49 642, comprising 40 percent of the total population of Ngamiland and 0.03 % of Botswana. Gumare village has a population of 7478 in 1559 households. The Batawana, Bayei, Baherero, Bambukushu, Banoka (River Bushmen) and the Bakgalagadi are the different

tribes that live in the Okavango area. Most of these people reside along the rivers, which they use for subsistence fishing, to water livestock and for crop cultivation, with the major crops being millet and sorghum. (Ministry of Local Government, 2009).



Plate 3.4 Household structures in Gumare

3.4.2 Administrative profile of Gumare

This study was conducted in Gumare village, which is the headquarters of the Okavango Sub-district. The majority of employed people in Gumare are not local residents, but come from other districts within Botswana and are employed by the government, such as teachers and hospital staff.

The Gumare Counselling Centre, which offers HIV counselling and testing, is the only non-governmental organization which is active in Gumare. The village has two primary schools, one community Junior Secondary School, one vocational training institution (Brigade), nine churches, one clinic (Plate 3.5.) and one primary hospital which serves 27 villages and settlements in the Okavango district. The shops in Gumare are small general dealers which supply basic necessities, because they cannot provide a large range of products, people are compelled to travel to Maun to buy provisions.

3.4.5 Communication and Electricity in Gumare

The Botswana Telecommunications Corporations (BTC) is responsible for communication systems, such as telephones and internet connections. Gumare is supplied with electricity from Namibia, However, due to frequent electricity interruptions; these communications systems are very unreliable. Tariffs are high and electricity connections very expensive, each costing P5000.

3.5 THE RESEARCH PROBLEM

According to the Department of Women Affairs (1998), women are more affected by poverty than their male counterparts. In an effort to minimise these disadvantages and reduce poverty, the government of Botswana has implemented policies and strategies to address the problems among women and the underlying causes, such as women's heavy workload and unequal access to economic resources and decision- making. However, these government initiatives have not been successful since statistics show that out of 450 destitute families in Gumare Village registered to be provided with a monthly food basket in the year 2005, 300 of them were single women with children (Department of Social and Community Development, 2005).

It is evident that female-headed families in Botswana are more affected by food insecurity than men, with 47% of them living in abject poverty. Programmes such as the Arable Land Development Programme (ALDEP) and the Financial Assistance Programme (FAP) that have been designed to ensure sustainable livelihoods, do not meet the needs of the households. Women have difficulty accessing these programmes due to lack of resources such as land, consequently food insecurity continues to affect female-headed households, despite government support.

Ngwenya & Mosepele (2007) also suggest that to deal with food insecurity, people in the Okavango need to adopt different coping strategies to manage food shortages. These strategies include cutting down the number of meals consumed in a day, reducing meal portions, asking for food from relatives, gathering wild foods and asking for assistance from the government.

This study is crucial to establish the extent of food access among these rural households in Gumare and to document the coping strategies that are used to deal with these food shortages. This type of study has never been conducted in this area and the outcomes from this study could be used by government to address the pressing welfare needs of the people in Gumare.

3.6 RESEARCH DESIGN

A qualitative and quantitative survey was chosen as the research design for this study. Three questionnaires were used to collect data:

1. A socio- demographic questionnaire to collect the demographic data.
2. An internationally standardised Household Dietary Diversity Questionnaire, (HDDS) to establish food variety
3. An internationally standardised Coping Strategies Index questionnaire to establish how households deal with shortages of food.

3.7 SAMPLING

The sample used for this study were unemployed single mothers aged 21-39 years with children aged 0-9 years living in Gumare village. Snowball sampling was used as a non-probability sampling method to select 50 mothers. In this method, a few single female-headed households, which met the criteria of the study, were identified and the women were asked to direct the researcher to other similar households. This method was found to be useful, because, even though it was not difficult to find female headed households with children, it was more difficult to find unemployed female-headed households with children from age 0-9 years. The clinic records, which could have led the researcher to these households, did not have information on whether those children, who were brought for monthly growth monitoring, were from female-households.

3.8 DATA COLLECTION METHODS

Three questionnaires were developed and piloted for use during the structured individual interviews, there were administered by the researcher to accommodate those respondents who were illiterate.

1. A socio demographic questionnaire, developed by the researcher, was employed to establish the socio-demographic status of the households. This questionnaire documented details such as household size, age of mothers, marital status and income sources (Appendix A).
2. The international standardised Household Dietary Diversity Score questionnaire was used to identify the variety of foods from fourteen food groups consumed by the households over the previous 24 hours. The fourteen food group questionnaire, an expanded format of the HDDS questionnaire,

covered more specific information on foods of special interest such as Vitamin A-rich foods and iron-rich foods. After the above foods had been identified, the fourteen food groups were collapsed into nine food groups, for the findings to be compared with other studies conducted in South Africa (Swindale and Bilinsky, 2006). The HDDS questionnaire was contextualised to reflect the culture, food consumption patterns and specific foods commonly consumed (Appendix B).

3. The international standardised Coping Strategies Index (CSI) was used to determine the coping strategy behaviours of members of the household regarding food shortages (Maxwell *et al*, 2003). The CSI was also contextualised for Gumare, to include government welfare programmes (Appendix C)

Both the Household Dietary Diversity Questionnaire and the Coping Strategies Index have successfully been used in Africa and found to yield reliable results (Maxwell *et al*, 2003). To ensure validity and reliability and to test for probable errors or misunderstandings, all three questionnaires were given to four other single women, as a pilot project.

3.8.1. Ethical concerns during data collection

The people in Gumare village still live in a traditional setting, where cultural beliefs and practices are followed. In recognition of these traditional bonds, consultation with the chief and other leaders of the village took place to obtain permission for the study to be conducted in their village (Appendix C). Other government departments such as Social and Community Development were approached and permission requested (Appendix D). The purpose and importance of the study was explained to all involved.

The sample of 50 respondents was informed of the objectives of the study and made aware of their rights with regard to their participation in the study. To ensure privacy and confidentiality of the respondents, the researcher used codes instead of names on the questionnaires. Participants were given the opportunity not to participate in the study. Those that agreed signed the Ethics Letter of Informed consent (Appendix F).

3.9 DATA ANALYSIS AND PRESENTATION

The Microsoft Excel program was used to capture and analyse the data. The Excel program provided the data in the form of frequencies and percentages.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter deals with the analysis and discussion of data collected on dietary diversity, food access and the coping strategies applied by single mothers with children under the age of 9 years to handle food shortages.

4.2 SOCIO-DEMOGRAPHIC DATA

4.2.1 Size of household

Table 4.1 indicates the distribution of household size of the 50 participants from Gumare village in the northern Okavango area of Botswana. Three hundred and seventy people resided in these 50 households, with 127 women (average 2.5 per household) and very few males (0.54 averages). The total number of children under 9 years of age in the households was 216 (average 4.32 per household).

Table 4.1 Frequency distribution and average household size of the 50 single mothers in Gumare village

HOUSEHOLD MEMBERS RESIDING IN EACH OF THE 50 SAMPLED HOUSEHOLDS	TOTAL NUMBER OF RESIDENTS PER 50 HOUSEHOLDS	AVERAGE NUMBER PER 50 HOUSEHOLD
Total number of adult females	127	2.54
Total number of adult Males	27	0.54
Total number of adults	154	3.08
Total number of children	216	4.32
TOTAL number household Members	370	7.4

This study documented that there were a high number of children in all the households (216 children), possibly due to factors such as high death rates of parents as a result of HIV/AIDS. In Botswana surveys have recorded 24.9 % HIV/AIDS prevalence among adults aged between 15 and 49 years, making the prevalence of this disease in Botswana one of the highest in Sub-Saharan Africa.(Wikipedia, 2007). The high prevalence of HIV/AIDS has resulted in a large number of orphans in Botswana, with 120 000 (75%) children now without parents (Ministry of Local Government, 2008).

Another factor that would account for the high number of children per household could be that traditionally, a single Motswana female is more likely to have at least one child by the age of 25, whereas a male usually starts fathering children at around 30 years (Department of Women Affairs, 1998). Currently the cultural beliefs of Botswana society have changed and women who have children outside wedlock are not discriminated against. Furthermore, the African culture in this region puts pressure on women around the age of 20 years to prove their fertility, thereby increasing their eligibility for marriage. Men only father children at a late stage in life, at around 30 years, because men are expected to prove their fertility later in life.

4.2.2 Age of mothers and children

The distribution of age ranges for the single mothers is shown in Table 4.2.1. It indicates that 54% of the mothers fall in the 30-39 range, with the majority of respondents (90%) being between the ages of 26 and 39 years.

Table 4.2.1 Frequency and percentage distribution of participant mothers according to age range

AGE RANGE	<i>f</i>	%
20-25	5	10
26-30	18	36
30-39	27	54
TOTAL	50	100

The distribution of age among the children under 9 is indicated in table 4.2.2. The sample indicates a fairly equal spread between the age groups.

Table 4.2.2 Frequency and percentage distribution of children according to age in the 50 households

AGE RANGE	<i>f</i>	%
0-3	11	22
3-5	14	28
5-7	16	32
7-9	11	22
Total	52	104

4.2.3 Education level of mothers

Table 4.3 Indicates that single mothers have a fairly low literacy level, with 28% of women having no form of education and 72% only some form of education. The formal education categories were: Non-formal, Post-secondary, Senior Secondary, Junior Secondary, Completed Primary and some Primary. In a governmental survey in Botswana a similar high illiteracy rate was documented among the general population of Ngamiland district (Ministry of Local Government, 2009).

Table 4.3 Frequency and percentage distribution of education level of mothers

Education level of mothers	<i>F</i>	%
Non –formal	1	2
Post –secondary	2	4
Senior Secondary	3	6
Junior Secondary	15	30
Completed Primary	7	14
Some Primary	8	16
None	14	28

Though the Government of Botswana has introduced different strategies and policies that are aimed at ensuring that women have equal access to education, challenges such as heavy work loads and other social pressures such as caring for the sick, abuse and teenage pregnancy that expose girls to HIV/AIDS, block educational opportunities for young women in Botswana (Ministry of Labour and Home Affairs, 2005).

Other studies show that even though education is a basic human right, 60% of women and girls in Botswana have no access to education. This could be an indication of discriminatory customary attitudes towards women, early marriages and a lack of school facilities. Another factor is increased teenage pregnancy, despite the sex education introduced in schools to deal with high (9%) school dropouts. Domestic chores of girls also interfere with their school work, contributing to poor performance and eventually to dropping out of school. To deal with these issues that hamper women's progression in education, the government of Botswana has introduced programmes such as the 1994 revised National Policy on Education, which states that all children should be provided with free basic education for ten years (Teachers Employment, 2009).

4.2.4 Marital status of mothers

In this study, the results on marital status in table 4.4 show that 82% of women are in the category of single without partners, while 14% are widowed and 4% divorced. The criteria for this study were single mothers with children under nine, living without a partner, widowed, divorced or never married. This sample therefore represented female-headed households living in a rural area of the Okavango delta where the government has become aware of extreme poverty and challenges in these households (Department of Culture & Social Welfare, 1995).

Table 4.4 Frequency and percentage distribution of marital status of mothers

Marital status of mothers	<i>f</i>	%
Widowed	7	14
Divorced	2	4
Married without partner	0	0
Single without partner	41	82

Recently, the marriages in Botswana have decreased, with only 34% of the total population of women aged above 20 years ever having been married. Single female-headed families have therefore become a significant part of Botswana culture. With this decline of the institution of marriage, single women without partners are now burdened with all the family responsibilities (Department of Women Affairs, 1998).

In Africa, factors such as male migration, death of males in civil wars and family disruptions have resulted in the increase in female-headed households. Most of these households are poor as they do not have access to land, livestock, credit, health care and extension services. Similarly, in Eastern and Southern Africa, 25%-60% of households are headed by single women. In Zimbabwe surveys showed that 30-50% of female headed households have smaller land holdings than male headed families, a common scenario also found in Malawi and Namibia (International Fund for Agricultural Development, 1999).

4.2.5 Household income

The majority of female-headed households in this study were receiving government welfare support, and were thus classified as destitute. Even though the government of Botswana has rehabilitation programmes to equip beneficiaries of the destitute programmes with relevant skills, knowledge and motivation to engage in sustainable economic and social activities for self reliance, many of the households classified as destitute are not utilizing these rehabilitation programmes. Some people find it easier to get food rations rather than to work, while others find it difficult to meet the challenges of entrepreneurship such as finding markets to sell their products. The result is a high dependence on food rations and other welfare support systems from government. This dependence on welfare support and the rapid increase in registered destitute people can be a result of a reluctance of these women to engage in economic rehabilitation. This is exacerbated by a lack of employment opportunities and a high unemployment rate in this area (Ministry of Local Government, 2002).

