

## Unit 3: Food behaviour change for diet diversity



### Introduction

In the previous two units we learned about the complexity of being well-nourished, vulnerability to food insecurity, and the consequences of being malnourished. Without nutritious food we cannot live a healthy life. A healthy life relies on having ongoing access to nutritious food. Poor people living in rural and urban areas struggle with food security and poverty. Food availability and accessibility are barriers to most households eating adequate nutritional food on a regular basis.

**“  
The man in the street thinks  
in terms of foods and  
not in terms of nutrients”**

(Adapted from Labadarios and Steyn 2001),

Often their health is further compromised by inadequate food safety practices and poor food behaviour. Food is essential for survival. Food provides the energy and nutrients our bodies need and is directly and continuously responsible for our nutritional health and well-being. Why do people eat what they eat? The food choices people make and

their eating behaviours are often influenced by available food sources, traditions and customs passed on from generation to generation, life stage and lifestyle needs. Other factors affecting these choices are emotional experiences and sensory preferences particularly taste, flavour and texture.

By changing the food choices we make we can improve our nutritional health and well-being. The focus in this unit is on examining the food choices that people make and how we can improve the food choices we make using very little resources. You will help households will develop a clear idea about their present food choices and how they can change their food choices and practices by engaging the households in a learning session involving participation in activities followed up by home visits.

This unit has the following sections:

- 3.1 Why do we eat what we eat?
- 3.2 Eating a variety of food - Food Based Dietary Guidelines
- 3.3 What is dietary diversity?
- 3.4 Planning meals using a variety of foods
- 3.5 How people develop or change food behaviours

## Specific learning Outcomes

The table below shows the learning outcomes and list of assessment activities for this unit. A time estimate is shown for each activity. This will help you to plan the use of your time. When you have completed the activities write down the actual time you spent.

Learning outcomes	Assessment Activities	Actual time spent
Determine food choices, behaviours and practices in a given situation.	<b>Workbook activities</b> <b>1.1 What food choices do you make?</b> 1.2 Factors affecting food choices (1hr) 1.3 Local (market) survey of availability of fruit and vegetables (2hrs)	
Identify and explain the reasons for food choices, behaviours and practices in a given situation.	1.11. Interpretation of graphs (1hr) 1.8 Interpreting food groups table (1hr) 1.14 Planning a healthy meal (1.5hrs)	
Involve selected households in assessing their food choices behaviours and practices.	<b>Portfolio activities</b> 4.3 Assessing dietary diversity (questionnaire) (2.5hrs) 4.4 Household Food Security and Nutrition Calendar ( 2.5hrs) 4.5 Household Food Security Action Plan (2hrs)	
Reflect on the food assessment activity with households.	<b>Assignment</b>	

## Key Concepts

**Cereal based diet**

**Diet**

**Diet Diversity**

**Dietary habits**

**Dietary patterns**

**Food based dietary  
guidelines**

**Food behaviour**

**Food choices**

**Food combinations**

**Food consumption**

**Food intake**

**Food practices**

**Food preferences**

**Macro nutrients**

**Micronutrients**

**Nutrition**

**Protein**

**Vitamins**

Note: You will come across a variety of terms relating to eating and drinking, such as eating behaviour, food behaviour, food choices, food preferences, eating patterns, dietary patterns, food intake, food consumption and dietary habits. Some terms also have a similar meaning. As you work through the unit the differences in meaning will become clear to you. They focus on the foods we select and the manner in which we use food.

Our focus in Unit 3 involves investigating **current food choices, food practices and food use patterns in food insecure households**. The main causes of food insecurity are food availability, access, utilization and stability because these components influence food behaviour and therefore the household's level of food security and nutritional health.

*“Food behaviour can be defined as a regular dietary pattern that is influenced by the food choices that people make daily in their diet because of the geographical, socio-economic and cultural environment in which they live.”*

(Masekoameng & Molotja, 2002)

As you have already discovered in the previous modules, it is essential to be well informed so that you can work more productively with households. At the end of this Unit you will get an opportunity to invite and support several households to participate in a practical activity to raise their awareness of their current food choices and food practices. Unit 3 is closely associated with the food security dimension of utilization as it involves determining the food intake of households.

### **3.1 Why do we eat what we eat?**

If we want to know why we eat what we eat, then we have to find out what we eat, and how people's food behaviour develops over time. This changes as household circumstances, livelihoods and lifestyles change. In describing food behaviours we have to identify the food choices people make. The food choices we make are influenced by a number of factors that determine the food choices.

Complete a record of the food choices you made or foods that you were served and ate in the home over a period of seven days. Use this information to complete Activity 3.1 in your workbook. We will use this information again in other activities later in the Unit. Answering questions about what you eat, refers to the food choices we make in our diet. A person's diet usually refers to the kind and amount of food a person eats per day.

#### **Activity 3.1 - What variety of food do you eat in a week?**

**Do this activity in your workbook**

#### **What to do**

- Each day for 7 consecutive days make a list of foods you have eaten for that day. Make sure to also note how many times you ate each food. Capture the information in the first table provided below.
- If it was a combination dish. You can list the two or three main ingredients.

**My seven day food behaviour record**

Day of the week	Morning	Mid morning	Midday	Afternoon	Late afternoon/ Evening	Before bedtime
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						

- Once the table is complete summarise the foods eaten each day by counting how many times each food type was eaten and list the food type and number of times it was eaten into the first two columns of the second table below (an example is given). In the 3<sup>rd</sup> column list the foods in decreasing order – from most eaten to least eaten.
- Then answer the questions that follow:

**Example:**

List of foods	Number of times eaten / listed in table	Foods eaten (arranged in descending order of times eaten)	Number of times eaten
Maize porridge	6	Tea with a little milk	15
Rice	1	Margarine	13
Bread	11	Bread	11
Margarine	13	Maize porridge	6
Chicken liver	2	Tomato & onion relish	5
Tomato& onion relish	5	Cabbage	5
Cabbage	5	Apple	3
Pumpkin	2	Chicken liver	2
Tea with a little milk	15	Pumpkin	2
Apple	3	Rice	1

Answer the following questions in the space provided in your workbook

1. What is the total number of different foods you have eaten this week? This gives an indication what the food variety is in the diet.
2. Which foods did you eat most often? Did you eat the foods, nearly every day (5-7) days, every second to third day (3-4 days) or once or twice (1-2days) a week?
3. Did the foods you eat on weekdays differ from the foods eaten over the weekends? Explain your answer.
4. Were the foods eaten at home or outside the home? Explain.
5. List your reasons for making these choices or why the household food care giver made these choices.

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### **Comments on activity 3.1**

*You now have some idea of the variety of food you have eaten in the week. The food choices for each day (daily diet), the daily food (meal) combinations, and the diet pattern whether for morning, midday or the evening all describe your food behaviour. The ways in which the food is handled, prepared and served refers to the food practices. Your own food behaviour is thus described by the food choices you make in your diet and the dietary pattern that indicates when certain foods are eaten. These are then determined by certain factors some of which you may have mentioned when answering the questions asked. We will revisit this information in activities to follow.*

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You will come across the word *diet* frequently in the module. It is important to reinforce your understanding of the word when it is used to refer to a healthy diet. The word *diet* does not mean the kind of food people eat for slimming or losing weight but it means all the foods and beverages (drinks/liquids) any person consumes daily. The food people eat daily may take on a specific pattern and therefore is referred to as a *dietary pattern*.

#### **3.1.1 What factors affect what people eat?**

The factors that affect what we eat determine our food choices. The Ndunakazi case study shows that people's food choice and eating behaviours are influenced by the *geographical or physical environment* in which they live. But is this the only environmental factor involved? What about the social environment? From the day we are born we are connected to a particular family, community and society. This *social environment* is characterized by diverse relationships with others. The social environment has a huge influence on our values, beliefs and practices throughout our lives. There is also the *personal environment* to consider. Each person has a unique personality that influences his/her reactions to and participation in the physical and social environments. Each person will use his or her own ideas, experiences and beliefs to make decisions that influence their behaviour.

The Ndunakazi case study is based on the real-life situation of people who live in a rural village and whose food behaviour is influenced by the three environmental factors. The food

choices made by the people living in Ndunakazi highlight that food and nutritional health security is dependent on the food in these environments which determines:

- **availability** of nutritious food
- **access** to nutritious food sources
- food preparation, care and safe practices which are part of how people **utilize** food
- planning and storage practices to ensure a **stable** food supply

The following activity will help you understand what affects the food choices of people in this village and the factors that determine their food behaviour. In other words, it answers the question: Why do they eat what they eat?

### Activity 3.2 - What affects the food choices of households in Ndunakazi village?

**Do this activity in your study guide**

#### What to do

Carefully read Part 3 of the Ndunakazi case study below and then answer the questions that follow in the spaces provided below.

#### Case study Ndunakazi: Part 3

Ndunakazi is a rural village in The Valley of a Thousand Hills in KwaZulu-Natal. It consists of two hundred households scattered over a large mountainous area. There are on average eight persons per household.

Families in the village consume mostly a cereal-based diet, with staple foods being a stiff porridge made from maize meal, bread, or rice. Legumes, mostly beans, form an important part of the diet. Foods of animal origin such as meat as well as fruits and vegetables are not frequently consumed. Very few households in the village have a refrigerator and the lack of cold storage facilities makes frequent consumption of perishable foods such as meat and dairy products difficult. Unemployment in the area is high, and so the families do not frequently eat foods of animal origin such as chicken, pork, mutton etc because they cannot afford to buy them.

1. What is the staple food for the people who live in Ndunakazi?  
.....
2. Which foods do the households not consume regularly?  
.....  
.....
3. Why do they not eat these foods on a regular basis?

.....  
.....  
4. How does your own dietary pattern (as defined in the previous activity) compare with that of the people of Ndunakazi?  
.....  
.....

5. Do you think the households eat a healthy diet? Your answer could be Yes, No, or Not sure. Explain your answer.  
.....  
.....

6. Explain which of the factors in the case study affect the food  
a) Available to the household.  
.....  
.....

b) Accessible to the household.  
.....  
.....

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### Comments on activity 3.2

*The staple diet of the people who live in Ndunakazi consists of bread, rice, and a stiff porridge made of mealie meal, and beans. A staple food is defined as:*

*“a food that can be stored easily, and eaten throughout the year forming the basis of a diet or foods eaten daily. Staple foods vary from place to place and in different parts of the world, but are typically inexpensive starchy foods of vegetable origin that are high in food energy provided by carbohydrates.” [Wikipedia]*

*The people of Ndunakazi village do not consume dairy products, meat, fruit and vegetables on a regular basis for three reasons.*

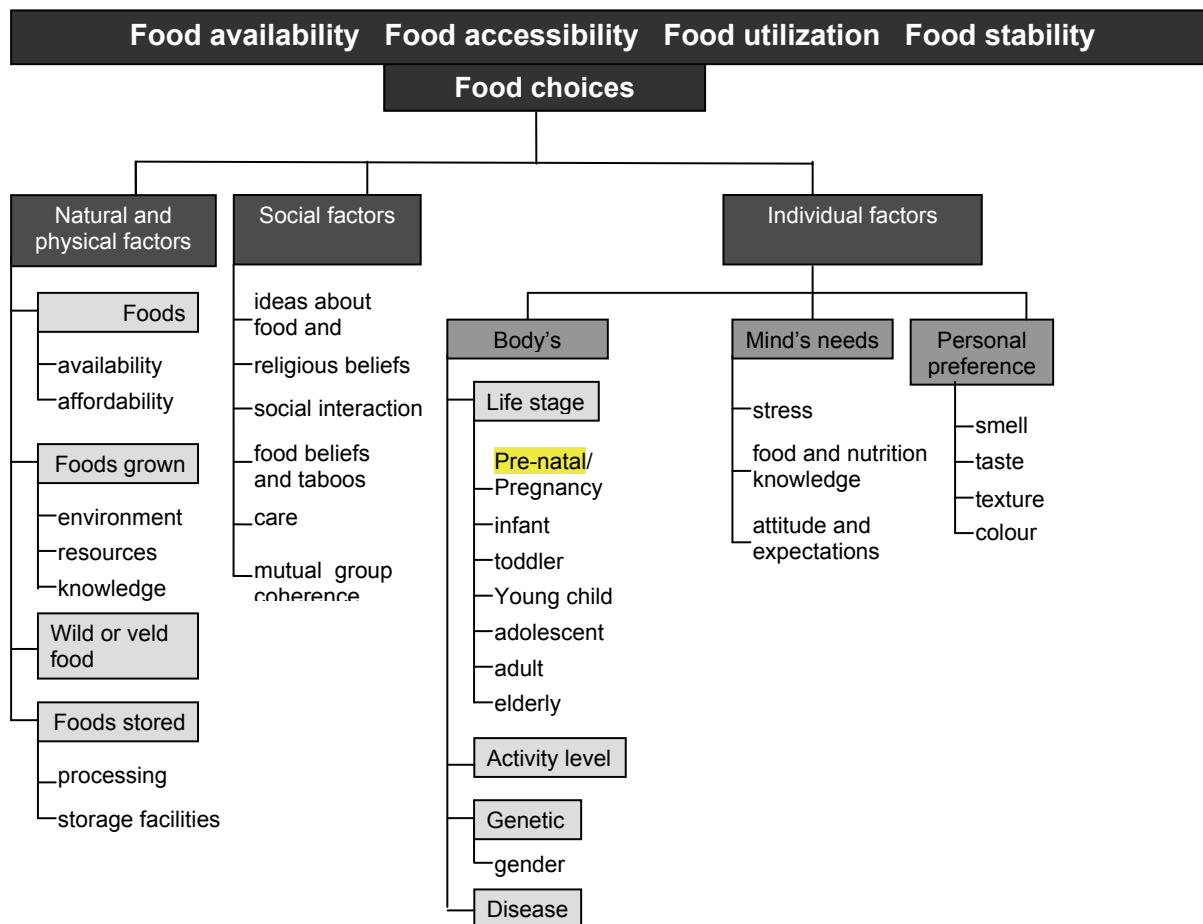
- The people cannot afford to eat these expensive foods as many are unemployed.*
- The foods are not easily available to the households because they live in a remote mountainous area which makes transport to and from the nearest shops both difficult and costly.*
- As most people do not have refrigerators, they cannot store perishable food like meat and dairy products for periods long enough to make it possible to eat these foods regularly.*

*The people in this village do not eat a healthy diet because their food intake is limited. Eating a healthy diet means eating a variety of different foods including fruit and vegetables. You will discover more about a healthy diet in this unit.*

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The physical, social and personal environments are interlinked with the food security dimensions of food availability, accessibility, utilization and stability. Together they influence the decisions we make and the behaviours and practices we adopt. The following diagram summarizes the factors in each of the three environments that influence the food choices people make.



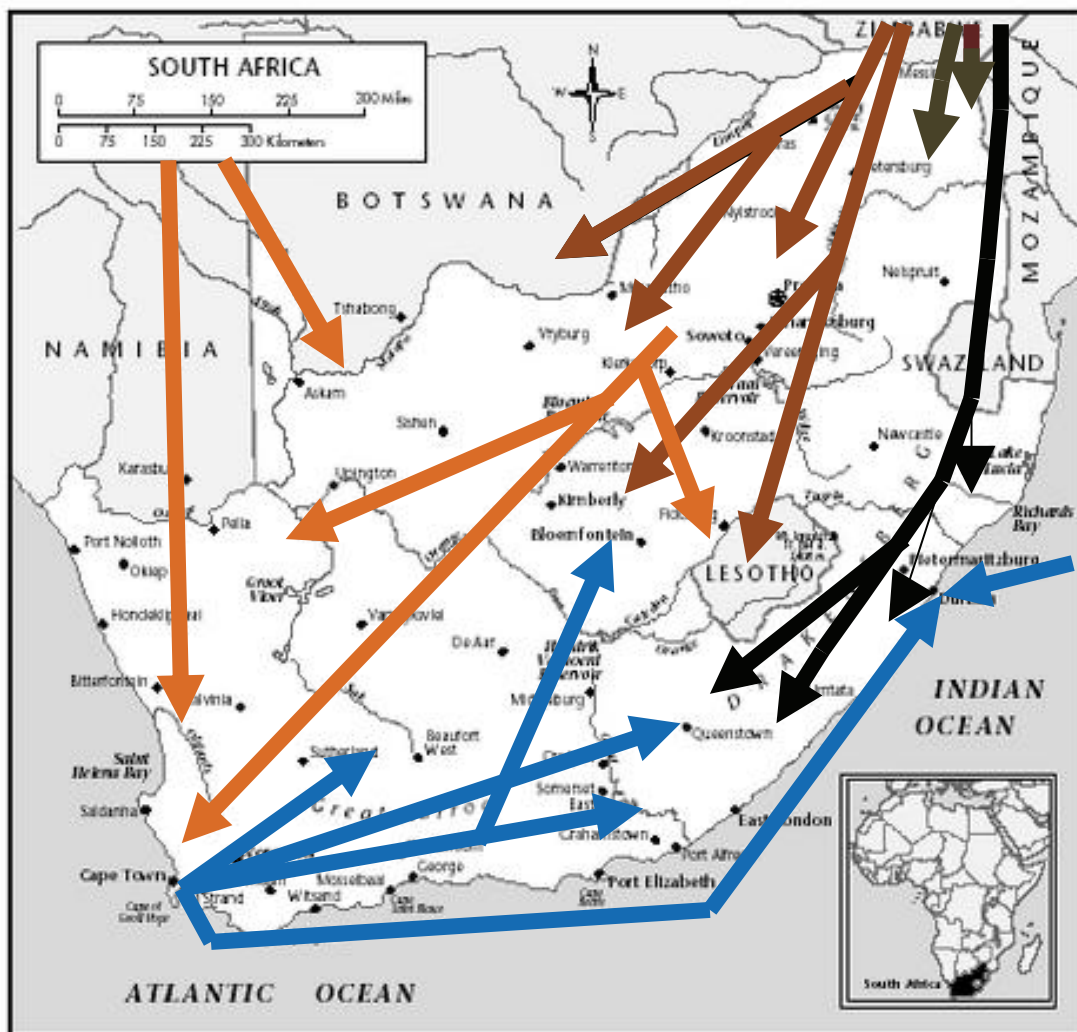
**Figure 3.1 Factors that affect people's food choices**

In Module 3 we looked at the rainfall patterns across South Africa and their influence on the natural environment in different provinces and districts. Have you ever considered their influence on the dietary patterns of the cultural groups in South Africa? Figure 3.2 shows the directions in which the different ethnic groups moved in their search for food for themselves and pasture for their animals.

### 3.1.2 Natural and physical environment

The Natural resources that are available to households in the geographical/physical environment in which they live or are available via the physical infrastructure and technology

found in the area. See how natural resources have influenced people's food behaviour over time.



**San and Khoi-khoi**  
**Sotho:**  
**Northern, Southern, Western**

**Europeans / Asians**  
**Nguni: Zulu and Xhosa**  
**Venda / Shangane**

**Figure 3.2 Map of South Africa indicating the directions in which the different ethnic groups moved (Adapted from Coetzee 1996)**

The Nguni groups (Zulu and Xhosa) moved from the Great Lakes in East Africa along the eastern escarpment in search for grasslands and fields for crops. The animals were usually kept close by their kraals and therefore for example *amasi* was used frequently. The (Sotho groups) moved down the middle of the escarpment, some remained North and some to the South and West. As the grasslands for grazing were often far from the kraal, *amasi* was not frequently consumed, but instead these people ate sour porridge also called *ting* by the Northern Sotho and Tswana.

The San and Khoi San and later the Europeans moved from the South (Western Cape) and South West to the North and East of the country looking for grazing areas and fields. These groups were not exposed to maize as a staple food and relied on other seeds and wheat for their starch or staple food. At present maize is not a common dish in the dietary pattern of the Western Cape households with San heritage and consume mainly wheat products and bake bread as staple. Europeans retained some of the European dietary patterns and food dishes, while also being influenced by the Malayan slaves and the African dietary patterns.

When advising people on healthy eating, we need to be aware of the food resources that are *available* to the household. The food resources that are available to people can be categorized (grouped) as:

- foods bought
- foods locally grown
- food resources available in nature
- food stored at the household level
- food exchanges and gifts

Find out more about the factors that affect the food choices people make. Figure 3.1 shows the various factors that can impact on food choices people make. These factors include natural and physical factors as well as individual and social factors.

- **Foods bought**

The most significant factor that influences what people buy is the cost of the food and the amount of money they have available to spend on food. As the food prices increase, families can buy less food with the money that they have. The number of persons per household and the sources of income for the household will determine how much “purchasing power” the household has.

The food that families can buy also depends on which foods are available in the shops or local markets nearest to them. People who live in rural areas buy from the local shops where the variety of foods available is usually more limited than people who live in urban areas. Supermarkets and markets in nearby towns have a bigger variety of foods to choose from. The packaging of foods (in terms of amount), and the appearance and freshness of the food may also influence what people choose to buy.

However, rural families are often restricted in going to town frequently because of the poor public transport system, or because of the cost of public transport. The food people buy will also depend on the amount of time and effort needed to reach the shops and carry the food home.