4.2.5.1 Income sources from Government programmes

The results of this study in Table 4.5 are supported by the findings of the Ministry of Labour & Home Affairs (2005) that female-headed families have fewer economic resources and lower incomes than male-headed households and therefore likely to be poorer.

Table 4.5 Frequency and percentage distribution income from Government sources

Government sources of income	<i>f</i>	%
Government drought relief projects	6	12
Destitute monthly cash vouchers & food baskets	29	58
Pension	4	8

The major source of income for many households in Gumare is the monthly Botswana Destitute Government Monthly Cash Voucher, which contributes 58% of the total household income. In Botswana, a destitute person is classified as any individual who, due to any form of disability, old age or terminal illness, is unable to engage in economic activities and has a limited or an unreliable source of income. This group includes children who are below 18 years and who have no proper care, due to death or terminal illness of a parent (Ministry of Local Government, 2002).

4.2.5.1.1 Food baskets and cash vouchers

In this study, 58% of the households were welfare households and dependent on government food baskets for their food security. Each destitute person is given both a cash component and a food basket. The criteria to qualify for receiving food baskets are based on socio economic status, namely:

- not having any source of reliable income
- income not exceeding P120 (R134.40) without dependants or P150 (R168)with dependants;
- not owning more than 5 cattle
- not physically fit to engage in any economic activities

In this study, those households who did not receive food baskets (42%) did not qualify for this support, because they depended on small-scale crop production. Many of these households have small fields in which they plant crops such as millet, melons and beans. Some households relied on food handouts from relatives (10%) and money handouts (2%) from friends and relatives, whilst 16% of the households purchase food. Only one household depended on small-live stock as a source of food, such as goats and chickens.

The cash component which is given to destitute households per month is P80.00 (equivalent to R105.30, 2008 rates). The purpose of the cash component is to provide money for purchasing those items that are not provided in the food basket, and to restore some human dignity and pride. Cash vouchers are distributed to all who receive a food basket.

4.2.5.1.2 Pensions

The government of Botswana provides elderly people from 65 years of age with an old age pension. Individuals who qualify are requested to have a valid Botswana identity card, who do not receive old-age pension from another country. The persons are also expected to register with Department of Social Services (Ministry of Local Government, 2003). The old-age pension allowance is P180 per month, equivalent to R 234. Table 4.5 shows that 8% of the households received a government pension.

4.2.5.1.3 Drought relief

In this study, government drought-relief projects contributed 12% to the total income. These drought-relief projects are used as a poverty alleviation strategy during times of drought to assist citizens who are unemployed and have financial difficulties. The projects which are usually included in such a programme are construction of houses for government workers, offices, traditional shelters and connections of standpipes to supply water (Department of Finance and Development Planning, 2007).

4.2.5.1.4 Non-governmental income of households

The non-governmental sources of income (Figure 4.1) for these women include informal employment in the form of piece jobs, such as picking up litter and home laundry and provided 36% of the household income with small businesses contributing 20%.

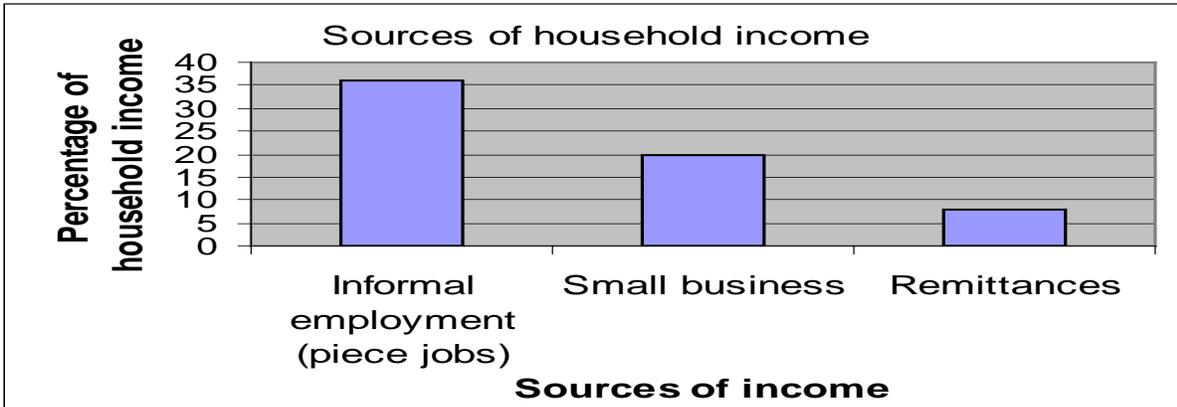


Figure 4.1 Percentage distribution of non-governmental household income for female -headed households

4.2.6 Living conditions

4.2.6.1 Sources of power

4.2.6.1.1 Fuel for cooking

The Okavango district is a rural area and wood is a basic source of domestic energy. Figure 4.2 indicates that wood is used as fuel for cooking by 96% of the households, gathered from the veldt. Wood is the major source of power supply, which is used mainly in cooking, whereas only 4% of the households use paraffin (2%) and gas (2%).

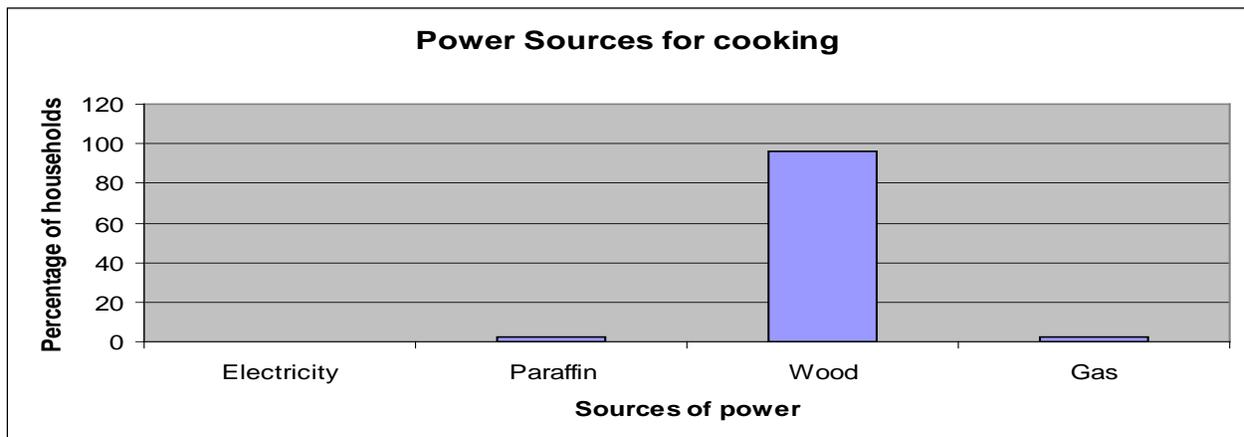


Figure 4.2. Percentage distribution of power sources for cooking

4.2.6.1.2 Power sources for lighting

In this study Figure: 4.3 indicates that candles are the most common source of lighting, with 54% of households using them for lighting. Candles are inexpensive and readily available. There is only one fuel station shop which supplies paraffin to the whole of Gumare village, and only 40% of household use paraffin for lighting.

Despite electricity being accessible in Gumare, findings show that it is used by only 3 households. This is probably due to the very high cost of electricity connections (P5000 or R5500, 2008) and high electricity tariffs (Botswana Power Cooperation, 2009).

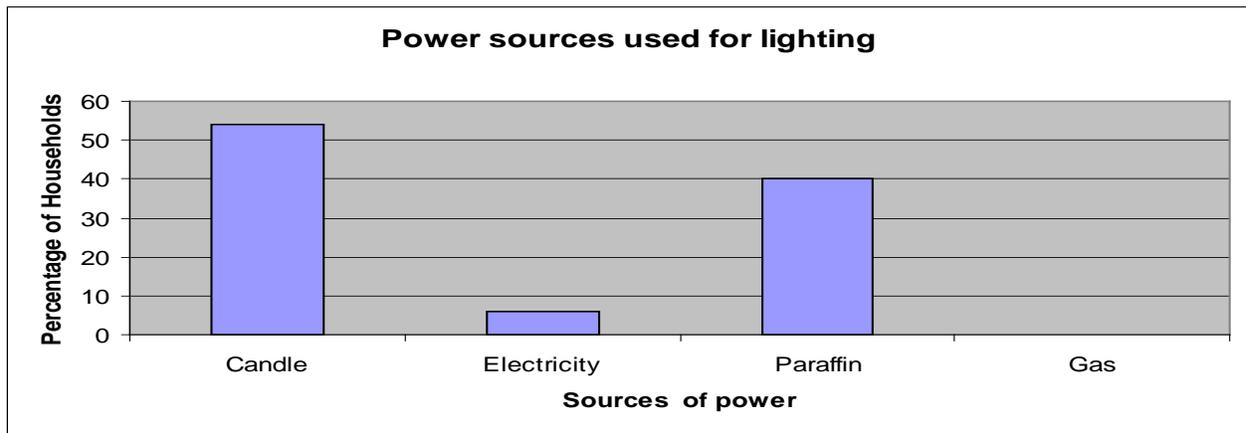


Figure 4.3 Percentage distribution of power sources used for lighting

4.2.6.2 SOURCES OF WATER

The results show that many households have access to clean and safe drinking water, with 84% of the households using public standpipes, while 16% of the households have private taps (Figure 4.4). The government provides clean water through public taps which are installed in public places that are easily accessible by the community. None of the households used drinking water from the river or a borehole.

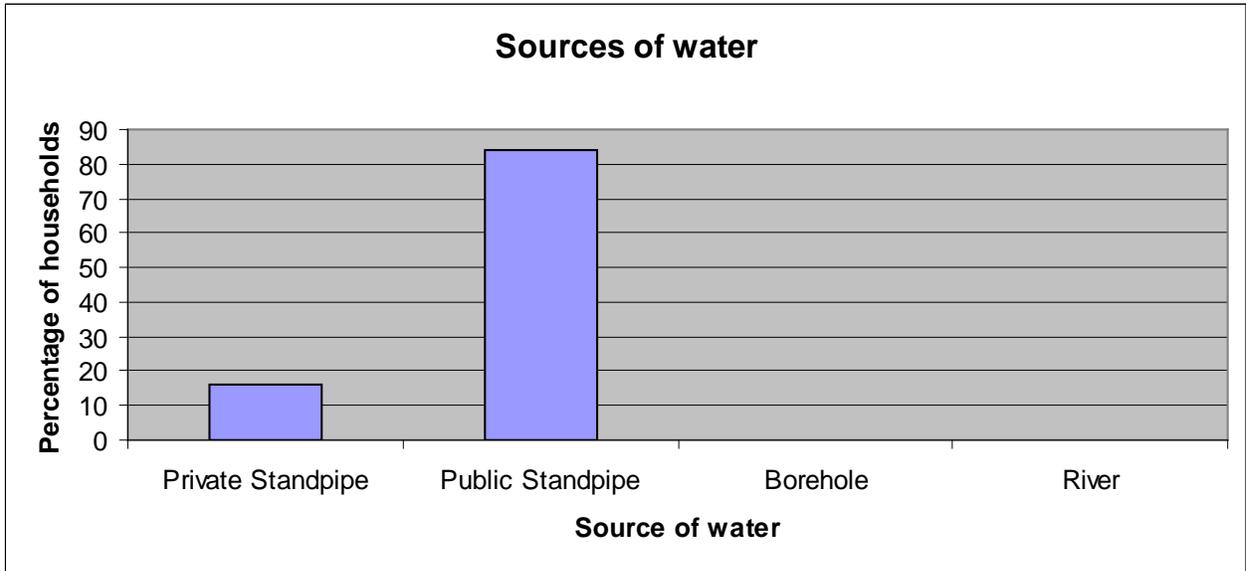


Figure 4.4 Percentage distribution of water sources

4.2.6.3 Sources of food

4.2.6.3.1 Household food gardens

This study shows that even though households have access to water provided by councils, only 2 % of the women cultivated their own vegetable gardens (Table 4.5). This may be due to a lack of proper skills in caring for and cultivating vegetables, poor storage of harvested food and the negative impact of high daily temperatures and unreliable rains in the Northern area of Botswana. Water that is used for gardens by the households is collected from public standpipes which are far from their houses.