- **Foods locally planted and grown**

From knowledge gained in Module 3 you are aware that the availability of food produced at the household level is influenced by *environmental* factors. These factors include the climate (not all crops grow well in all areas), the availability of water for irrigation, and the characteristics of the soil (e.g. soil fertility). In order to garden families need suitable tools and access to high quality seeds at an affordable price. Families will often grow crops that grow easily, need low agricultural inputs and give good yields, without considering the nutritional value of the crop. As people must have appropriate knowledge on food production, it is important for them to liaise with the extension officers of the Department of Agriculture in the area so that they can give advice to families on which crops to plant for good nutrition.

- **Foods from nature: Wild or veld foods**

One hundred years ago, the diet of people in your local area was probably much better and more varied than it is today. However, this is not because people had more money or time. In the past, South African people ate a healthy diet of meat, milk, wild cereals and wild plants containing lots of beneficial nutrients. They also processed their own foods such as cereals and vegetables.

Today, the dietary pattern of people are changing or in transition. People often or only buy staple foods that have been mechanically processed such as 'white' rice, 'white' bread and 'white maize' for porridge. Processing removes the dark outer layer of grain, which contains a lot of vitamins and protein. This means that a lot of the processed foods people eat nowadays are often lacking in sufficient quantities of nutrients needed for growth and maintenance.

What is the attitude of your family and friends towards eating African leafy vegetables like *morogo* or *imfino* that grow wild in nature? Read the information below and answer the questions that follow.

### **Activity 3.3 Using food resources available in nature**

What is the attitude of your family and friends towards eating leafy green vegetables like *morogo* or *imfino* that grow wild in nature?

<b>Do this activity in your study guide</b>
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#### **What to do**

Read the information below and answer the questions that follow in the spaces provided.

**Case study Sekhukhune**

Today the Pedi proverb “*Meat is a visitor, but morogo a daily food*” is becoming more important in today’s world as we face large-scale food insecurity. Although wild-growing leafy vegetables can play an important part in a healthy diet, these are often regarded as being inferior and tend to be seen as the “poor person’s food”. When promoting these leafy vegetables as part of a healthy diet, the focus should be on the younger people as they generally have less knowledge of wild-growing leafy vegetables than the older people

(Adapted from Masekoameng & Molotja, 2003).

1. Are there any particular reasons why people choose to eat African leafy vegetables?  
.....  
.....  
.....
2. Can you mention or ask elderly women about the types of African leafy vegetables they and are still available?  
.....  
.....  
.....
3. Are people reluctant to eat leafy vegetables that grow in the veld such as morogo? Give reasons for your answer.  
.....  
.....
4. Why do you think some young people do not want to eat these types of vegetables?  
.....  
.....
5. Reflect on how people especially younger people, could be encouraged to eat leafy vegetables. Write down your ideas as we will use them at a later stage when we explore meal planning.  
.....  
.....  
.....  
.....
6. Why is it important when harvesting plants from the wild, to do it in a sustainable way?  
.....  
.....

### Comments on Activity 3.3

*People who live in rural areas have traditionally used African leafy vegetables called morogo in their diets and many still do so today. As people move to the cities they adopt new lifestyles and eating behaviours. This may account for a rather negative view of traditional or African leafy vegetables foods among some people. Young people often do not know about these foods or associate them with poverty. This means that when promoting leafy vegetables as part of a healthy diet, the focus should be on the younger people as they generally have less knowledge of the advantages of eating wild-growing leafy vegetables than the older people (Masekoameng & Molotja, 2003).*

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In South Africa there has been a revival of interest in African foods and many people are rediscovering the value of these foods as this short excerpt from a newspaper article shows:

“The Department of Basic Education’s latest approved provincial menu for its national school nutrition programme encourages schools to accommodate traditional foods such as mopane worms (mashonza), spinach (morogo) and the traditional potato (amadumbe).” [Sunday Times, 2010].

Wild or veld foods culturally eaten by people in Africa are also referred to as *African foods*. Each culture across the world has a variety of foods approved through indigenous knowledge as being food suitable for human consumption. At times African foods are referred to as *traditional foods* or indigenous, but this term can be used in many ways which can be confusing. African veld foods refer to the parts of wild plants that can be eaten and include leaves, flowers, seeds, bulbs, roots or a combination of these. Families use wild-growing plants as a food source because they see them as being a special delicacy.

Wild-growing leafy vegetables are widely available mostly during the rainy season and are usually collected from the wild by women. Some varieties of these plants can be cultivated from seed and was done by the elderly women. The edible wild green leafy vegetables are known as *miroho*, *morogo* or *imifino*. Lately research is done to reserve this knowledge and promote these vegetables due to its high nutritional value. The raw or cooked leaves can be dried and stored to be used in times when they are not freely available.

Wild vegetables are also eaten when income to buy food is scarce. Such foods are also at times referred to as *famine foods* and are used as a coping strategy by vulnerable households. This is a pity as these healthy foods are associated with poverty and being of a lower status in society.

In Kenya efforts were made to restore the previous perceptions and make African leafy vegetables available in rural and urban. African leafy vegetables have been promoted through different promotional and communication campaigns as healthy foods and to be

available in markets, how to prepare and store them, and are also sold in stores and exported to extend livelihoods. This has served to increase their status as nutritious foods. We will discuss African food and leafy vegetables, also known as traditional food, later in this unit.

- **Foods stored at household level**

Households that do not have refrigerators cannot buy large amounts of perishable foods because the food will spoil quickly and be inedible. But they can use different food processing methods to store food for longer periods and thereby increase the availability of, and access to, a variety of foods. For example, foods can be dried (such as maize) and canned (such as fruit). Food safety during storage of food is important, and this is discussed in Units 1 and 3. In Module 6 you will examine food processing methods in more detail.

- **Foods as exchange or gifts**

Food that is available in one household may be exchanged for food of other households, for favours or labour. This factor has a social aspect to it and depends on the cultural habits of the group. Food exchange and gifts are also used as coping strategies in times of food insecurity.

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### **3.1.3 Socio-cultural factors**

Social and cultural factors, religious beliefs, as well as food preferences and taboos within communities will affect the food choices people make. Food is often used at social gatherings, for example at weddings and funerals. In adults, attitudes and beliefs play an important role in eating behaviour and food likes and dislikes. Sometimes people have specific ideas about food and health which are based on their cultural and religious beliefs. At present research find more and more that most traditional foods are high in nutritional value.

Regardless of the cultural and religious beliefs about food, food behaviour will depend to a large extent on the availability of adequate food at affordable prices. Although the variety of foods available in rural communities is still very limited, improved transportation systems are increasing the variety of foods. But the ability of individuals and communities to access the variety of foods available depends on their ability to purchase them. This is in turn is reliant on their income. So, for many households in South Africa the foods are available but the unemployment and resultant poverty prevents them from accessing these foods.

We are observing in South Africa a food transition that has had a major impact on the nutritional health of people. The transition from a traditional rural lifestyle to a more urbanised western lifestyle has many negative impacts on nutritional health. The dietary

pattern is shifting from eating a mainly starch, fibre and vegetable diet to eating one with more refined starch, fat and sugar.

The media, particularly the radio and television, is an important source of information on foods. It sometimes influences food choices by encouraging people to buy less nutritious food with their limited monetary resources. Because of improved transport and marketing system, as well as increased exposure by the media, people are more frequently exposed to unhealthy food behaviour and fast foods. Children that are influenced by media may prefer to eat food eaten by fictional heroes in a story or advertisement. The preference for fast foods has increased sharply over the years, even in remote rural communities.

Think about the community that you live in - how many people refer to food by its brand name if they like to eat “Kentucky Fried Chicken”? Or maybe they like to eat fast foods from other outlets, such as “Nando’s”, “Steers”, MacDonal’d’s”.



People also have access to fast foods through street vendors and spaza shops (e.g. “bunny chow”, vetkoek and burgers). Fast foods are usually high in fat content (fatty foods). The increased preference for fast foods and the “false status” of economic welfare and life style associated with fast foods have important consequences for nutritional health.

On the African continent Kenya as a country is reintroducing these traditional foods, especially African leafy vegetables into the diet to improve the quality and amount of nutritional foods in the diet and dietary patterns of Africans. These programmes are very successful, more about African foods later in the module.

### **3.1.4 Individual factors**

Think of the foods you like best and those you like least. Why do you prefer some foods and not others? The smell, taste, texture and colour of foods play a major role in the personal food choices we make. If we do not like the smell, taste, texture and colour of the food it is unlikely that we will be persuaded to eat the food. A lot of our food choices and behaviours today are linked to our past experiences. For example if we were punished for not eating a



particular vegetable, we may grow up to dislike it as we connect it with negative feelings. People often eat sweet things to reward themselves if they have achieved something they are proud of. So emotions play a big part in our food preferences and choices.

As we grow and understand how our bodies work we begin to realize that our food needs change according to the various stages in life, e.g. infant, toddler, adolescent, young adult, mature adult and old age. When we are young our parents, guardians or carers make food choices for us, but as we grow older we have to make nutritional choices based on what is good for our health at the particular stages of our life.

Our body or *physiological* needs must inform the kind of food choices we make. The body's needs depend not only on the life stages but also the level of activity, health and stress situations. Some people say that food is a medicine and that by eating the right food we can greatly increase our chances of being healthy.

Many children in South Africa go to school without having eaten a nutritious breakfast or snacks and as the day progresses these children are unable to concentrate and do their school work. The same applies to adults who are not able to be productive because they do not eat the right food at the right time.

Our brain and our thinking and feeling capabilities need enough of the right food to be able to function. Personal food choices are influenced by:

- the needs of the body (physiological needs)
- the need of the mind (psychological needs), and
- personal food preferences.

### **Activity 3.4 What is your food behaviour with regards to vegetable and fruit consumption?**

<b>Do this activity in your study guide</b>
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#### **What to do**

Refer to the information you collected to complete Activity 3.1 and then answer the questions about how often you eat fruit and vegetables. Circle the correct answer. Use the statements listed below to help you with your answers.

#### **Statements**

- Usually or always = 6-7 days of a week
- Often = 4-5 days of a week

- sometimes = 2-3 days of a week
- Rarely or never = 0-1 days of a week

**Food behaviour checklist: These questions are related to fruit and vegetable intake.**

(In this exercise roots and tubers are considered to be vegetables (Blackburn, *et al.* 2006)

1. Do you eat more than one kind of fruit daily?

- |    |                   |   |
|----|-------------------|---|
| a. | Do not eat fruit  | 0 |
| b. | Rarely or never   | 1 |
| c. | Sometimes         | 2 |
| d. | Often             | 3 |
| e. | Usually or always | 4 |

2. During the past week did you have citrus (orange, lemon or naartjie) juice?

- |    |     |   |
|----|-----|---|
| a. | Yes | 1 |
| b. | No  | 0 |

3. Do you eat more than one kind of vegetable a day?

- |    |                       |   |
|----|-----------------------|---|
| a. | Do not eat vegetables | 0 |
| b. | Rarely or never       | 1 |
| c. | Sometimes             | 2 |
| d. | Often                 | 3 |
| e. | Usually or always     | 4 |

4. How many servings of vegetables do you eat per day? Write the number.

.....

.....

5. Do you eat two or more servings of vegetables at your main meal?

- |    |                           |   |
|----|---------------------------|---|
| a. | Do not eat with main meal | 0 |
| b. | Rarely or never           | 1 |
| c. | Sometimes                 | 2 |
| d. | Often                     | 3 |
| e. | Usually or always         | 4 |

6. Do you eat fruit or vegetables as snacks?

- |    |                   |   |
|----|-------------------|---|
| a. | Rarely or never   | 1 |
| b. | Sometimes         | 2 |
| c. | Often             | 3 |
| d. | Usually or always | 4 |

How did you do in this food behaviour assessment with regards to fruit and vegetable intake? What scores did you get?

1. .... 2..... 3.....  
 4. .... 5 ..... 6.....

The criterion for a diet adequate in micronutrients is to eat 5 vegetables and fruit per day of about 400g. This is about five 80g servings of each vegetable or fruit. How close were you to eating this amount of fruit and vegetables?

.....  
 .....

Do you or your household have a garden? What do you grow in it?

.....  
 .....

After completing this exercise you may have realised you are not eating sufficient fruit and vegetables in your diet. Your response may be “I don't like vegetables or I can't afford them or I don't have time to grow them” etc. However, people with household gardens usually do not have a problem in getting and eating enough vegetables and fruit per day.

List any reasons why you may are not able to eat sufficient fruit and vegetables every day:

.....  
 .....

Try using this checklist with 5 households with gardens (HG) and 5 households without gardens (HN).

You can also do this exercise with your peer group. Write the scores from the questions in the columns.

Question	HG1	HH2	HH3	HH4	HH5	HN1	HN2	HN3	HN4	HN5
1										
2										
3										
4										
5										
6										
<b>Total</b>										

What do the scores indicate to you? The higher the scores the more vegetables and fruit have been consumed? Can you calculate the average score for each group?

Average score for households with gardens. Sum of totals of 5 HG ÷5 = ?

.....

Average score for households without gardens. Sum of totals of 5 HN ÷5 = ?

.....

How do the scores of the households with gardens compare with those of households without gardens?

.....

.....

\_\_\_\_\_

**Comment on activity 3.4**

*Most probably availability, accessibility, utilization and stability play a part in the answers you have found.*

\_\_\_\_\_

The next part of the Ndunakazi case study looks at what foods are available and accessible locally in the shops in that area.

**Activity 3.5 - What foods are available to the households in Ndunakazi?**

**Do this activity in your study guide**

**What to do**

Read the next part of the Ndunakazi case study and answer the questions that follow.

**Case study Ndunakazi: Part 2**

In part 1 of the case study at the beginning of this unit, we described the diet of families in Ndunakazi village. Because of their poor diet, the families were encouraged by nutrition monitors to eat yellow/orange vegetables and fruit daily.

Nutrition monitors (volunteers) visited the five most accessible local shops in the village to observe and record the vegetables and fruits that were available for sale in these shops. They found that potato, cabbage, onions, tomato, apples and bananas were available most of the time in all five shops. People in the village therefore had the option to buy such foods.

The availability of oranges fluctuated (went up and down), depending on the season. Yellow/orange vegetables (butternut, pumpkin and carrots) and fruit (yellow peaches, mango and paw-paw) were not available in the local shops.

1. Which foods were actually available to the people in Ndunakazi?
2. Write down the foods under each of the headings to complete the table below.

<b>Food easily available</b>	<b>Food sometimes or seasonally available</b>	<b>Foods not available</b>

3. Give two possible reasons why some foods were only available sometimes?

.....  
.....

**Comments on Activity 3.5**

*Vegetables like potatoes, onions, tomatoes and fruits such as apples and bananas are on offer in the shops most of the time. Oranges can only be bought at certain times mainly during the winter season. The local shops did not stock yellow and orange vegetables and fruits. There could be various reasons for this. These vegetables and fruits are not preferred by the local people. Or they do not grow in the immediate area and the transport costs are too high and would push up the price too much. Another reason could be that fruits such as paw-paws, peaches and mangoes spoil easily and this would impact on the shopkeeper's profits.*

*The Ndunakazi case study (part 2) conveys a very important message. People can only use foods that are actually available to them on an ongoing basis. Any actions to improve their diet must be informed by the reality that exists. They are able to get a good idea of the foods available in their immediate environment by means of making accurate observations and reflections on their behaviours. This links up with the **assess** component of the Triple A cycle.*

---

In South Africa there has been a revival of interest in African foods and many people are rediscovering the value of these foods as this short excerpt from a newspaper article shows: “The Department of Basic Education’s latest approved provincial menu for its national school nutrition programme encourages schools to accommodate traditional foods such as mopane worms (mashonza), spinach (morogo) and the traditional potato (amadumbe).” [Sunday Times, 2010].

Different types of food contain different nutrients. In order to be able to make people aware, we need to convey messages on good nutrition and not ignore traditional African foods that are nutritious.

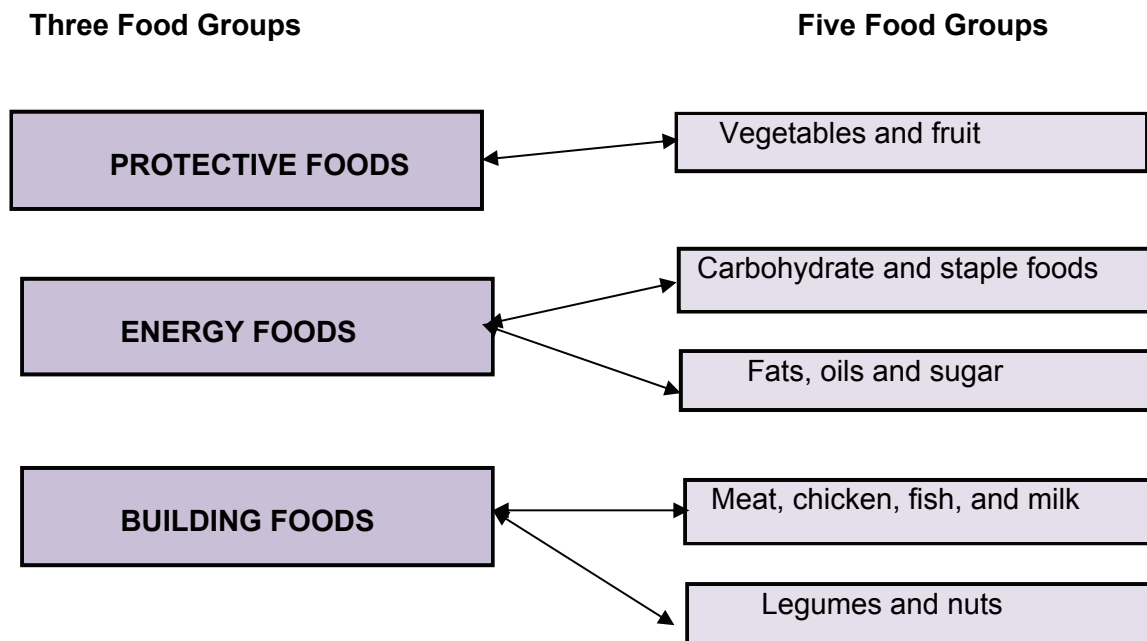
## **3.2 Eating a variety of food - Food Based Dietary Guidelines**

Foods that come from plants are called **plant foods**, and foods that come from animals are called **animal foods**. Different foods contain different combinations of nutrients. There is no single food that contains all the nutrients that our bodies need. It is therefore important that we eat a variety of foods to increase the diversity of the diet.

To assist families to make good food choices from a wide selection of different foods, we can group foods into “food groups” according to the nutrient content of the food and the function of the food in the body. Foods that are in the same food group contain more or less the same nutrients. To educate people on good nutrition that different food group tools have been developed. Often foods are grouped in either three groups referred to as the “Three Food Groups” or into five groups called the “Five Food Groups”. We will however also include group the foods according to the FAO (2008) which refers to 16 different groups to assess diet diversity. We will use these groups to determine household dietary diversity later in this unit. Let us have a look at the Food Based Dietary guidelines as the main instrument for learning people about nutritional health.

### **3.2.1 Why divide food into food groups?**

Carefully examine the Figure 3.3 below which shows the links between the original 2 food group classifications.



**Figure 3.3 The links between the Three food groups and the Five Food Groups.**

The **Three Food Groups** play a protective, energy and building role and are also sometimes referred to as the Glow, Grow and Go foods. This classification is still being used in developing countries. The three food groups are based on the functions of the foods in the body. Why is the three foods grouping system not used anymore?

Community field workers often argue that the three food groups are easy to use. In the Northern Province research indicated that 65% of the food items eaten were from carbohydrate sources, 20% were from fat sources and 15% were from protein sources. This would mean that if a person ate maize porridge, cabbage and chicken it could be assumed using the three groups system that they had eaten a balanced healthy meal. But is this true? There are more food types in a group that one should include in their daily meals. Let us proceed and look at the food based dietary guidelines and diet diversity, then you should be able to answer the question.

The three food groups were later extended into five food groups according to the **food source and its origin**. The energy foods were split into two types of starches, fats and oils, while the building foods were split into animal protein foods and plant protein foods. Some nutritionists also split the vegetable and fruit group.

The five food groups in South Africa are known as:

- vegetables and fruit
- meat, chicken, fish, milk , eggs

- legumes and nuts
- cereals and carbohydrate rich vegetables
- fats, oils and sugar

Figure 3.4 shows how the 2 food group variations link to the **Food-base Dietary Guidelines** and the FAO classification of foods that is used for assessing **Dietary Diversity**.