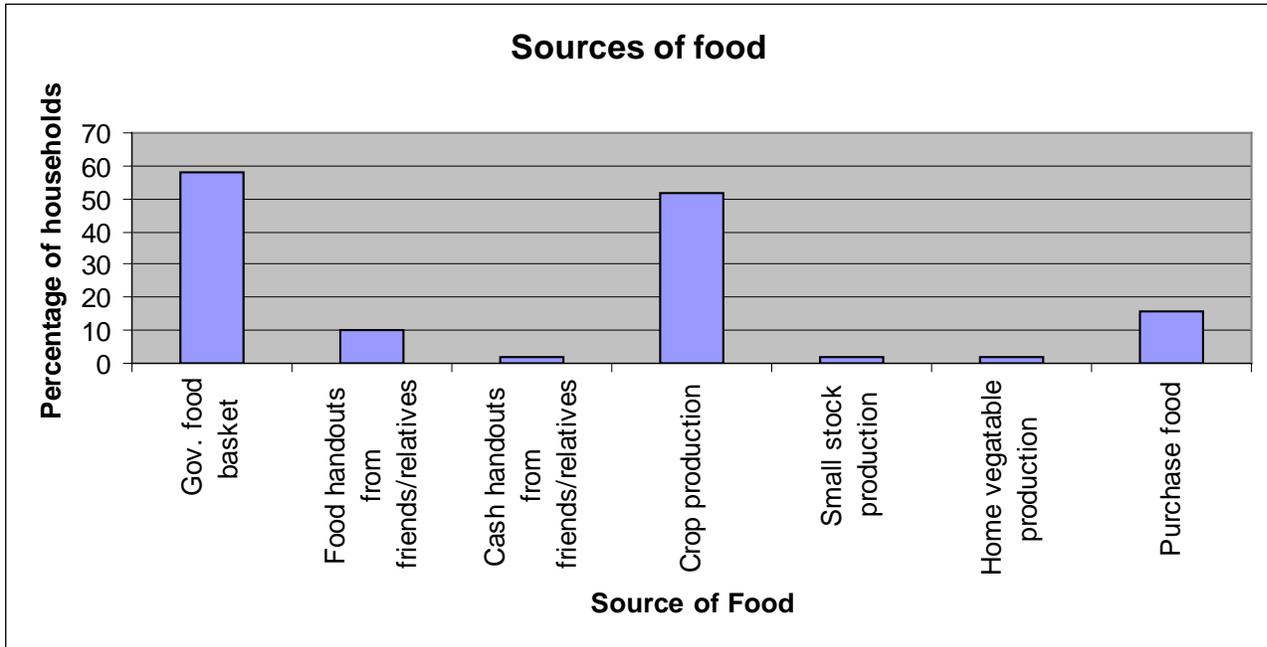


Figure 4.5 Percentage distribution of food sources

4.2.6.3.2 Indigenous foods

Frequently, food that is preferred by a community is influenced by the culture and beliefs of that particular group of people (Mugabe, Gobotswang & Holmboe-Ottesen, 1998). This study (Figure 4.6) shows that most of the foods which are commonly consumed in the households are those where the community have a traditional attachment to cultural beliefs largely influence eating habits, The Bayeyi, Bambukushu, Batawana and Baherero tribes in the North–Western part of Botswana eat Tswii, the root of the water lily. Maere (sour milk) and dried fish are some of these tribes’ indigenous foods. Tswii and fish form part of their diet because of the perennial rivers that run through the region (Bogopa, Brandon & Mohango, 2006).

The importance of indigenous foods as a food source in this study is indicated in Figure 4.6. The results show that 98 % of households are dependent on indigenous foods for subsistence or income generation. Indigenous foods in the Gumare area are gathered from the veld from May to October and are consumed by the households and sold to the local community. These include veld products such as Tswii (water lily) which is harvested in the delta, fruit -bearing trees such as Mongongo, which produces nuts, and the baobab tree which produces mowana fruit. However, this study only reflects data collected in July and

August. It has to be noted that most of these products are seasonal, hence they appear in abundance during rainy seasons, as is the case with Tswii (water lily).

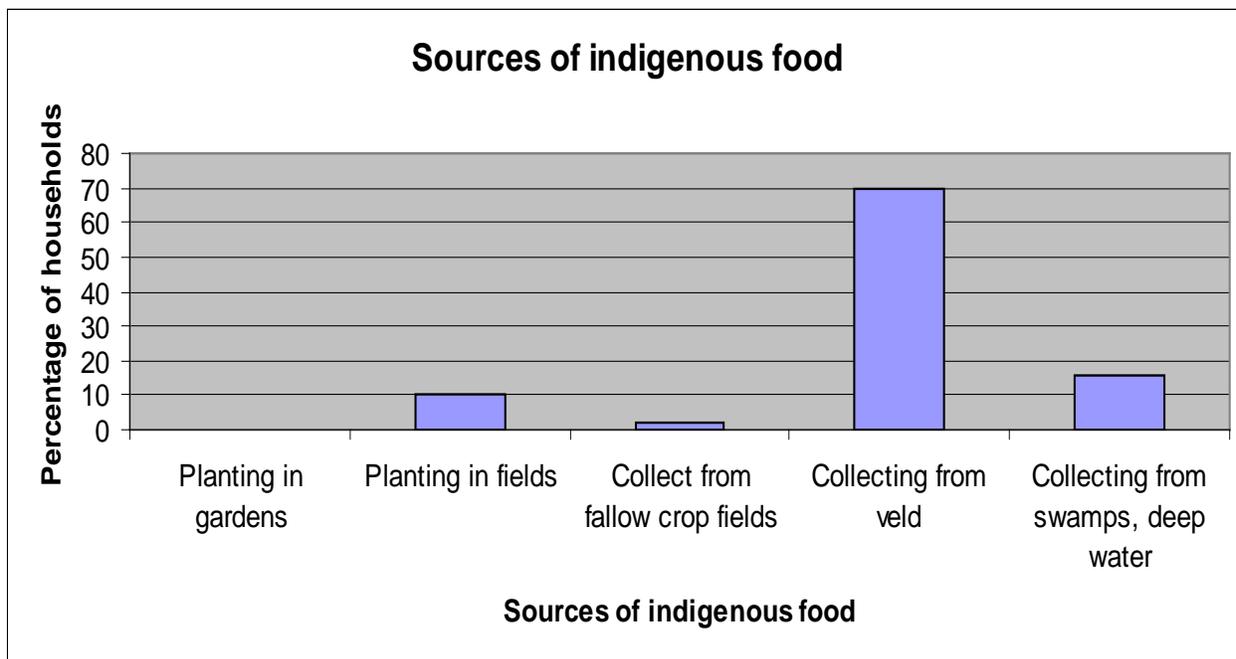


Figure 4.6 Percentage distribution of indigenous foods

4.3 DIET DIVERSITY FOR HEALTH

4.3.1 Introduction

Dietary diversity is an important component of a high-quality diet, since a diverse selection of foods promotes good health through availability of different nutrients in a variety of food.

The major finding in this study is a score of 2, which is well below 4 as recommended as a cut-off point for dietary quality (Steyn *et al.* 2006). This finding indicates that the diversity of foods consumed in these households is very low and pointing to diets of low nutrient quality, and by proxy, restricted food access and susceptibility to food insecurity.

In the study of Steyn *et al.* (2006) in Limpopo, using a 9 food group classification, it was suggested that any diet diversity value below 4 would be an indication of a poor consumption of a variety of foods with low

nutrient quality and resultant micronutrient deficiencies. Steyn *et al.* (2006), suggest that a dietary diversity score above 4 is a good indicator of diet quality.

The findings regarding foods consumed from the 9 food group questionnaire are indicated in figure 4.7 below.

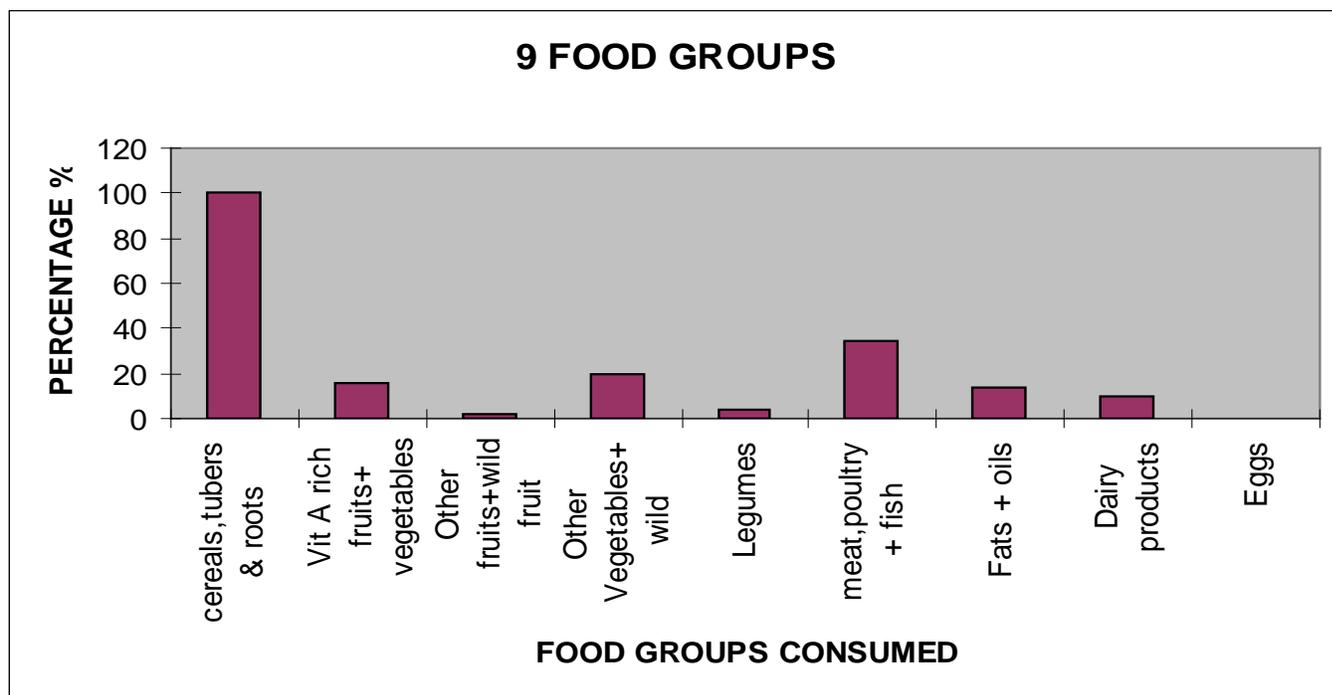


Figure 4.7 Food consumption from 9 food groups

4.3.2.1 Consumption from the food groups

Fortified cereals can benefit households, especially if they are consumed frequently, as they contain valuable micro-nutrients such as iron and B-vitamins (Winichagoon, 2008).

Figure 4.7 show that 100% of households consume cereal every day. These cereals are mainly maize and millet, which are easily accessible as they are grown locally. At the beginning and the end of the ploughing season there is a varying dietary diversity therefore accessibility of food is effected. Savy *et al.* (2006), show that when there is a cereal shortage in Africa, which is usually in September, the dietary diversity is at its lowest, while when compared to April which is in a rainy season, there are enough cereals and other

foods. During the periods when there are food shortages there is a higher dependence on leguminous and wild foods by households.

In most rural areas in developing countries, the poor consume large amounts of staple foods. A predominantly starch-based diet of cereals, roots and tubers is frequently found amongst poverty-stricken populations, resulting in a dietary intake low in micro-nutrients. Micro-nutrient intake can only be sufficient if vegetables, fruits and animal products are combined with these staple foods (Fewster, 1975).

A study on diet diversity that was conducted in eleven countries, namely Rwanda, Zimbabwe, Nepal, Peru, Nepal, Mali, Malawi, Haiti, Ethiopia, Colombia, Cambodia and Benin, showed that diet diversity for children was vital for the children’s mental and physical development, and optimal growth (Arimond & Ruel, 2004). These households depend mostly on staple foods such as cereals and low food diversity was widespread among poor households in these countries, probably since they cannot afford a variety of foods. However, cereal cultivation can be modified either through hybridization, or the use of fertilizers or genetic engineering to improve their micronutrient content (Gibson & Hotz, 2007).