From figure 3.4 it can be seen that for a healthy way of living one needs to:

- Eat a variety of food
- Be active
- Drink lots of clean water  
and ends with also:
- Use sugar containing foods and drinks sparingly
- Use salt sparingly
- If you drink alcohol do so in moderation

The food based dietary guidelines expand on the five food classification by recommending that one needs to:

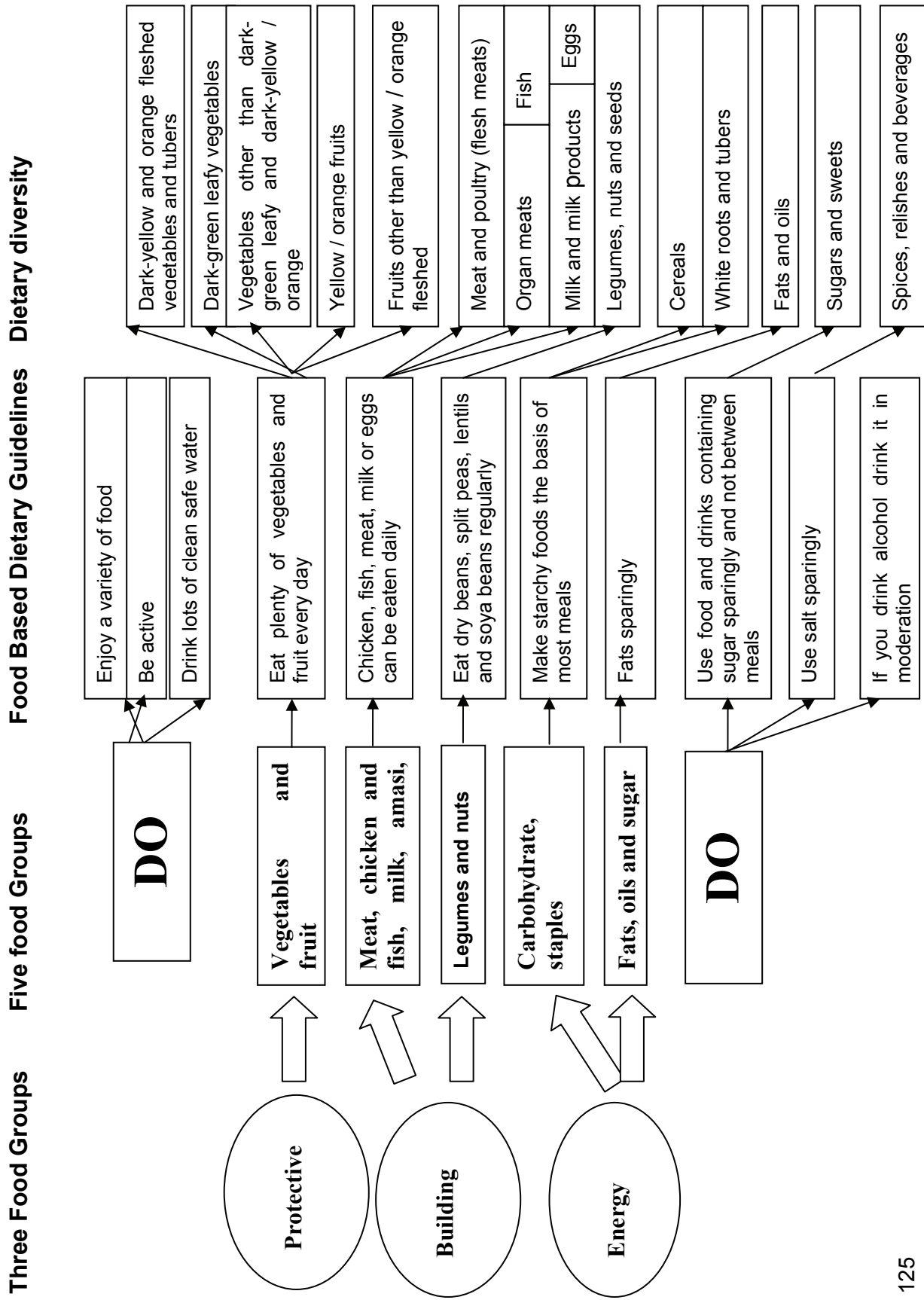
- Eat plenty of vegetables and fruit every day
- Chicken, fish, milk or eggs can be eaten daily
- Eat dry beans, split peas, lentils and soya beans regularly
- Make starchy foods the basis of most meals
- Use fats sparingly

But also recommends that a variety of foods from the different food groupings need to be eaten in order to get the various nutrients required for proper maintenance, growth and development of the body.

Diet diversity will be discussed in more details after the section on the Food Based Dietary Guidelines.



Figure 3.3



### 3.2.2 The Food-based Dietary Guidelines for a healthy diet

In South Africa the choice was made to develop the Food Based Dietary Guidelines (FBDG) to address not only nutrition but the different health issues. The guidelines are meant to be simple, easily understood and should make sense to the different cultural groups and their food behaviour in the country.

What can be regarded as good eating behaviour and practices resulting in a healthy diet? To address this question, a set of guidelines known as the **Food-based Dietary Guidelines for South Africa (FBDGs)** were developed by various stakeholders. The meaning of the words in the guidelines was tested with different cultural groups (Love, *et al*, 2001). This process was essential in a country like ours that has such a wide diversity of nutritional disorders and food consumption patterns.

The use of food-based guidelines in education programmes is mainly because people think in terms of food. In developing effective nutrition education tools and interventions the following factors had to be taken into consideration:

- household food security (the availability, accessibility and utilization of food)
- the consumer's socio-economic circumstances
- the consumer's specific nutrition and health concerns
- the consumer's lifestyle and cultural food behaviour
- the consumer's understanding of and ability to implement the information.

Potential constraints to implementation of the FBDGs were identified as:

- the cost and availability of food,
- household taste preferences,
- routine food purchasing habits,
- habitual or traditional food preparation and cooking methods,
- time constraints,
- accessibility (mostly transport difficulties)
- underlying attitudes towards health and nutrition.

The guidelines are aimed very specifically at those at risk of under-nutrition and deficiency disorders and also at those who might suffer from chronic lifestyle diseases. **The guidelines are based on foods and not on the nutrients in foods.** They aim to be positive, accessible, sustainable and culturally sensitive for all population groups. The FBDGs are intended to keep all South Africans over the age of 7 years healthy.

Some additional guidelines have also been identified to contribute to good health. These guidelines need to be considered together with foods selected from the five food groups to



provide the nutrients necessary for health. These guidelines are mostly related to modern diets and assist in prevention of the so-called modern or Western diseases.

When the five food groups and these guidelines are considered together the guidelines are referred as the food-based dietary guidelines. To learn what these guidelines recommend, complete the following activity.

### Activity 3.6 - What do the Food-based Dietary Guidelines for South Africa recommend?

**Do this activity in your study guide**

#### What to do

Read the food-based dietary guidelines given below and answer the questions that follow.

**FOOD-BASED DIETARY GUIDELINES FOR SOUTH AFRICA**

South African citizens and residents should:

- Enjoy a variety of food
- Make starchy foods the basis of most meals
- Chicken, fish, meat, milk or eggs can be eaten daily
- Eat plenty of vegetables and fruit every day
- Eat dry beans, split peas, lentils and soya regularly
- Use salt sparingly
- Eat fats sparingly
- Drink lots of clean, safe water
- If you drink alcohol, drink sensibly
- Use food and drinks containing sugar sparingly and not between meals
- Be active

Answer the following questions in the space provided.

#### Questions

1. Which three guidelines do you regard as most important for keeping healthy? Explain your answer.

.....

.....

.....



2. Rank the guidelines which reflect the five food groups.

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

3. Give your thoughts on the last four guidelines on using sparingly. (We will discuss this later in detail)

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

4. What does the last guideline mean and what does it have to do with what we eat?

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

---

### Comments on Activity 3.6

*Remember that a healthy diet means applying all of these guidelines and not only one or two because all of these guidelines are important. Individual foods are not “healthy” or unhealthy”, but a diet as a whole is healthy or unhealthy. The one guideline which is most important is eating a variety of food. You will find out more about this guideline when we discuss the diet diversity as a measurement for food access and utilization for the household food security.*

*The guideline which refers to being active means we need to participate in regular physical activity. This will help lower the risk of many chronic diseases associated with a negative life-style such as wrong food behaviour.*

---

The food based dietary guidelines are an easy tool to use in meal planning and food preparation. They can be used to guide the choice of food to be bought, grown, exchanged or gathered in the wild. One can see from looking at the various food groups recommended how important it is to keep a household garden and some small stock to provide protein, Vitamin A and minerals that are not available in white staple foods. African vegetables that include green and yellow vegetables, exotic and wild beans, nuts and chickens are food sources rich in nutrients and therefore make a “superior” diet for better health and quality of life of the household.



For you to be able to apply these guidelines to your own diet and later to that of the households you will work with, it is necessary that you have an understanding of the basic facts about nutrients, food groups, foods dietary diversity, meal planning and food preparation.

### 3.3 What is dietary diversity?

Good nutrition and health principles and the FBDGs teach us that the body needs a diverse diet that includes a variety of foods. To identify whether the diet indeed includes a diverse selection of foods, the five food groups are broken down into smaller groups. The purpose is to identify whether foods that are good sources of protein, Vitamin A, iron, zinc, and iron have been included in the diet. Therefore these groups are also used in the assessment and analysis of diets and dietary patterns of people that are vulnerable and at risk of malnutrition or poor health. For assessment of the dietary diversity of households or individuals, the 16 food groups are used but only twelve are really counted for nutritional value. More about the diet diversity as a measuring tool is covered in section 3.3.3

In Figure 3.4 try to identify the splitting up of the food groups into smaller diet diversity food groups of food with similar colour and nutrients by following the arrows.

The vegetables and fruit foods are divided into (See also Table 3.4)

- Dark yellow and orange fleshed vegetables and tubers
- Dark green leafy vegetables
- Other than dark green, yellow and orange vegetables
- Yellow orange fruits
- Fruits other than yellow / orange fleshed

The meat, chicken, fish, milk and milk products are divided into

- Meat and poultry (flesh meats)
- Organ meats (Offal)
- Fish
- Eggs

#### 3.3.1 The food groups used for planning and assessing diet diversity

Table 3.1 displays the food groups used for planning and assessing diet diversity, the foods in the group, the major nutrients and role of the nutrients in the body. When we calculate foods eaten from the groups to be 12 groups we group them as shown in the list that follows. The groups containing sugars and sweets as well as the spices, beverages and savoury



snack are not included in diet diversity assessments as they are considered to be of little or no nutritional value.

1. Cereals
  2. White roots and tubers
  3. Dark-yellow and orange fleshed vegetables and tubers
  4. Dark-green leafy vegetables
  5. Vegetables other than dark-green leafy and dark-yellow / orange
  6. Yellow / orange fruits
  7. Fruit other than yellow / orange fleshed
  8. Meat and poultry (flesh meats)
  9. Organ meat
  10. Eggs
  11. Fish
  12. Legumes, nuts and seeds
  13. Milk and milk products
  14. Fats and oils
- Omitted in calculation:**
15. Sugars and sweets
  16. Spices, beverages and savoury snacks, (eg. Simba chips, Niknaks, Doritos etc)

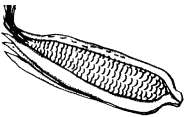


Nine food groups are used when assessing the diversity of women's diets. The numbering is as for the above 16 groups

- |       |   |
|-------|---|
| 1, 2  | Starchy staples   |
| 4     | Dark green vegetables   |
| 3, 6  | Other vitamin A rich fruits and vegetables (and red palm oil) |
| 5, 7  | Other fruits and vegetables                                   |
| 8     | Organ meat  |
| 9, 11 | Meat and fish   |
| 10    | Eggs  |
| 12    | Legumes, nuts and seeds                                       |
| 13    | Milk and milk products  |




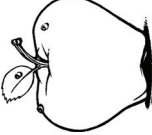
These groups are given for reference and may be used in future surveys or tools.



**Table 3.1 Groups of foods for promoting diet diversity, the most important nutrients they contain and their role in the body**

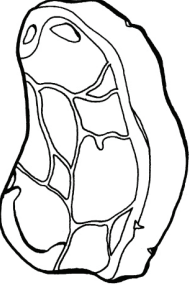

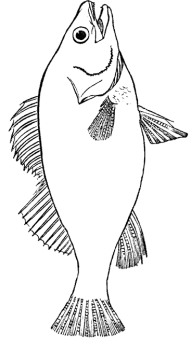
Groups for diet diversity	Foods	Major nutrients	Role
Cereals	<p>Maize and maize products, bread, rice, wheat, sorghum, pasta, breakfast cereals, oats, Mabella, Morvite (or any foods made with the above)</p> 	<p>Good source of carbohydrates</p> <p>Unrefined cereals are a good source of fibre</p> <p>Maize meal and bread flour are fortified with various micronutrients</p>	<p>Provide energy</p> <p>Help the bowels to function properly and prevent constipation</p> <p>Help to prevent micronutrient deficiencies</p>
White roots and tubers	<p>Potato, white sweet potato, amadumbe</p> 	<p>Good source of carbohydrates</p>	<p>Provide energy</p>
Dark-yellow and orange fleshed vegetables and tubers	<p>Carrot, butternut, pumpkin</p> <p>Sweet potato with dark-yellow or orange flesh</p>	<p>Good source of vitamin A</p> 	<p>Prevent infections</p> <p>Keep the eyes healthy</p> <p>Help children grow properly</p>
Dark-green leafy vegetables	<p>Spinach, imifino, morogo, beetroot leaves, pumpkin leaves, butternut leaves, wild growing green leaves. Also herbs such as dried Moringa leaves and dried Cilantro</p>	<p>Good source of vitamin A if taken with little fat</p> <p>Non-heme-iron if taken with Vitamin C rich fruit</p>	<p>Prevent infections</p> <p>Keep the eyes healthy</p> <p>Help children grow properly</p>




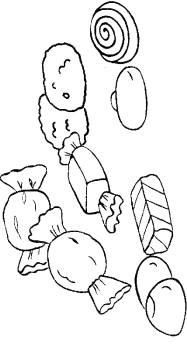

Groups for diet diversity	Foods	Major nutrients	Role
	(coriander leaves)	Dark-green leafy vegetables are a good source of folate	Particularly important for pregnant women
Vegetables other than dark-green leafy and dark-yellow / orange	Broccoli, cabbage, cauliflower, green beans, onion, tomatoes, turnips 	Provide some vitamins and minerals Good source of fibre	Help to prevent micronutrient deficiency Help the bowels to function properly and prevent constipation
Yellow / orange fruits	Ripe mangoes, pawpaw, yellow peach	Good source of vitamin A 	Prevent infections Keep the eyes healthy Help children grow properly
Fruits other than yellow / orange fleshed 	Apple, banana, grape, peach, pineapple, plum, strawberry, watermelon Grapefruit, guava, lemon, orange, naartjie	Good source of vitamins and fibre Good source of vitamin C	Help the bowels to function properly and prevents constipation Prevent infections Needed for healthy gums
Meat and poultry (flesh meats)	Meat: beef, goat, lamb, mutton, pork, venison Poultry: chicken, birds	Good source of protein	Build and maintain healthy and strong muscles, bones, skin and blood





Groups for diet diversity	Foods	Major nutrients	Role
		Good source of iron 	Make red blood cells
Organ meats	Liver, kidney 	Excellent source of heme- iron Excellent source of vitamin A	Make red blood cells Prevent infections Keep the eyes healthy Help children grow properly
Fish 	Fresh fish or canned fish (e.g. sardines, pilchards, tuna)	Good source of protein, bones good source of calcium Fatty fish contains essential fatty acids	Build and maintain healthy and strong muscles, bones, skin and blood
Eggs	Egg white Egg yolk	Good source of protein Good source of vitamin A	Build and maintain healthy and strong muscles, bones, skin and blood Prevent infections Keep the eyes healthy Help children grow properly
Milk and milk products	Milk, sour milk (amasi), cheese, yoghurt, or any other milk products	Good source of calcium	Strong bones and teeth
Legumes, nuts and seeds	Beans (haricot beans, peas, lentils,	Good source of protein	Build and maintain healthy and



Groups for diet diversity	Foods	Major nutrients	Role
	cowpeas, bambara nuts, nuts, seeds, or any food made with these)		strong muscles, bones, skin and blood
		Good source of fibre	Helps the bowels to function properly and prevent constipation
Sugars and sweets <sup>a</sup>	Sugar, honey, sweetened or sugary foods such as sweets, chocolates, cake	Poor source of nutrients 	Provides energy and no nutrients-
Spices, relishes and beverages <sup>a</sup> 	Spices: salt, pepper, curry Relishes: chutney, tomato sauce Beverages: coffee, tea, alcoholic drinks	Are generally a poor source of nutrients except for tomato sauce that is a good source of a substance called <b>lycopene</b>	<b>Lycopene</b> is not an essential nutrient but is good for keeping the prostate gland healthy and helping prevent prostate cancer



### Activity 3.7 Interpreting dietary data from a table of information

**Do this activity in your study guide**

#### What to do

Use the information in table 3.1 to answer the following questions in the space provided

1. Which food groups include food that comes only from plants and which that come only from animals? List these food groups.

.....  
.....

Which food groups include both plant and animal products? List them.

.....  
.....

2. Which foods shown in the table are foods that are traditionally not eaten in communities?

.....  
.....

3. Name some other foods that are traditionally eaten by communities but have not been mentioned in the table.

.....  
.....

5. Which food groups are good sources of protein and which ones are good sources of minerals?

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

6. Which food groups build immunity, prevent infections, and keep eyes healthy and children growing properly?

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

7. What problems did you experience with doing this activity?

.....  
.....

8. How can you solve these problems?

.....  
.....

---

### Commenting on activity 3.7

*Interpreting scientific tables is an important skill, and when you are presented with a complicated table like the one above, you need to go about it step by step. The questions therefore help you focus on one section of the table at a time, before interpreting the table as a whole. We hope the guidance given has assisted you in completing the task.*

---

Each of the food groups according to the food groups and diet diversity list will be discussed for more information and analysis on why a diverse diet is important for nutritional health.

## A Starchy foods



Starchy foods provide the energy that we need to do our daily activities. Starchy foods are bulky and therefore give us a feeling of fullness. This means that we won't get hungry easily. We should include a starchy food in each meal, and should eat a variety of the different starchy foods that are available. Starchy foods are the cereals and roots and tubers.

### 1 Cereals

There are a variety of cereals to choose from, such as maize (mealie) meal, bread, rice, sorghum, samp, pasta and porridges such as oats. There is also a wide range of breakfast cereals available on the market, but these cereals are generally expensive and there is no need to buy them – especially the sweetened ones. Cereals contain fibre which is mostly removed during processing and we refer to these cereals as “refined”. Unrefined cereals have more fibre than refined cereals. For example, brown or whole wheat bread contains fibre, whereas the fibre has been removed from white bread. We need fibre (roughage) in the diet to help our bowels function properly. The unrefined cereals contain more B vitamins than the refined types.

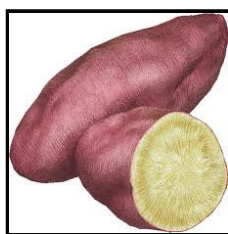


When you go to the local shops look at the different maize meal packets that are available. Do you see the fortification logo on any of the labels? Also look at the bread that is available

in the shop. Do you see this logo on the label? Please note that the logo may not always appear in colour on the packaging but may have the manufacturers' brand colours instead.

In South Africa the law stipulates that maize meal and bread flour that are produced in commercial mills must be **fortified**, which means that specific amounts of micronutrients are added to the food. The added nutrients help keep us healthy. The government specifies which nutrients and how much of these nutrients must be added. If the logo shown below is on the package of either maize meal or bread it means that the product in the packet has been fortified with the stipulated nutrients. We should take care that when we buy maize meal and bread both have this logo on the label of the packaging. Maize meal and bread are commonly eaten by a large proportion of the population; most people in South Africa will therefore benefit from the fortified maize meal and bread flour.

## 2 Roots and tubers



In contrast with most of the cereals, roots and tubers have the benefit of providing certain vitamins. For example, although potato and sweet potato are not rich sources of vitamin C, they can provide a substantial amount of vitamin C if we regularly eat large portions and, as long as they are not over-cooked in too much water.

The colour of the flesh of the sweet potato can vary from cream, to yellow and some sweet potatoes are even orange. The colour of the flesh is a good indication of the vitamin A content of the sweet potato – the darker the colour, the higher the vitamin A content. If different coloured sweet potatoes are available, it is better to choose the yellow or orange ones, as these are good sources of vitamin A. The orange sweet potato is grouped with dark yellow vegetables.

We can improve the availability of and access to potatoes and sweet potatoes by planting these crops in our own home-gardens. Planting sweet potatoes at the household level has the additional benefit that the both the sweet potato (as a starchy food) and the leaves (as a leafy vegetable) can be eaten.

## B Vegetables and fruits

Vegetables and fruits are an important part of healthy food behaviour. We should eat a variety of different vegetables and fruit every day, because different vegetables and fruit contain varying amounts of different micronutrients. Vegetables and fruit do not supply a lot

of energy, but they provide the vitamins and other substances that keep the immune system strong, and help our bodies to fight against infections.

Vegetables and fruit can also play a role in the prevention of heart disease, stroke and certain cancers. Vegetables and fruit are good sources of fibre which keeps the digestive system healthy. It is therefore important that we eat plenty of vegetables and fruit every day. To be more specific, we should eat at least five portions of vegetables and fruit every day.

**Immune system:** *When harmful micro-organisms (bacteria or viruses) are multiplying in our bodies and making us ill we are said to have an infection. There are harmful micro-organisms around us all the time and they often enter our body. Most of these harmful micro-organisms, however, do not make us ill. This is because we have an immune system that uses many defences such as white blood cells and anti-bodies in our blood, to protect us against infections.*



**Figure 3.3** The children of Ndunakazi eating their orange flesh vegetables during the study

### What is the average recommended amount (serving size) for vegetables and fruit?

Vegetables	½ cup raw or cooked vegetables 1 cup leafy vegetables
Fruit	½ cup diced, cooked or canned fruit 1 medium size fruit (e.g. apple, banana, orange, peach, pear) 1 melon wedge ¾ cup (200 mL) fruit juice Servings 5 per day = 400gm

### Activity 3.8 Interpretation of data on the Ndunakazi case study (part 4)

**Do the activity in your study guide**

Read Part 4 of the Ndunakazi case study below. Answer the questions that follow by choosing the correct option for each question.