4.3.2.1 Types of cereals consumed

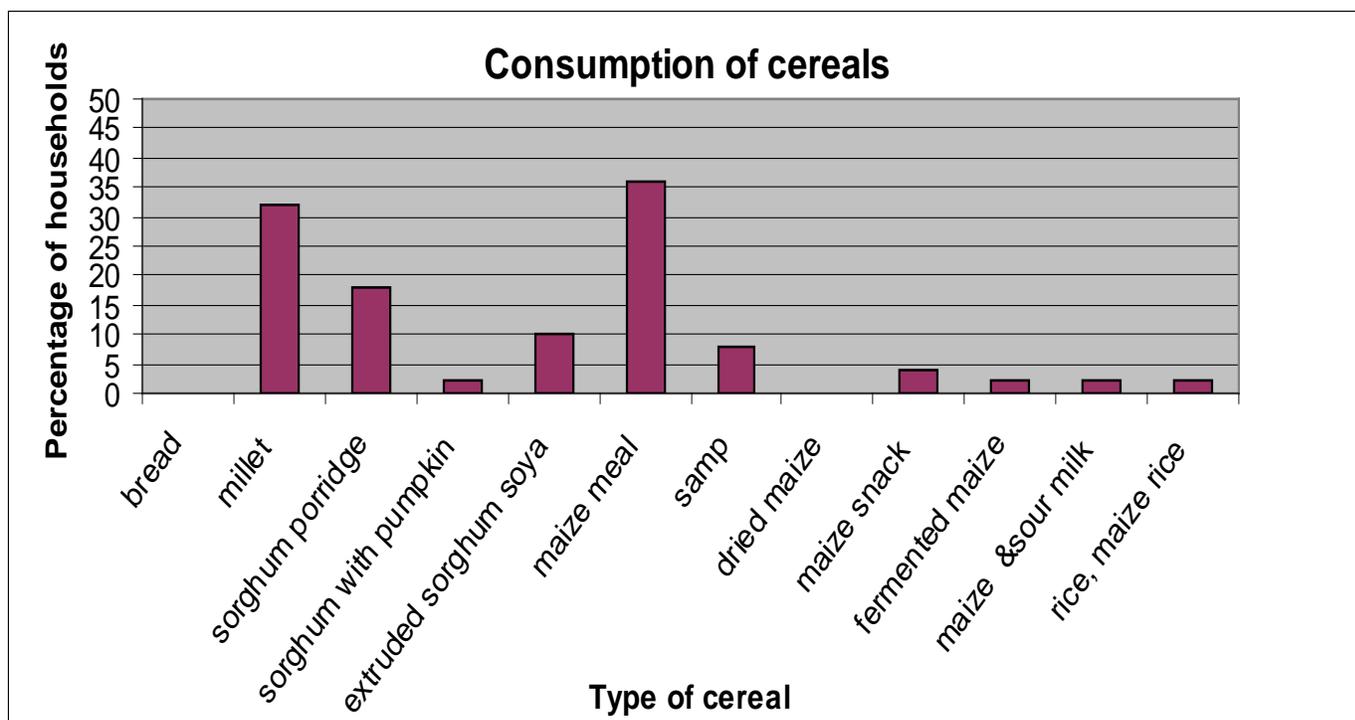


Figure 4.8 Percentage distribution of different types of cereals.

- **Millet (*Bogobe jwa Lebelebele*)**

The results of the study indicate that 32% of households consume millet (Figure 4.8). Millet is a major cultural food in the Okavango, especially among the Hambukushu tribe. Millet is usually consumed as a stiff porridge or soft porridge.

- **Sorghum**

In this study many sorghum products had a high consumption (30%). Consumption of specific sorghum products included: 18% for non-fermented soft porridge (motogo), 2% for semi-stiff porridge (bogobe) and 10% for extruded sorghum Soya meals (Tsabana) (Figure 4.8).

Sorghum is one of the major staple foods in many Sub-Saharan countries due to its good yield, despite the harsh environmental conditions of Africa (Gibson & Hotz, 2005). Sorghum is regarded as the main staple food of Botswana and is widely grown in the Okavango district since it is drought resistant. It can be consumed in the form of soft porridge or stiff porridge which can be eaten with beans and pumpkin (Mugabe, Gobotswang & Holmboe-Ottesen, 1998). The consumption of sorghum products is greatly influenced by culture, age, household size, educational level, gender and residential area, and is commonly accepted by different communities in Botswana (Kebakile *et al*, 2003).

Since sorghum is a staple food for 500 million people in Africa and Asia, researchers are working towards fortifying sorghum, in order to improve its nutritive value. The enriched sorghum will provide increased calories and proteins needed by the body, therefore consumption of Sorghum is crucial. (Greensfelder, 2006).

Consumption of sorghum in Africa has been negatively affected by different factors such as unavailability of sorghum products, poor marketing and processing techniques, rapid rates of urbanisation, inadequate domestic structures and the amount of time and energy required to prepare food based on sorghum (FAO, 1988). In Botswana consumption of sorghum-based foods has decreased over the last two decades due to the traditional processing of sorghum which is more time consuming and expensive, At present it appears that people's preferences seems to be shifting from sorghum to millet (Hulse,1985).

- **Sorghum porridge with pumpkin (Bogobe jwa Lerotse)**

This is a cultural dish prepared using sorghum and traditional pumpkins that are grown locally in the fields. However, in this study only a single household ate this dish, possibly due to pumpkins not being in abundance as it was not ploughing season when the study was conducted (Figure 4.8).

- **Sorghum porridge (Bogobe jwa Mabele)**

Sorghum porridge is a popular dish among all communities in Botswana and in this study 18% of the households consumed sorghum porridge made from ground sorghum and boiled water. The dish is usually eaten at breakfast or supper (Kebakile *et al*, 2003).

- **Tsabana: extruded sorghum plus Soya meal**

Tsabana is a weaning food that has been developed in Botswana to address protein and energy malnutrition among children. This weaning food is made of a mixture of sorghum and soya meal that is fortified with minerals and vitamins. The weaning food is provided to children under five years old at no cost at health clinics every month, when the children are brought in for growth monitoring (Mugabe, Gobotswang & Holmboe-Ottesen, 1998). However, though the weaning food is given free by the government of Botswana, the results of this study show that only 10% of the households consumed Tsabana. This may be due to Tsabana not always being available at the clinics and the fact that some parents do not take their children for monthly monitoring.

- **Bread**

The findings of this study show that none of the households consumed bread. This could be because bread is very expensive, with a loaf of bread costing P9.00 (R10.80). Other than the existing bakeries, those who sell bread have to buy and transport it from Maun, which is 245 km from Gumare village. Bread flour that is used in Botswana is imported from other countries therefore it is not always available or affordable. Dumplings, fat cakes, flat cakes and roasted breads are some of the dishes that can be prepared from bread flour (<http://www.botswanaembassy.or.jp/culture/body5.html>).

Maize Consumption

- **Stiff maize meal porridge (Phaleshe)**

The results show that 36% households consumed maize meal porridge, commonly taken as a breakfast dish or a main meal. Maize meal is also included in the Government destitute food basket therefore these households have immediate, inexpensive access to maize. The high consumption of maize may be also due to price control by the government of Botswana on all cereal foods. Cereals are considered to be basic foods by the government of Botswana, therefore they are available at a reasonable price.

- **Osopa fermented Maize meal with sour milk and Mageu (fermented Maize meal)**

Osopa, a dish made from fermented maize meal with sour milk, is a traditional dish commonly eaten by the Baherero tribe, who live in large numbers in the Okavango region, while mageu is a dish frequently eaten by the Tswana-speaking group. Unlike Mageu, Osopa is made from maize meal and sour milk, while mageu is made from maize meal and water or fresh milk. In this study however, only one of the households consumed Osopa and one Mageu. At present there is shortage of sour milk in the area due to an outbreak of foot-and-mouth disease.

- **Samp**

The results showed that only a few households consumed samp (8%), which is made from pounded maize. The pounded maize is usually eaten with or without beans, but it can be eaten without any accompaniments or it can be served with butter or fat, beef, lamb, fish or poultry. This low consumption in Gumare may be due to the fact that the maize harvest from the last ploughing season had already been consumed when the study was conducted. Another possible explanation is that samp requires long, slow cooking for several hours, resulting in many households excluding it from their diet in order to save energy.

- **Dried maize (Letshotlho)**

This preserved maize is prepared after harvest, with the maize boiled until it is dry. The main reason for drying the maize is to preserve it so that it can be consumed later, when food is not in abundance. The

results show that none of the household consumed it, probably due to dried maize not being available during the collection of research data.

- **Kabu (Maize eaten as a snack)**

This snack is prepared by boiling fresh maize. However, only 2% of the households consume Kabu, again because fresh maize was not available during the time of data collection

- **White tubers and roots**

Tswii is a tuber-like vegetable found in the North West district of Botswana that is commonly consumed in Okavango where it grows in the deep water of the Okavango Delta. It has to be noted though that most of the households did not include Tswii as part of their diet during the study due to its non-availability. Tswii is seasonal and only available between April to June.

4.3.2.2 Consumption of pulses and nuts

Legumes are commonly consumed in developing countries such as Africa, Latin America and Asia. Legumes are a very important part of the diet as they are a good source of plant protein and are used to complement cereals, starchy roots and tubers. The majority (62%) of the households in this study consumed legumes, with only 38% not consuming cowpeas. This may be due to the fact that the major source of legumes would be from the food basket.

4.3.2.3 Consumption of meat, poultry and fish

- **Flesh Meat**

The results show that within the protein group, 28% of the households consumed flesh meat, with only 2% consuming organ meat purchased from local butcherries. These results could indicate a serious iron-deficient dietary intake. None of the households consume chicken since many households do not keep traditional Tswana chickens. The rearing of Tswana chickens is not a common practice among the Herero, Hambukushu and Wayeyi tribes in the Okavango.

Even though meat is the major source of animal protein food of high quality, 70% of the households do not include meat in their diet, as a result of limited availability, since the government of Botswana has restricted movement and slaughtering of cattle, because of the outbreak of foot and mouth diseases in the area, resulting in an increasing price of any kind of meat in the area.

- **Fish**

Fish is abundant in the delta of the Okavango District, but according to this study, 96% of the households in Gumare village did not consume any type of fish. However, this study was conducted during the dry season, and fish was not available since the small delta streams that supply the village with water had dried up. The Okavango people largely depend on fish, which is not always available due to its seasonal nature, resulting in a shortage of food that coincides with those months when fish is not available.

Another contributing factor to poor fish consumption is the recent introduction of fishing licences by the government of Botswana, which people are required to buy in order to catch fish. A licence for fishing cost P200.00 and must be renewed every 3 years. As this licence is expensive this has affected fresh fish consumption (Department of Wildlife and Tourism, 2008).

4.3.2.4 Consumption of eggs

None of the households consumed eggs, probably due to eggs being expensive to purchase and the culture of rearing chickens for egg production is not a common practice in the Okavango.

4.3.2.5 Consumption of dairy products

Only 10% of households consumed sour milk, with none drinking fresh milk. The low availability of drinking milk currently in the Okavango District can be as a result of the outbreak of food-and-mouth disease and subsequent culling of cattle, people are also unable to get milk from cattle posts. Sour milk is not traditionally consumed in the Okavango, since it is Herero tradition.

4.3.2.6 Consumption of fats and oil

In the food group of oils and fats, 14% of households use oil in the recipe for Mangwinya (fat cakes). The low percentage of Mangwinya is due to that flour is expensive and only a few households who had flour were able to make Mangwinya.

4.3.2.7 Consumption of vitamin A rich fruits and vegetables as a source of micro-nutrients

- **Vitamin A**

The micro-nutrient quality of a diet is determined by using the expanded 14 food groups which provide data on specific foods of special interest such as Vitamin A-rich and Iron-rich foods (FANTA, 2008).

There are two main sources of Vitamin A, namely from plant and animal foods (FANTA, 2008). In Figure 4.9 it is evident that more plant based vitamin A foods are consumed compared with animal-based vitamin A, Where 16% of the households consume green leafy vegetables and only 62% consuming legumes. However, in the animal-based Vitamin A category, only 2% of the households consumed organ meat, while 28% of the households ate flesh meat, 4% fish, 10% milk and milk products and none ate eggs.

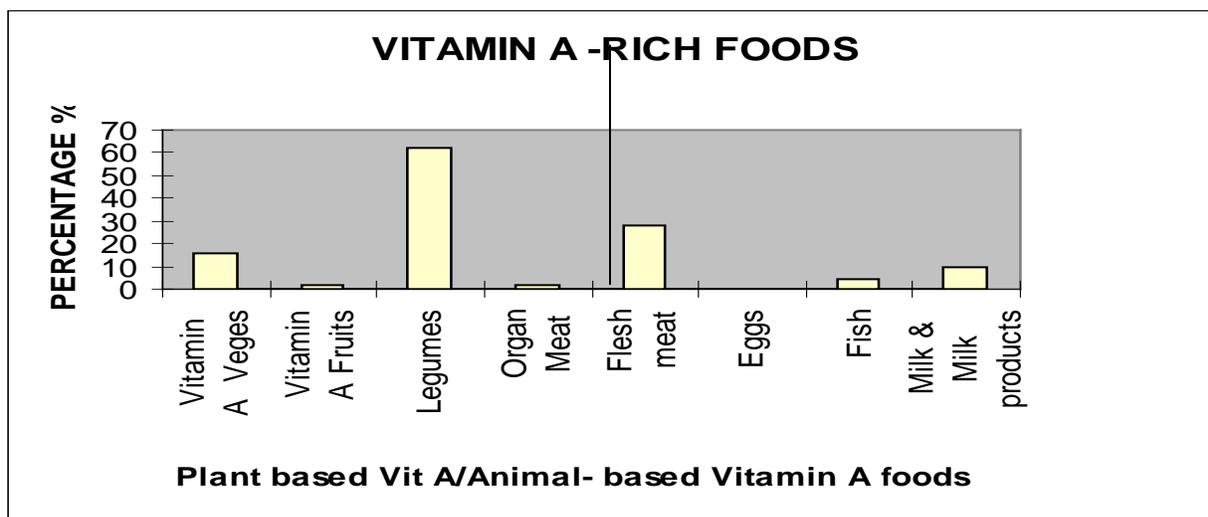


Figure 4.9 Consumption of animal and plant-based Vitamin A foods (as grouped by vertical line)

- **Consumption of Vitamin A Rich Vegetables**

In this study, data for this food group show that 16% consume dark green vegetables, with the major choice of vegetables being spinach. Spinach is bought from the local market since these households do not grow vegetables. It is possible that these households lack skills in planting, caring and storing of vegetables. The high temperatures and unreliable rains in the Northern area of Botswana also make crop production and vegetable gardening difficult.

- **Consumption of other vegetables, including wild vegetables**

Table 4.6 shows that only 20% of these 50 households consume wild vegetables, despite the fact that 68% (44% & 24%) gather wild foods as a strategy to deal with food shortages.

The data on low consumption of the wild vegetables was due to that wild vegetables were not available due to scarce rains during collection of data during. Wild vegetables that grow in Botswana are usually available in the veldt during the rainy season. Common wild vegetables found in Botswana are Thepe (pigweed), Rothwe (single-leafed-cleome), Delele (Corchorus), and Monyanku (wild striped cucumber) (Chengeta & Matlhare, 2000).

Table 4.6 Percentage distribution of wild vegetable consumption

Name of vegetable	FREQUENCY	PERCENTAGE %
Thepe (traditional wild vegetable)	9	18
Any wild vegetable	1	2

Thepe was consumed by 18% of the households. Thepe is one of the common wild vegetables culturally known in this area and has been eaten by people in Gumare for generations. This vegetable is also commonly found in fertile soils such as animal kraals. When Thepe is dried, it can be stored for more than a year; hence it can be consumed all year round (Department of Social Services, 2008).

It has to be noted though that the damaging environmental changes in Botswana are negatively affecting the availability of wild foods as some of the wild trees and tubers are slowly disappearing. Wild foods can be used to curb food insecurity within households. (<http://www.botswanaembassy.or.jp/culture/body5.html>)

- **Consumption from vitamin A - rich fruits and other fruits, including wild fruits**

Vitamin A fruits found in the Okavango, such as Mogorogorwane, Mongongo, Motsentsela and Motsotsojane fruits, are not eaten. Only 2% eat a wild fruit called Mongongo, which is seasonal and found in the Northern part of Botswana. Most of the wild fruits were not available at the time of data collection, hence the low consumption.

4.3.2.8 Consumption of iron-rich foods

Though iron is an important aspect of haemoglobin that is needed by the body for oxygen transportation and prevention of stress and diseases, only 34 % of households consumed foods which are rich in iron, such as flesh meat (28%), organ meat (2%) and fish (4%) (Figure 4.9). This low intake of iron can expose household members to anaemia (www.lifemojo.com/.../importance-of-iron-in-diet-1832992).

4.3.3 Dietary diversity and diet quality

Food variety is important to ensure a quality diet and is therefore highly recommended in national food-based dietary guidelines. The results of this study show that the households in Gumare had a poor diet quality as shown by the low score of 2.

The results of this study are supported by a study among the elderly that was conducted in Botswana to determine food diversity. It was found that a variety of foods was positively linked to physical and cognitive functioning in older adults. Clausen *et al* (2005) found that the diet of older people, living in rural areas in Botswana, had no variety due to poor socio economic status. However, it was also found that older persons who lived in urban areas and had cattle and higher education, had a greater food variety, which resulted in a desirable health outcome. Increasing the variety of foods in the diets is crucial as it is able to ensure an adequate intake of essential nutrients, resulting in good health (Ruel, 2008).

4.3.4 Food access and Household dietary diversity

Dietary Diversity can be used to monitor changes in the level of household food security and to monitor the success of interventions used to address household food insecurity. There is a definite relationship

between diversity and the various indicators of household food security, namely food access and availability (Hoddinott and Yohannes, 2002). When dietary diversity increases, there is a significant increase in food accessibility and conversely, if diet diversity is low, food access is compromised.

The major finding of this study was that the households had a very low diet diversity score. Since a Household Dietary Diversity Score is a proxy measurement for food access, the low value for diet diversity, namely a score of only 2, indicated restricted food access by households, exposing them to vulnerability to food insecurity. As a result, there is need for the households to employ some kind of coping strategies to deal with food access.

It is evident that for a household to have a diversified diet, there has to be a variety of foods from different food groups, A lack of foods from different food groups can lead to low diet diversity, with households being forced to depend on wild foods and pulses which are usually available during periods when food from other sources is not available (Savy *et al*, 2006).

4.3.5 Summary of Household dietary diversity findings

The results from this study indicate a Household Dietary Diversity Score of only 2, far below the advised cut-off point of 4 for dietary quality. Clearly female-headed households that consume a very low variety of foods are more affected by food shortages and by proxy, have limited access to food.

4.4 COPING STRATEGIES USED IN TIMES OF FOOD SHORTAGES

4.4.1 Introduction to coping strategies

The Coping strategy Index tool (CSI) is used to assess and monitor behaviour changes in relation to food shortages, through recording the different strategies that households employ to deal with poor access to food (Appendix C). The Coping Strategy Index can also be used to assess the impact of food aid on households during emergency food shortage periods and to identify those households that are more in need of emergency food aid (Maxwell, 2003).

Hoddinott (1999) states that dietary diversity and indices of coping strategies are straightforward and less expensive measuring tools. Furthermore, using indices of household coping strategies works well as the questions asked are easy to understand by both respondents and the researcher.

Coping strategies indicate inadequacy of food and vulnerability within a family. Households that are poor and likely to be destitute, use more coping strategies. This could suggest that those who use severe strategies are more vulnerable to hunger (Maxwell & Caldwell, 2008). Diet diversity can be applied as a proxy measurement for food access. A low diet diversity score will indicate poor food access therefore households need to put in place several coping strategies to deal with food shortages.

The Coping Strategy Index tool is an international, standardised questionnaire, designed to determine the number and the frequency of coping strategies that the household may employ when there is a shortage of food in the household. Some of the strategies, such as changing food consumption, reducing food portions, spending a day without a meal or sending members of the family to eat with the neighbours are used by different households to deal with food insecurity. When there is a shortage of food, people's behaviour changes in order to adapt to the food shortages. The coping strategies fall in four major categories (Maxwell, 2003).

1. dietary change: changing the household's diet by consuming less preferred or less expensive food.
2. using short-term strategies to increase their food supplies, namely to obtain food by borrowing, purchasing on credit, begging or consuming wild foods and immature crops or even seed stock.
3. reducing the number of people in the household that they have to feed by sending some of them to eat elsewhere, for example, sending children to eat with their neighbors.
4. reducing the portion sizes of meals within the household, favoring certain household members and spending a day without a meal. (Maxwell, 2003).

The analysis of the Coping Strategy Index data from this study is illustrated in figure 4.10.below

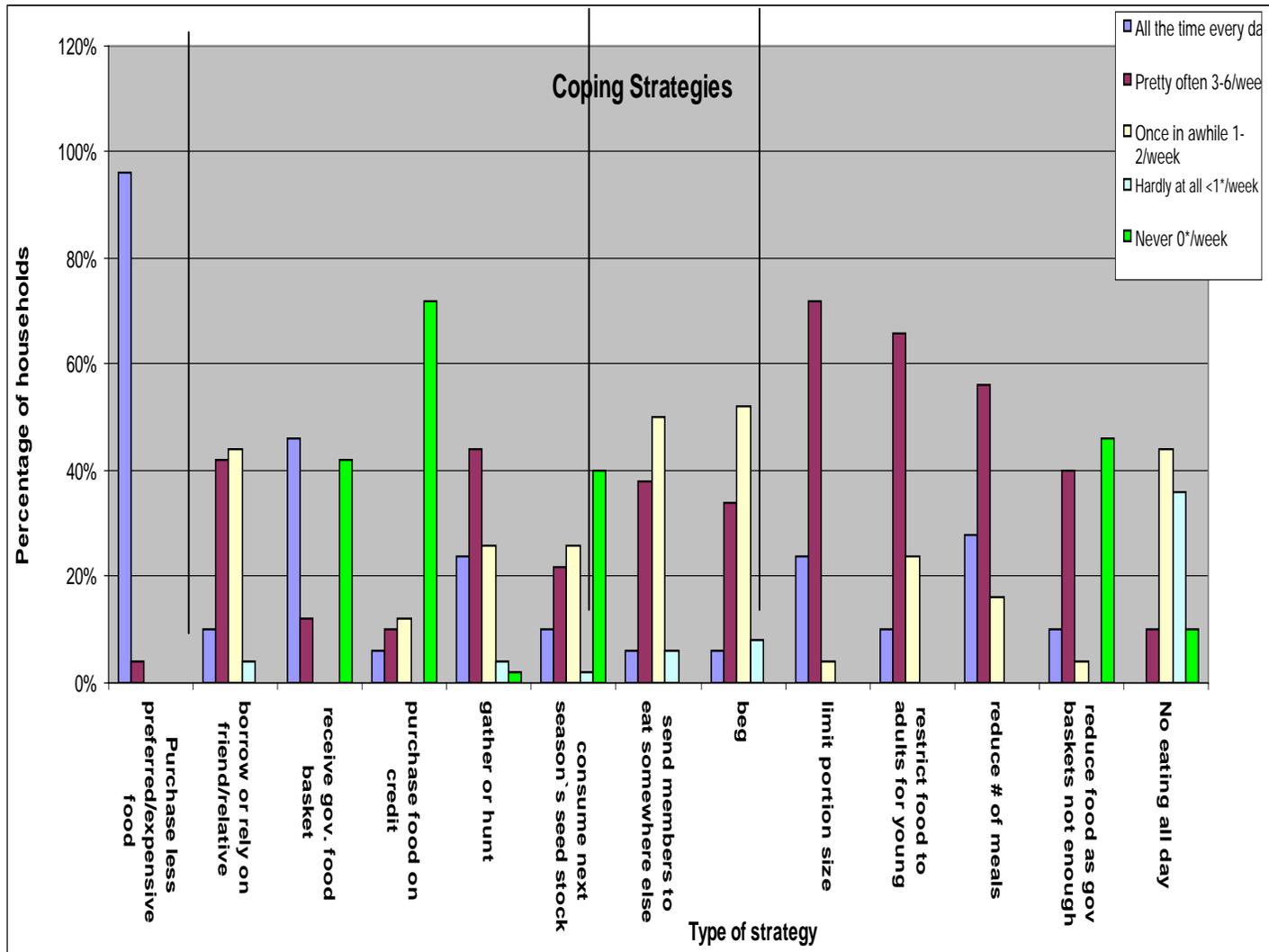


Figure 4.10: Percentage distribution of households which utilised specific coping strategies. (The four vertical lines indicate the four categories of strategies used)

4.4.2 Dietary change

4.4.2.1 Rely on less preferred and less expensive food.

The results, as shown in Figure 4.10, indicates that 96% of the household employed this type of coping strategy, namely of eating less preferred food every day, while only 4% use this strategy pretty often (3-6/week). This data reflects the findings of a low diet diversity and poor access to food.