#### **Case study Ndunakazi: Part 4**

*Families were encouraged to plant yellow/orange vegetables in their garden. They were also encouraged to plant spinach, a good source of vitamin A. It was important that they planted a variety of these because of the seasonal availability.*

*From February to December in 2003, mothers of 2-5 year old children were asked whether the child ate vitamin A rich vegetables the previous week. The results are shown in the graphs (the bars indicate the percentage (%) of children who ate the specific vegetable during a specific month of the year).*

*Butternut was eaten mostly during the first quarter of the year; most households did not have access to butternut from April to December.*

*Pumpkin and orange-fleshed sweet potato were eaten mostly during the first half of the year; most households did not have access to these vegetables during the second half of the year.*

*Carrots and spinach were eaten mostly during the second half of the year; most households did not have access to these vegetables during the first half of the year.*

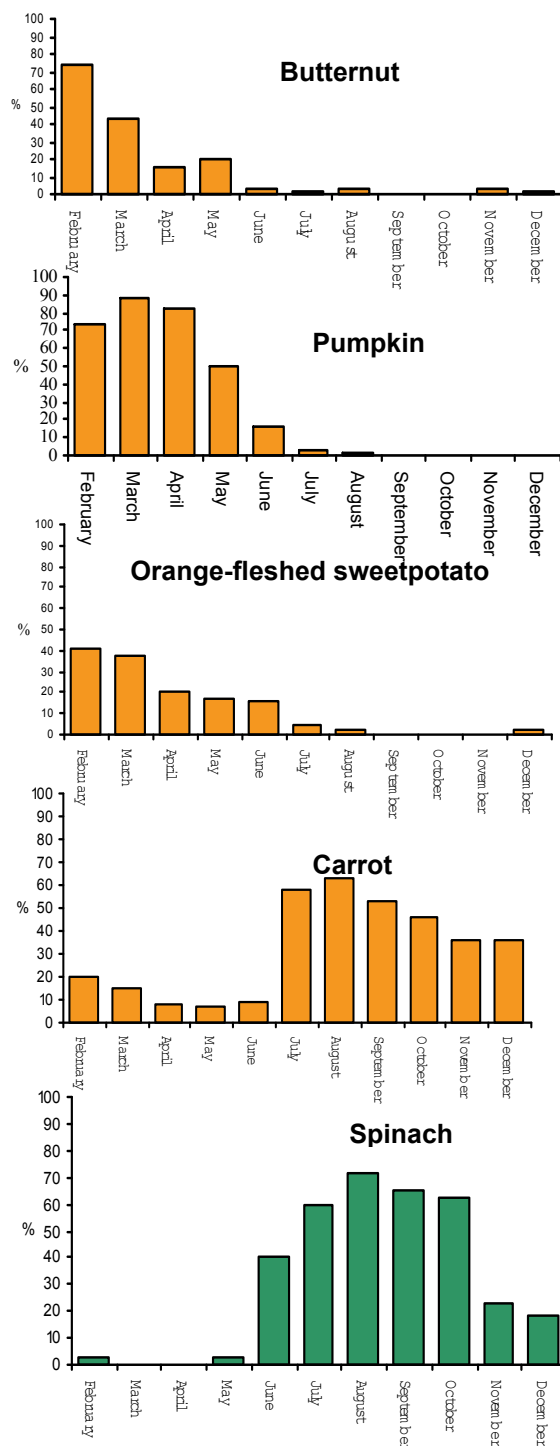


Availability of vegetables and fruit is mostly seasonal, which makes it important to eat a variety of vegetables and fruit.

When families plant their own vegetables and fruit trees in their garden, they should therefore plant a variety of vegetables and fruit trees, including both winter and summer crops.

It is also important that they plant vegetables of different colours, for example, both green and yellow vegetables. It is particularly important that they plant yellow/orange vegetables because of the high prevalence of vitamin A deficiency in South Africa.

Research to gather information on seasonal vegetables eaten by the people of the Ndunakazi village provided interesting data which was presented as bar graphs. What do we find when we interpret this data?



Study each histogram. Look at the height of the histogram bars and the seasons in which the vegetables are available.

Answer the following questions:



## Questions

Put a tick (✓) next to the correct answer.

1. What percentage of children ate orange-fleshed sweet potato in February?  
 none  
 20%  
 40%  
 60%  
 80%
  
2. Which vegetable was not eaten in March?  
 butternut  
 pumpkin  
 orange-fleshed sweet potato  
 carrot  
 spinach
  
3. Which yellow vegetable was eaten mostly during the second half of the year?  
 butternut  
 pumpkin  
 orange-fleshed sweet potato  
 carrot  
 spinach
  
4. Is spinach is a warm weather (summer) or cool weather (winter) crop?  
 warm weather crop  
 cool weather crop  
 not sure
  
5. Which ONE of the following statements is the correct message to convey to the people of Ndunakazi? Place a tick (✓) against the most appropriate message.  
  
 If we plant butternut and pumpkin in our gardens, we will have vitamin A rich vegetables for our family to eat throughout the year  
 It is not possible to grow vitamin A rich vegetables for our family to eat throughout the year  
 We need to plant a variety of different vitamin A rich vegetables to ensure that our families have vitamin A rich vegetables to eat throughout the year  
 We can plant pumpkin and spinach any time of the year

---

### Comment on Activity 2.8

*There is a need to plant a variety of vegetables to overcome the seasonal effect on availability.*

---

Vegetables and fruit are usually grouped according to their **colour**. We differentiate between:

- Dark yellow or orange fleshed vegetables,
- Dark-green leafy vegetables, and
- Dark yellow or orange fleshed fruit.

Vegetables and fruit not included in these groups are all grouped together as either “other vegetables” or “other fruit”.

### 3 Dark yellow and orange fleshed vegetables



Vegetables with a dark yellow or orange colour contain vitamin A, which helps the body fight against infections. Examples of these vegetables are carrot, butternut, pumpkin and orange-fleshed sweet potato. Although the orange-fleshed sweet potato is actually a root crop, it is grouped with the dark yellow and orange fleshed vegetables because of its high vitamin A content.

### 4 Dark-green leafy vegetables



Dark-green leafy vegetables such as spinach and imifino/morogo also contain vitamin A, but not as much as the dark yellow and orange vegetables. Dark-green leafy vegetables are also a good source of folate, which is a micronutrient of particular importance for pregnant women. Folate (is one of the B vitamins) that helps the body grow and to make healthy red blood cells. It is important to remember most of the folate is lost if we cook the leaves for too long. During the rainy seasons households have access to several traditional leafy vegetables that grow either in the wild or are semi-cultivated on the farm. Read Table 3.2- you will see that cabbage has a low nutritional value compared to African leafy vegetables.

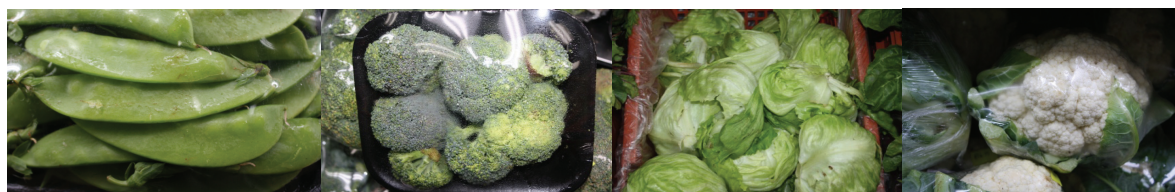
**Table 3.2 Nutritional value of African leafy vegetables and cabbage/ 100gm**

Nutrient	Amaranth	Spider plant	Cowpea	Jews mallow	Pumpkin	Cabbage
Protein (g)	4.6	4.8	4.1	5.2	4.2	1.7
Carbohydrate	8.2	5.2	6.8	10.3	5.0	6.0
Fibre (g)	1.8					1.2
Iron (mg)	8.9	6.0	3.9	6.3	15.9	0.7
Phosphorus (mg)	103	111	80.1	136.4	119.2	40
Calcium (mg)	410	288	221.1	548.5	382.9	47
Vita A / carotene(mg)	5716		2249.35	3662.99	1694.55	100
Thiamine	0.05		0.05	0.07	0.12	0.04
Riboflavin	0.42					0.01
Folic Acid (mg)	122		107	80		
Vitamin C (mg)	64	13				54
Calories	42	34				26

Cabbage leaves contains small amounts protein, iron , calcium, phosphorus, specifically vitamin A than the African leafy vegetables.

Indigenous plant leaves with a high vitamin A content can be used as supplementing vegetables such as Moringa powder and Cilanto dried leaves (coriander). They can be grown in home gardens to supplement the diet with natural products.

## 5 Other vegetables





All vegetables other than the dark yellow or orange fleshed ones and the dark green leafy vegetables are grouped together as “other vegetables”. The vegetables in this group provide some vitamins and minerals, and are a good source of fibre. Unfortunately the very popular cabbage falls in this group. Cooked cabbage has an inferior nutrient content in terms of vitamins and minerals to address micronutrient deficiencies. An analysis has been done with dark green African leafy vegetables and cabbage. The results are given in the table below.

## **6 Dark-yellow and orange-fleshed fruit**

Fruit with a dark-yellow or orange colour contains vitamin A, which helps the body fight against infections. These include ripe pawpaw, mango, yellow peach, and apricot. It should be noted that for both the fruit and the vegetables, the colour of the flesh is an indication of the amount of vitamin A that the food contains. The darker the colour of the flesh then the more vitamin A it contains. That is why we should eat fruit when they are ripe – a mango that is not ripe will not have a dark yellow colour, meaning that it does not contain much vitamin A.

## **7 Other fruit**

All fruits other than the dark yellow or orange fleshed ones are grouped together as “other fruit”. Fruits are generally good sources of sugar, which provides energy, sweetness and fibre.



The citrus fruits such as oranges, naartjies (tangerines), grapefruit and lemons are good sources of vitamin C, which help to fight infections. Guavas are also a good source of vitamin C. White and creamy white fruits such as apples, pears, and bananas also belong in this group.

## **C Animal foods**

These are all the foods that come from animals. Meat, chicken, fish and eggs are the best sources of high quality protein. However, meat, chicken and fish are expensive and poor



households often cannot afford to buy these foods frequently. What foods can you eat in the place of animal foods for a complete protein? Remember animal foods contain fat, and eating too much of these foods is therefore not healthy.