4.4.3 Increase short term food availability

4.4.3.1 Borrow food, or rely on help from a friend or relative.

Figure 4.10 indicates that, while 10 % of the households always use this strategy, 42% of households do so pretty often and 44% households use this once in a while. Only 4% households never use this strategy.

The results of this study are supported by the findings of a study conducted in Chobe, Botswana, which revealed that 18.7% of the households borrowed food or cash from relatives as a strategy to deal with food shortages (Mugabe, Gobotswang & Holmboe-Ottesen, 1998).

4.4.3.2 Depend on a government food basket.

The household members who were interviewed revealed that 46% always depended on a government food basket each month, while 12% often depended on this support. The results showed that 58% of the female single-headed households were impoverished and classified as destitute.

4.4.3.3 Purchase food on credit

Given that so many of these households are destitute with insufficient funds to enable purchasing of food on credit, only 6% purchased food and 72% never do. This study also showed that the earnings of those women who find piece jobs are very low, with an income between P50-P150 (R56-R168). The socio-demographic data (Table 4.3) indicate that 28% of the women have no education, and thus they have limited opportunities to find paid employment in the formal sector.

The low income amongst these women is supported by the 1996 statistics from the national poverty studies in Botswana, which demonstrated that poverty was more severe in rural areas. The Botswana Institute for Development Policy Analysis estimates that 62% of the single-headed households live in poverty (Perret *et al*, 1996).

4.4.3.4 Gather wild food; hunt or harvest immature crops

Most of the households (94%) gather wild foods like mongongo, Tswii or hunt for fish and wild animals during the hunting season to deal with food shortages (Figure. 4.1). In this study 24% always gathered wild foods, 44% do so 3-6 times per week and 26% of the households gather or search for wild foods only once in a while.

These findings are supported by a study conducted in Chobe, Botswana, which found that 20% of the households used hunting as a coping strategy to deal with food shortages, consequently hunting and gathering are important activities in their daily lives (Mugabe, Gobotswang & Holmboe-Ottesen, 1998).

Wild foods are readily available and culturally acceptable in the Northern part of Botswana. Kuhnlein and Receveur (1996) notes that the people in the Okavango District in Botswana are dependent on the use of Tsweii (water lily), gathered by women from the river. The water lily has been used by women as a source of income and food for generations by the community.

Studies from other Southern African countries (Zambia, Mozambique, Zimbabwe and Malawi) illustrates that, due to a high rise in prices of staple foods, prolonged droughts and poor harvests, dependence on wild foods has increased to combat food insecurity (World Food Programme, 2009). This is true for this study, given that 58% of households depend on welfare handouts and most collect wild foods to combat food shortages.

The results from this study are supported by a study in Ghana where the research findings showed that indigenous vegetables played a significant role in enhancing household food security. This research also found that women were unable to grow traditional vegetables due to limited resources such as water. In this study in the Okavango only a very few households have home food gardens. If poor families in Africa can be educated on the nutritional importance of these vegetables and be encouraged to use them and food insecurity can be addressed. (<http://www-wds.worldbank.org/servlet/main?menuPK>).

4.4.3.5 Consume seed stock held for the next ploughing season

Figure 4.10 shows that 10% of the households always consumed seed stock, 22% fairly often and 26% once in a while. Because 60% of the seed stock from the previous season was consumed, there was little left to plant for the next season, further endangering the households' food security.

4.4.4 Decrease numbers of household members consuming food

4.4.4.1 Send household members to eat elsewhere

Instead of spending a day without eating, 38% of the households sent their family members to eat elsewhere, 50% only once in a while, and 6% of the households always send their children to eat with neighbours or family members (Figure 4.10).

4.4.4.2 Send household members to beg

Figure 4.10 shows that only 6% of the households always send their household members to beg for food, while 52% do so only for one or two days per week. This is an acceptable practice among households in Gumare village, where people still have strong cultural ties that promote the spirit of sharing.

4.4.5 Rationing strategies

4.4.5.1 Limit portion sizes.

From Figure 4.10 it is clear that many households limit the portion sizes of food, with 24% of households always limiting food portions and 72% fairly often. This strategy will provide food for a longer period of time and also ensure that each household family member gets at least one portion per day.

The results of this study are supported by the study in Chobe where 8.2% of the households reduced the size portions of food eaten within the households to deal with food shortages (Mugabe, Gobotswang & Holmboe-Ottesen, 1998).

4.4.5.2 Restrict consumption by adults to enable young children to eat.

The majority of the households restricted food consumption by adults to provide more sustainable food, with 66% restricting food on at least 3-6 days per week.

This strategy used by households in Gumare village is also used by households in other African countries, such as Swaziland. Fifty percent of adults reported that they would first provide food for their children before they would eat. Mothers are knowledgeable on the need for quality and quantity of food to ensure maximum growth and development of children, hence the strategy of food restriction. Adults are able to restrict food, because, unlike children, adults can survive hunger for a longer period of time. Adults are also able to use other strategies such as eating at a friend's house or asking for food from a friend to deal with lack of food in their own households (Plus News, 2009).

4.4.5.3 Reduce number of meals eaten in a day.

Twenty eight percent of the households always reduced the number of meals eaten in a day and 56% of the households did so fairly often (Figure 4.10).

The study in Chobe had similar results, where reducing the number of the meals eaten in a day was the second-most used strategy, with 22 % of the households showing that they cut down the number of meals in a day to curb food shortages (Mugabe, Gobotswang & Holmboe-Ottesen, 1998).

Similarly, a study conducted in Swaziland found that over 60% of the Swazi people when faced with acute food insecurity reduce the number of meals that they consume in a day (Plus News, 2009). In Zimbabwe, 96% of households employ some kind of coping strategy to deal with food shortages, with the most commonly used strategies being limiting the size portions of food and reducing the number of meals per day (Urban Food Security assessment report, 2008).

It has to be noted though that when households reduces the number of meals, they become more vulnerable to malnutrition if this is applied over long periods.

4.4.5.4 Reduce food intake when the government food basket is not sufficient for all household members

The findings from the study, as shown in Figure 4.10 indicated that households usually have to reduce food intake when the food basket is not adequate to feed all members. Ten percent of the households always reduced their overall food intake, 40% pretty often and 46% never needed to reduce food since the food basket provides sufficient food. Households are entitled to only one food basket, despite the fact that one is not sufficient for a large household.

4.4.5.5 Skip entire day without eating

Data in Figure 4.10 indicated that 80% of the households are able to last for a whole day without any food, ten percent do so often (3-6 weeks), 44% once in a while (1 to 2 weeks) and 36% hardly ever .

Skipping meals to deal with food shortages is a coping strategy that is used in countries such as Swaziland, where over 30% of people do not eat during an entire day (Plus News, 2009).

4.4.6 SUMMARY OF COPING STRATEGIES

The data from this study indicate that household food security and food access are inadequate. Most of the households which experience food insecurity employ six coping strategies to address inadequate food availability, namely consuming inexpensive foods, borrowing or relying on friends or relatives, gathering or hunting, sending households members to eat elsewhere, sending households members to beg, restricting food to adults in order for young children to eat and reducing the size of food portions. Almost all the households in this study applied some kind of strategy to cope with food shortages. The major strategy commonly used was skipping eating an entire day. It is important to note that cultural practices and beliefs of the households play a major role in defining the kind of strategy that is adopted to address food access (Maxwell & Caldwell, 2008).

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS REGARDING SOCIO-DEMOGRAPHIC DATA

The results revealed that the female-headed households had an average of 7.4 people per household (Table 4.1). The majority (58%) of the single-headed female households depended on government food rations as they are destitute. The income of these households are very limited due to lack of employment opportunities, exacerbated by little or no education of the mothers. These households are more likely to be poor, as they are the ones who are registered in high numbers under the welfare programme. Statistics show that out of 450 destitute families registered to be provided with food baskets in 2005 in Gumare Village, 300 of them were single women with children (Department of Social and Community Development, 2005).

5.2 CONCLUSIONS REGARDING HOUSEHOLD DIET DIVERSITY

The aim of the study was to determine the variety or diversity of foods consumed in households headed by single mothers, and to document the coping strategies applied to manage lack of food access. A dietary diversity score below the suggested cut off point of 4 would indicate that households diet variety is extremely poor and of low nutrient quality. In the long term this will lead to micro-nutrient deficiencies. The Household Dietary Diversity Questionnaire further revealed that in this study, the major foods are from the cereal food group, indicating a starch-based diet. This starch based diet, low in micronutrients, is a common occurrence among poverty-stricken households in developing countries. Micronutrient intake can only be sufficient if vegetables, fruits and animal products are combined with starch staple foods

In this study the diversity score was only 2, indicating inadequate food access and hence the need for households to employ different coping strategies. One such strategy used by 98% of the households was to gather wild foods.

5.3 CONCLUSIONS REGARDING FOOD ACCESS

Since the Household Dietary Diversity Score is a proxy measurement for food access, the extremely low diet diversity score of only 2 indicates extreme restriction to food access, a higher vulnerability to food security and an urgent need for households to engage in different coping strategies to deal with this issue.

5.4 CONCLUSIONS REGARDING COPING STRATEGIES

Even though the majority of the households in Gumare qualified as recipients for food baskets, the food baskets was not sufficient for the larger households, therefore several coping strategies were used to address these food shortages, namely:

- Rely on less preferred and less expensive food (100%)
- Gather wild food, hunt or harvest immature crops (68%)
- Limit portion sizes (96%)
- Reduce number of meals eaten in a day (76%)
- Depend on food basket (58%)
- Reduce food intake when government food basket is not adequate (50%).

5.5 RECOMMENDATIONS

In light of the findings in this study, the following recommendations can be made:

- Similar research should be conducted in wet and dry periods to compare dietary diversity in these different seasons.
- The government of Botswana should adjust the monthly money vouchers and the quantity of foods per food basket for destitute households to be in line with high food prices and to ensure that the food lasts until the next ration period.
- The Department of Social Services should educate the community on the importance of consuming a variety of foods and promote the use of indigenous foods through establishing reliable markets.

- The government through the Ministry of Agriculture should promote the cultivation of backyard gardens by providing equipment and materials such as seed and water tanks.
- The government should educate the communities on a selection of coping strategies so that they can apply these during the dry periods to deal with food shortages.

REFERENCES

- ACQUAH, B.K., 2007. *The impact of drought on household food security in the Limpopo Basin of Semi Arid Southern Africa; The case of Kgatleng District in Botswana*. Botswana. Department of Economics. University of Botswana.
- ADEBOOYE, O.C. & OPABODE, J.T., 2004. *Status of conservation of the indigenous leaf vegetables and fruits of Africa*. Nigeria. Obafemi Awolowo University Ile-ife.
- ARIMOND, M. & RUEL, M.T., 2004. *Dietary diversity is associated with child nutritional status: Evidence from 11 demographic and health surveys*. Washington. International Food Policy Research Institute.
- BERKOW, R., BEERS, M.H., BOGIN, R.M. & FLETCHER, A.J., 1999. *The Merck Manual of Medical Information*. Merck Research Laboratories.
- BIO-INTENSIVE APPROACH TO SMALL SCALE HOUSEHOLD FOOD PRODUCTION. 1993. Sustaining gardens as nutrition. International Institute for Rural Reconstruction (IIRR). [Online]. Available from: www.greenstone.org/greenstone3/nzd/ [Accessed: 20/09/2009]
- BOGOPA, G., BRANDON, D. & MHANGO, M., 2006. *Lifestyles. Botswana*. Botswana Publishing Co. (PTY) LTD.
- BOTSWANA EMBASSY. Food and Selected dishes. [Online]. Available from: www.botswanaembassy.or.ip/culture/boy5.html [Accessed: 20/09/2009]
- BOTSWANA POWER COOPERATION. 2009. Department Manual. Botswana. Power Cooperation (PTY) LTD.
- CHENGETA, J. & MATLHARE, C., 2000. *Enjoy Agriculture*. Botswana, Hodder & Stoughton Educational (Pty) LTD.
- CLAUSEN, T, CHARLTON, K.E, GOBOTSWANG, K.S.M, CHARLTON, K.E. & HOLMBOE-OTTESEN, G., 2005. Predictors of food variety and dietary diversity among older persons in Botswana. *Nutrition*, 21:86-95.

CLOVER, J., 2003. Food Security in Sub-Saharan Africa. *African security review*, 2:1-3

COMMUNICATION FOR DEVELOPMENT GROUP. 2003. Knowledge and information for food security in Africa. [Online]. Available from: <http://www.fao.org/sd/Cddirect/Cdan0017.htm> [Accessed: 29/04/ 2009].

DANIELS, M.C, ADAIR, L.S. POPKIN, B.M. & TRUONG, Y.K. 2007. *Dietary diversity scores can be improved through the use of portion requirements: an analysis in young Filipino Children*. Nature Publishing Group. United States of America.

DEPARTMENT OF CULTURE AND SOCIAL WELFARE. 1995. Policy on women in development. Government Printers. Botswana.

DEPARTMENT OF FINANCE AND DEVELOPMENT PLANNING. 2007. Labour intensive public works programme implementation guidelines. Government Printers. Botswana.

DEPARTMENT OF SOCIAL & COMMUNITY DEVELOPMENT. 2005. Report on destitute rationing. Department of Social & Community Development. Botswana.

DEPARTMENT OF SOCIAL SERVICES. 2003. Social Benefits. Government Printers. Botswana

DEPARTMENT OF SOCIAL SERVICES. 2008. Traditional food recipes and nutritional analysis. Palmesco (Pty) Ltd. Botswana.

DEPARTMENT OF SOCIAL SERVICES. 2010. Report on destitute rationing. Department of Social Services. Botswana.

DEPARTMENT OF WILDLIFE AND TOURISM. 2008. Fisheries. Department of Wildlife. Botswana

DEPARTMENT OF WOMEN AFFAIRS. 1998. Report on a review of all laws affecting the status of women in Botswana. Government Printers. Botswana.

FEWSTER, J.A., 1975. Relationship between malnutrition and nutrient content of staple foods. *Journal of Tropical Pediatrics*, 21:36-41

FOOD AGRICULTURAL ORGANISATION (FAO)/NUTRITION AND CONSUMER PROTECTION DIVISION. 2007. Guidelines for measuring household and individual dietary diversity. Rome, FAO.

FOOD AGRICULTURAL ORGANISATION (FAO)/NUTRITION AND CONSUMER PROTECTION DIVISION. 2008. Guidelines for measuring household and individual dietary diversity. Rome, FAO.

FOOD AGRICULTURAL ORGANISATION (FAO). 1988. Sorghum and millets in Human Nutrition [Online]. Available from: <http://www.fao.org/DOCREP/TO818E04.html> [Accessed: 12/28/2009]

FOOD AGRICULTURAL ORGANISATION (FAO). 2003. The state of food insecurity in the world. [Online]. Available from: <http://www.fao.org-docre-006-J0083e-j0083e00.html> [Accessed: 04/03/2010]

FOOD AGRICULTURAL ORGANISATION (FAO)/NUTRITION AND CONSUMER PROTECTION DIVISION. 2007. Guidelines for measuring household and individual dietary diversity. Rome, FAO.

FOOD AGRICULTURAL ORGANISATION (FAO). 1988. Sorghum and millets in Human Nutrition [Online]. Available from: <http://www.fao.org/DOCREP/TO818E04.htm> [Accessed: 12/28/2009]

FOOD AND NUTRITION TECHNICAL ASSISTANCE (FANTA). 2002. Dietary diversity as a household food security indicator. Washington.

FOOD AND NUTRITION TECHNICAL ASSISTANCE (FANTA). 2006. Household Dietary Diversity Score(HDDS) for measurement of Household food access. Washington.

FOOD AND NUTRITION TECHNICAL ASSISTANCE (FANTA). 2008. Guidelines for measuring Household and individual Dietary Diversity. Italy.

GIBSON, R.S. & HOTZ, C., 2007. Dietary diversification /modification strategies to enhance micronutrients content. *British Journal of Nutrition*, 85:159-166

GOBOTSWANG, K.S.M., MARKS, G.C. & ROURKE, P.O., 2005. Determinants of rural household income in Botswana. Gender or household size. *Journal of African Studies*, 19(2):129-141

GREENSFELDER, L., 2006. African staple food get a boost. [Online]. Available from: <http://www.berkeley.edu/news/media/releases/2006/04/10-sorghum.shtm> [Accessed: 12/28/2009].

HODDINOTT, J., 1999. Choosing outcome indicators of household food security. Washington. International Food Policy Research Institute.

HODDINOTT, J. & YOHANNES, Y., 2002. Dietary diversity as a household food security indicator. Washington. Food and Nutrition Technical Assistance.

HULZE, J., 1985. Grain processing. Botswana. International Development Research Centre.

INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT (IFAD). 1999. Assessment of rural poverty in West and Central Africa. [Online]. Available from: <http://www.ifad.org/gender/learning/challenges/women/60.htm> [Accessed: 17/04/ 2008]

INTERNATIONAL FEDERATION OF RED CROSS AND RED CRESCENT SOCIETIES. 2008. Long-term foods security: investing in people and livelihoods. [Online]. Available from: <http://www.ifrc.org/pubs/disasters/resources/helping-recover/food-security-africa-ir-en.pdf> [Accessed 29/04/2009]

Importance of Iron in Diet. [Online]. Available from: www.lifemojo.com/.../importance-of-iron-in-diet-1832992. [Accessed: 7/01/2010]

JAMAHIRIYA, S., 2008. *Water for Agriculture and energy in Africa: the challenges of climate change*. [Online]. Available from: <http://www.fao.org/nr/water/docs/sirteconceptnote.pdf> [Accessed 04/03/2010]

JENNY, C., 2007. Food Security in Sub-Saharan Africa. [Online]. Available from: <http://sarpn.org.za/documents/d0000216/index.php> [Accessed: 25/10/2007]

JOHNS, T., 2001. *Managing biodiversity in agricultural ecosystems*. Canada: McGill University .

KAPUNDA, S.M., 2006. Food Security and consumption patterns in Botswana: analysis based on recent national household budget survey. *The ICFAI Journal of Agricultural Economics*. 3(3)69-76.

KEBAKILE, M.M, MPOTOKWANE, S.M., MOTSWAGOLE, B.S., LIMA DE FARIA, M., DOMINGUES, M. & SARAIVA, C., 2003. Consumer attitudes to Sorghum foods in Botswana. National Food Technology Centre. Botswana. [Online]. Available from: www.afripro.org.uk/papers/paper12Kebakile.pdf [Accessed: 28/12/2009]

KENNEDY, G., 2003. Food Security in the context of urban sub-Saharan Africa. [Online]. Available from: <http://foodafrica.nri.org/urbanisation/urbpapers/Ginakennedyfoodsecurity.pdf>. [Accessed 29/04/2009]

KENNEDY, E. & HADDAD, L., 1992. Food security and nutrition. *Food policy*, 17: 2-6.

KUHNLEIN, H.V. & RECEVEUR, O. ,1996. *Dietary change and traditional food systems of indigenous peoples*. Canada: McGill University.

KUHNLEIN, H.V., ERASMUS, B., CREED-KANASHIRO, H., ENGLBERGER, L., OKEKE, C., TURNER, N., ALLEN, L. & BHATTACHARJEE, L., 2006. *Indigenous peoples` food systems for health: finding interventions that work*. Canada. McGill University.

KUHNLEIN, H.V., 2003. *Micronutrient nutrition and traditional food systems of indigenous people*. Canada. McGill University.

MARUAPULA, S., 1993. *Children Nutritional status in Botswana: Results of the 1993 Nutrition Survey of children under five years*. Botswana. Lentswe la Lesedi. PTY.LTD.

MAXWELL, D., WATKINS, B., WHEELER, R. & COLLINS, G., 2003. *The coping strategies index: Field Manual*. Nairobi. CARE and WFP.

MAXWELL, D. *Urban food security in Sub-Saharan Africa*. International Development Research Centre. [Online]. Available from: <http://www.idrc.ca/en/ev-30583-201-1-DO-Topic.html> [Accessed 29 April 2009]

MAXWELL, D. & CALDWELL, R., 2008. *The Coping Strategies Index: A tool for rapid measurement of household food security and the impact of food aid programs in humanitarian emergencies. Field manual*, United States.

MINISTRY OF LABOUR & HOME AFFAIRS. 2005. National Gender Programme. Popular Version. Government Printers. Botswana,

MINISTRY OF LOCAL GOVERNMENT. 2002. Revised National Policy on Destitute Persons. Government Printers. Botswana.

MINISTRY OF LOCAL GOVERNMENT. 2008. National guidelines on the care of orphans and vulnerable children. Government Printers. Botswana.

MINISTRY OF LOCAL GOVERNMENT. 2009. Ngamiland development plan 6. Government Printers. Botswana.

MODI, M., MODI, A.T. & HENDRICKS, S. 2006. *Potential role for wild vegetables in household food security: a preliminary case study in Kwazulu- Natal. African Journal of Food Agriculture and Development*. 6 (1): 3-11

MUGABE, M., GOBOTSWANG, K. & HOLMBOE-OTTESSEN. 1998. *From Food Security to Nutrition Security in Botswana*. Botswana: Lentswe la Lesedi PTY.LTD

MUSINGUZI, E., KIKAFUNDA, J. & KIREMIRE, B.T., 2006. *Utilization of indigenous food plants in Uganda: A case study of South-Western Uganda*. Uganda. Department of Food Science & Technology.

MUSTAFA, K., ROD, M. & LUC, J.A., 2007. *Food Security is a global concern: International Development Research*. [Online] Available from: <http://www.idrc.ca/en/ev-30581-201-1-DO-TOPIC.html> [Accessed: 25/10/2007].

MWANIKI, A. 2006. *Achieving food Security in Africa: Challenges and Issues*. [Online]. Available from: <http://www.un.org/africa/osaa/reports/Achieving%20food%20security%20in%20Africa-challenges%20and%20issues.pdf>. [Accessed 29 /04/ 2009]

NGWENYA, B.N. & MOSEPELE, K, 2007. HIV/AIDS, artisanal fishing and food security in the Okavango Delta of Botswana. Botswana. *Physics and Chemistry of the Earth*, 32(15-18):1339-1349

OHIOKPEHAI, O., 2003. Promoting the nutritional goodness of traditional food products. Botswana. *Journal of Nutrition*, 2(4):267-270

OHIOKPEHAI, O., JAGOW, J., JAGWER, J., MARUPULA, S., 1993. Tsabana: Towards locally produced weaning foods in Botswana. Botswana. University of Botswana.

ONTARIO, O., 2001. *The importance of indigenous knowledge*. [Online] Available from: <http://www.farmradio.org/english/radio-scripts/60-1script-en.asp> [Accessed: 22/06/2006]

PERRET, S., ANSEEUW, W. & MATHEBULA.,N., 1996. Poverty and Livelihoods in rural South Africa. Investigating diversity and dynamics of livelihoods. Case studies Limpopo. Pretoria, Kelloggs

PLUS NEWS. 2009. Coping strategies wear thin in ongoing food crisis. [Online]. Available from: www.plusnews.org/Report.aspx?ReportId=74833 [Accessed: 20/09/2009]

RUEL, M.T., 2008. Operationalizing Dietary Diversity. Animal source foods to improve micronutrient Nutrition and Human function in Developing Countries. International Food Policy Research Institute (IFPRI). United States of America. Washington. [Online] Available from: <http://www.jn.nutrition.org>. [Accessed 09/22/2008]

RUEL, M.T., 2008. Is Dietary Diversity an Indicator of Food Security or Dietary Quality. Review of measurement issues and Research needs. International Food Policy Research Institute (IFPRI), United States of America.

SAVY, M., PREVEL, Y.M., TRAISSAC, P., DUVERNAY, S.E. & DELPEUCH, F., 2006. Dietary Scores and Nutritional Status of Women Change during the seasonal food Shortage in Rural Burkina Faso. [On line] Available from <http://jn.nutrition.org/ocgi/content/full/136/10/2625> [Accessed 04/06/ 2009]

STEYN, N.P., NEL, J.H., NANTEL, G., KENNEDY, G. & LABADARIOS, D., 2006. Food Variety and Dietary Diversity Scores in children: are they good indicators of dietary adequacy. *Public Health Nutrition*, 9 (5):644-650

SUMMIT ON FOOD SECURITY IN AFRICA. 2006. Towards a prioritized outcome-based approach to implementing Africa's food security commitments. [Online]. Available from: <http://www.africa-union.org/root/AU/Conferences/Past/2006/December/rea/Summit/>. [Accessed 29/04/2009]

SWINDALE, A. & BILINSKY, P. 2006. Household Dietary Score (HDDS) for measurement of Household food access: Indicator Guide. Washington D.C. Food and Nutrition Technical Assistance Project.

Teachers employment, 2009. Progress for women in Botswana. [Online]. Available from: <http://www.teachersemployment.org/resource-detail.php?id=957> [Accessed 12/22/2009]

UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE. 2008. Food Insecurity persists in Sub-Saharan Africa despite efforts to halve hunger by 2015. [Online]. Available from: <http://www.gao.gov/products/GAO-08-1007R> [Accessed 29/04/ 2009]

UNITED NATIONS SYSTEM. 2006. Fact Sheet on food and Nutrition Security Indicators/ measures: Dietary Diversity. United Nations. Standing Committee on Nutrition. [On line] Available from: [http:// www.unsystem.org/SCN/Publications/html/task-force/factsheet-Diet_Diversity-final.doc](http://www.unsystem.org/SCN/Publications/html/task-force/factsheet-Diet_Diversity-final.doc) [Accessed 29/04/ 2009]

VAN VUUREN, L. 2006. Wild vegetables tamed to decrease hunger. Emerging agriculture [Online]. Available from: www.sabinet.co.za/abstracts/waterb/waterb_v5_n6_a7.xml [Accessed: 20/09/2009]

WIKIPEDIA. 2009. HIV in Botswana [Online]. Available from: <http://en.wikipedia.org/wiki/hiv/AIDS> [Accessed:12/22/2009]

WIKIPEDIA. 2007. Food Security. [Online] Available from: <http://en.wikipedia.org/wiki/Food-security> [Accessed 25/10/07]

WINICHAGOON, P. 2008. Limitations and resolutions for dietary assessment of micro nutrients intakes. *Institute of Nutrition*. 17 (S1)296-298

WORLD FOOD PROGRAMME. 2009. Southern Africa's poorest go hungry as WFP runs short of funds. [Online]. Available from: <http://www.wfp.org/news/news-release/Southern-africas-poorest-go-hungry-wfp-runs> [Accessed: 20/09/2009]

APPENDICES

APPENDIX A: SOCIO DEMOGRAPHIC QUESTIONNAIRE TO COLLECT THE DEMOGRAPHIC DATA

Date of interview_____

Code of the respondent_____

Name of the respondent_____

Physical Address_____

1.

TOTAL SIZE OF THE HOUSEHOLD	
Total number of adults	
Female	
Male	
Total No of children	

2.

AGE RANGE OF MOTHERS	
20-25	
26-30	
30-39	

3.

AGE RANGE OF CHILDREN	
0-3	
3-5	
5-7	
7-9	

4.

EDUCATIONAL LEVEL OF MOTHERS	
None	
Primary ,some	
Primary, complete	
Junior Secondary	
Senior Secondary	
Post Secondary	
Non-formal education	

5.

MARITAL STATUS	
Single without a partner	
Married but without a partner(separated)	
Divorced	
Widowed	

6.

SOURCE OF HOUSEHOLD INCOME	.
Informal employment-Piece jobs	
Small business	
GRANTS	
Government drought relief projects	
Destitutes government monthly vouchers	
Remittances	
Pension	

7.

CATEGORIES OF INCOME	.
P50-P150	
P151-P400	
P401-P600	
P601-P800	
P801-P1000	

8.

SOURCE OF FOOD	.
Government food basket	
Food handouts from relatives and friends	
Cash handouts from relatives and friends	
Crop production (small fields)	
Small stock production	
Home vegetable production	
Purchase food	

9.

Source of water supply	
Private Standpipe	
Public Standpipe	
Borehole	
River	
Other	

10.

Indigenous Foods	
Planting in gardens	
Planting in field	
Collecting from fallow cropping fields	
Collecting from velds	
Collecting from swamps deep waters	

11. (A)

Power Supply-Cooking	
Electricity	
Paraffin	
Wood	
Gas	

(b)

Power Supply-Lighting	.
Candle	
Electricity	
Paraffin	
Gas	

APPENDIX B

HOUSEHOLD DIETARY DIVERSITY QUESTIONNAIRE
 HHDS CONTEXTUALISED: NORTHERN OKAVANGO , BOTSWANA

QUESTION NUMBER	FOOD GROUP	EXAMPLES	YES=1 NO=0
1	CEREALS	Bread(diphaphata) Bread(diphaphata Bogobe jwa lebelebele Bogobe jwa mabele Bogobe jwa lerotse Phaleshe Tsabana Letshotlho Kabu Mageu Osopa Rice Maize rice	
2	VITAMIN A RICH VEGETABLES AND TUBERS	Pumpkins Sweet potato Makatane(traditional pumpkins)	
3	WHITE TUBERS AND ROOTS	Potatoes Digwere(wild tubers)	
4	DARK GREEN VEGETABLES	Spinach Chomolia Cabbage	

		Cowpea leaves (Morogo wa dinawa)	
5	OTHER VEGETABLES (including wild Vegetables)	Thepe Any wild vegetable. Tswii	
6	VITAMIN A RICH FRUITS	Water melon Paw paw Lengangale	
7	OTHER FRUITS (including wild fruits)	Moretlwa Mompudu Mogorogorwana Motsotsojane Thima Mokujomo Motsaudi Mongongo Mokolwane Motsentsela Tsaudi	
8.	ORGAN MEAT (IRON- RICH) other organ meats or blood based.	Liver(sebete) Kidney(diphilo) Heart(pelo) Tripe(serobe,mateng) Gizzards(dintshu) Lebete	

9.	FLESH MEATS	Beef Pork Goat Lamb Chicken Wild Game(nama ya phologolo Duck,or other (dikgaka,dinonyane)	
10.	EGGS	Mae a dikoko le dinonyane	
11.	FISH	Fresh fish Dried fish Canned Fish	
12.	LEGUMES, NUTS AND SEEDS	Dinawa Soya beans Cowpeas Jugo beans-(Ditloo) Lentils(Letlhodi) Nuts(manoko) Seeds(ditlhotse) Manoko	
13.	MILK	Milk Sour milk(madila)	
14.	OILS AND FATS	Magwinya Small portions of Cooking oil Ongondivi butter	
15.	SWEETS	Sugar Sweetened Soda Sweetaid/Coo I aid	
16.	SPICES AND CAFFEINE	Spices Coffee	

	OR ALCOHOL BEVERAGES	Tea Traditional alcohol beverages such as: Mberere Mochema Khadi	
17.	Did you or anyone in your household eat a (or snack) OUTSIDE of the home yesterday?		

DEPARTMENT OF SOCIAL SERVICES. 2008. Traditional food recipes and nutritional analysis. Palmesco (Pty) Ltd. Botswana.

FOOD AGRICULTURAL ORGANISATION (FAO)/NUTRITION AND CONSUMER PROTECTION DIVISION. 2007. Guidelines for measuring household and individual dietary diversity. Rome, FAO.

APPENDIX C: HOUSEHOLD COPING STRATEGIES INDEX SCORE QUESTIONS

In the past 24hrs,how often has your household had to:	All the time every day	Pretty often 3-6 weeks	Once in a while 1-2 week	Hardly at all < 1 week	Never
1. Dietary Change					
1.1 Rely on less preferred and less expensive foods					
2.Increase Short-Term Food Availability					
2.1. Borrow food from a friend or relative					
2.2. Purchase food on credit					
2.3. Gather wild food, hunt, or harvest immature crops					
2.4 Consume seed stock held for next season					
2.5 Rely on government food basket					

3. Decrease Number of People					
3.1. Send children to eat with neighbours					
3.2. Send household members to beg					
4. Rationing Strategies					
4.1. Limit portion size at Meal times					
4.2. Restrict consumption order for small children to eat					
4.3. Feed working members of HH at the expense of non-working members					
4.4. Reduce number of meals eaten in a day					
4.5. Skip entire days without eating					

MAXWELL, D., WATKINS, B., WHEELER, R. & COLLINS, G., 2003. The coping strategies index: Field Manual. Nairobi. CARE and WFP.

APPENDIX D: LETTER TO THE CHIEF

PO Box 20912
Maun
25 September 2008

To: Senior Chief
Tribal Administration
Gumare

Dear Sir,

PERMISSION TO CONDUCT RESEARCH

My Name is Gomolemo Tembwe, a Masters Degree student at the University of South Africa. I would like to ask permission to conduct a research on diet diversity, coping strategies and food access of unemployed young single mothers with children under 9 years of age in Gumare (Botswana)

Based on the results of this study the Government of Botswana will be able to determine appropriate policies and programs to address food insecurity amongst unemployed single mothers in Gumare and Botswana as a whole. The community of Gumare will also benefit from the research as it will create awareness within them.

Sincerely,

Gomolemo Tembwe

APPENDIX E: LETTER TO THE DEPARTMENT

PO Box 20912

Maun

25 September 2008

TO: Senior Council Secretary
Okavango Sub District Council
Private Bag 006
Gumare

Dear Sir,

PERMISSION TO CONDUCT RESEARCH

My Name is Gomolemo Tembwe, a Masters Degree student at the University of South Africa. I am conducting a research on diet diversity, coping strategies and food access of unemployed young single mothers with children under 9 years of age in Botswana.

I would like to be assisted by your departments with information concerning diet diversity, coping strategies and food access within households in Gumare.

Based on the results of this study the Government of Botswana will be able to determine appropriate policies and programs to address food insecurity amongst unemployed single mothers.

Sincerely,

Gomolemo Tembwe

APPENDIX F: LETTER TO THE PARTICIPANTS

PO. Box 20912
Maun
25 October 2008

Dear participant,

LETTER OF INTRODUCTION

My Name is Gomolemo Tembwe, a Masters Degree student at the University of South Africa. I am conducting a research on diet diversity, coping strategies and food access of unemployed young single mothers with children under 9 years of age in Botswana

Based on the results of this study the Government of Botswana will be able to determine appropriate policies and programs to address food insecurity amongst unemployed single mothers. I have questions that I would like to discuss with you concerning diet diversity, coping strategies and food access within your household. Your responses will be treated with utmost confidentiality.

Sincerely

Gomolemo Tembwe

APPENDIX: H

GLOSSARY OF FOODS COMMONLY CONSUMED IN BOTSWANA

Definition of food terms commonly used in Botswana, which were used to contextualize the Household Dietary Diversity Questionnaire for Botswana (Department of Social Services, 2008.Traditional food recipes and nutritional analysis).

- **Bogobe jwa Lerotse-** A dish prepared using traditional pumpkin and sorghum.
- **Bogobe jwa lebelebele-** A dish that is prominent in Okavango especially among the Hambukushu tribe and is prepared using pounded millet.
- **Bogobe-** Sorghum meal
- **Dinawa-** The beans are usually one of the major foods which are in a large quantity after harvest. These are usually found in varieties known as the black eye beans.
- **Ditloo-** These are known as Jugo Beans. The beans are common food countrywide and can be eaten as a main meal or a snack.
- **Kabu-** Maize eaten as a snack
- **Khadi-** A traditional alcoholic beverage made out of fermenting wild fruits
- **Lengangale-** This is a dried melon. It is commonly used all over Botswana
- **Lerotse-** Melon
- **Letshotlho-** Boiled dried maize, It is preserved maize after harvest
- **Magwinya-** Deep fried bread, usually known as fat cakes.
- **Manoko-** These are found all over Botswana, but are mainly eaten and respected in the Northern part of Botswana.
- **Mberere-** A traditional alcohol beverage made out of fermenting sorghum grains called moretlwa.
- **Mochema-** A traditional alcoholic beverage made out of fermenting mokolwane
- **Mogorogorwane-** This is a wild fruit found in the North West part of the country.
- **Mokolwane-** This is a wild fruit found in the North West part of the country.
- **Mongongo-** Wild fruit
- **Mompudu-** A wild fruit found anywhere in Botswana.
- **Motsaudi-** This is a wild fruit found in the Northern part of Botswana
- **Motsentsela-** A wild fruit

- **Motsotsojane-** Wild fruit
- **Ongondivi Butter-** Butter made out of fermented milk, commonly found among the Baherero tribe, who are dominantly found in Okavango.
- **Osopa-** Mealie meal fermented with sour milk. A common dish among the Baherero tribe, who are dominantly found in Okavango.
- **Thepe-** Wild vegetable that grows naturally in the wild and grows during rainy seasons.
- **Tsaudi-** A wild fruit
- **Tswii-** This is a potato like vegetable (tuber) and is found in the North West district of Botswana. It grows in deep waters. Tswii has flowers with Seeds and the flower seeds are usually crushed to make porridge.