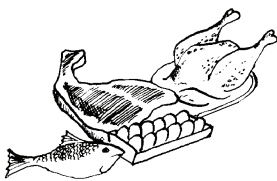
## 8 Organ meat

- Organ meat such as liver is an excellent source of iron and vitamin A. Organ meat is a delicacy for most African people and is considered a traditional dish.
- Insects and larvae, eg Mopane worms



Insects form an important part of many people's diets across southern Africa. Among these the mopane worm, is considered a delicacy. Dried worms were analyzed for their nutrient content and were determined to be a good source of protein containing 60.70% protein, 16.70% fat, and 10.72% minerals.

## 9 Meat and poultry



Meat and chicken contain iron, which is necessary for making red blood cells and protects our bodies against fatigue (tiredness) and certain illnesses. Red meat (beef, mutton, lamb) is a very good source of iron.

## 10 Eggs



Egg white is a good source of protein, while the egg yolk is a good source of iron and vitamin A. Eggs are more affordable than meat and play an important role in the diet of undernourished people.

## 11 Fish



Build and maintain healthy and strong muscles, bones, skin and blood. Bones from fish such as sardines and pilchards build our bones and teeth, as they contain calcium.

## D Legumes, seeds and nuts

## 12 Legumes, seeds and nuts



The word “legume” means that the seeds of the plant grow in a pod. Legumes are the dried edible seed of the plant and are also known as **pulses**. Examples of legumes are different beans (sugar beans, haricot beans, and kidney beans), peas, cowpeas, soybeans and lentils. Legumes are a good source of protein (without providing fat). They are a cheaper source of protein than animal foods, but the quality of the protein in legumes is lower than the quality of the protein in foods of animal origin.

It is recommended that legumes are eaten with a cereal in the same meal, because the proteins from the two foods ‘help’ each other when eaten together, and when they are combined make a more complete protein. We should eat legumes at least three times per week. Households can increase the availability of and access to legumes (and thus a good source of protein) by planting legumes in their home gardens.

Note that although green peas and green beans also grow in a pod they are considered to be vegetables.

## 13 Milk and milk products



Dairy products such as milk, sour milk or amasi, cheese and yoghurt are good sources of calcium. Calcium is needed to build bones of growing children, and calcium keeps our bones strong and protects us from broken bones later in life. Most dairy products are also a good source of vitamin A. We need to remember that vitamin A is a “fat soluble” vitamin and is present in the fat of the milk (cream). In skimmed dairy products the cream is removed from the milk, and therefore the vitamin A is removed as well. Skimmed milk and fat free yoghurt are therefore not good sources of vitamin A.

Pregnant and breastfeeding mothers need a lot of calcium because of the baby’s high calcium demands. Pregnant and breastfeeding mothers should therefore be encouraged to increase their milk intake (or other dairy products).

Milk can be fermented and becomes sour when harmless bacteria grow in it. Fermented milk keeps longer than fresh milk. Examples of foods made from fermented milk are sour milk (amasi), yoghurt and cheese. The taste of milk changes when it sours, but most of the nutrients do not change.

Condensed milk (sweetened milk in a can) keeps longer than fresh milk. Often people use condensed milk in tea. Condensed milk contains a lot of sugar and should therefore not be given to babies.

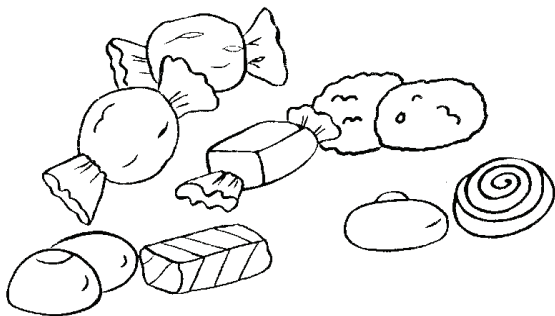
It should be noted that coffee creamers / whiteners are not made from milk, and should therefore not be used as a substitute (replacement) for milk, particularly in infants and small children.

## 14 Fats and oils

Fats and oils provide mostly energy. In fact, a small amount of fats or oils provide a lot of energy. Using fats and oils is an easy way to increase the energy intake of undernourished or sick people. Young children grow fast and therefore need more fats than adults. If we are not undernourished (too thin) and we regularly eat too much fats and oils, we can become overweight. It is therefore important that people who are not undernourished do not eat a lot of fats and oils. However, we cannot exclude fats and oils completely from the diet, as we need some fat to help us absorb certain vitamins (we call these fat-soluble vitamins). Using small amounts of fats and oils must therefore form part of a balanced diet.

## 15 Sugars and sweets

Sugar is rich in energy, but contains no other nutrients. As is the case for fats and oils, using sugar is an easy way to increase the energy intake of undernourished or sick people. However, eating too much sugar can make us overweight, especially when we eat it together with fatty foods.



Eating a lot of sugar containing foods, drinks and sweets is bad for our teeth. This is particularly true of sweets that are eaten between meals and those sweets that are sour. Foods that contain a lot of sugar are: cold drinks, cake and sweets, chocolates and ice cream, syrup, honey and jam. We should keep sugary and sweet foods for special occasions, and eat only a small portion.

Cold drinks contain a lot of sugar (except the “diet” drinks) and no other nutrients. Cold drinks are expensive, do not add nutrients to the diet and are bad for our teeth. It is therefore better to serve cold drinks only at special occasions.

## 16 Spices, relishes and beverages

Salt and spices are used to flavour food. They do not provide us with any of the important nutrients that we need. The exception is salt which is iodised. In South Africa all the salt that we buy in shops is iodised, which means that the mineral **iodine** has been added to the salt. We can plant herbs and relishes (e.g. onions and chilli's) in our home-garden, and use these to make our meals tasty instead of buying spices from the shop. What spices and relishes do you use?



A **drink**, or **beverage**, is a liquid which is specifically prepared for human consumption for. In addition to filling a basic human need, beverages form part of the culture of human society. They generally are a poor source of nutrients. There are different types of beverages:

- Alcoholic e.g. beer
- non-alcoholic (contain less than 0.5% alcohol e.g. low-alcohol beer or non-alcoholic wine)
- soft/cold drinks
- fruit juice
  - hot beverages such as tea, coffee, hot chocolate, rooibos and other herbal teas

Alcoholic drinks do not provide nutrients that we need. Although we do not need to drink alcohol at all, occasional use of small amounts of alcohol will not harm our bodies. If we drink too much alcohol we can become overweight, but more importantly, we can become aggressive and show unacceptable behaviour towards other people. Drinking too much alcohol is bad for our bodies as it can damage our livers, our hearts and our brains. It is therefore recommended that we limit our alcohol intake.



**The following people should not drink at all:**

- Pregnant and breastfeeding mothers should not drink any alcoholic drinks as the alcohol could harm the baby.
- People who are taking medication should also not drink alcoholic drinks. Alcohol and the medicine can interfere with each other and cause negative reactions.
- Children younger than 18 years should not drink alcohol.
- People who plan to drive or operate machinery should not drink alcohol. When we drink too much, our bodies don't react as fast as usual. We all know the saying "don't drink and drive – arrive alive".
- People who are addicted to alcohol (cannot stop drinking) should seek help.

Although water does not provide any energy, drinking enough clean and safe water is important. Water is absolutely essential for life and we can die if we go without water (drinking it, or as part of other drinks and water-containing food) for more than a few days. You should now have a good understanding of nutrients, food groups and foods and should therefore now be able to understand the meaning of the food-based dietary guidelines for a healthy diet.

### 3.3.2 Dietary diversity and the nutritional quality of the diet

It is important that we eat the right amount of food. In other words, we need to eat enough food to prevent us from being undernourished, but not too much food to avoid becoming overweight. Although we might eat enough food to meet our energy needs, we can still be unhealthy if we do not eat the right kind of foods. We have learnt that there are *different* types of foods, and they all have different roles in the diet. The different food groups, types of foods and their role in the diet were given in Table 2.2. Foods in the same group all have more or less the function in the body.

#### Activity 3.9 – Which type of foods contain which major nutrients?

**Do this activity in your workbook**

**Aim:** Nutrient game - to help participants clarify which types of foods contains which major nutrients: carbohydrate, protein, fat, vitamins, minerals and water.

**Time needed:**

60 minutes

**Materials:**

- at least 60 small pieces of paper,
- four large pieces of paper for the flip chart,
- marker pens or crayons.

**Instructions**

1. Give each participant at least two small pieces of paper. Ask them to write the name of a food type or ingredient on the piece of paper.
2. Explain that the ingredient or food can be an animal product such as beef, a vegetable such as a carrot, a plant product such as peanut butter, a piece of fruit such as a mango, a grain such as sorghum or a legume such as cow pea.

3. Explain that they must not write already mixed ingredients on one piece of paper such as umnqusho and stew or cake.
4. Collect all the pieces of paper and mix them up together in a basket. Meanwhile write the names of the different nutrient groups on the four large pieces of flip chart paper. Lay the pages on the floor in the centre of the room.
5. Ask each participant to take two small pieces of paper from the basket.
6. Get them to place each piece of paper on one of the flip charts on the floor according the nutrient group that the ingredient is in.
7. Ask the rest of the group to say whether they are correct.
8. Reflect on the results of the group's activity.

---

### Comments on Activity 3.9

*Knowing which foods belong to the different categories will help you when you have to carry out household dietary diversity assessments. This is also an exercise that one can do with households to determine how much they know about nutrition.*

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Do the next activity to help you understand what diet diversity means.

- **Dietary diversity in meal planning**

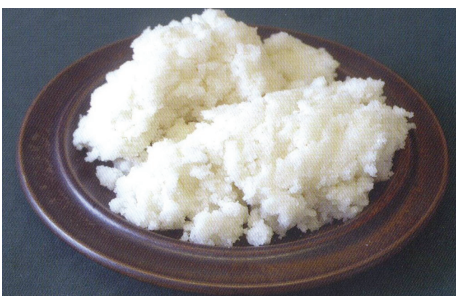
### Activity 3.10 Explaining dietary diversity

**Do the activity in your study guide**

Look at the three pictures below. Each picture represents a meal.

1. How do you think these meals differ in terms of the amount of food?
2. How do you think these meals differ in terms of meal composition, more specifically in terms of dietary diversity?

**Meal A**



**Meal B**



**Meal C**



**Figure 3.4 What do these meals show about dietary diversity?**

## Questions

1. How do these meals differ in terms of the amount of food?

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

2. How do these meals differ in terms of meal composition, more specifically in terms of dietary diversity?

.....  
.....  
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### Comments on Activity 3.10

*The amount of food for the three meals is more or less similar. However, the type of food and the number of different foods per meal differ.*

- **Meal A** consists of one food only, namely stiff porridge made with maize meal.
- **Meal B** consists of two foods combined in one dish, namely beans and maize.
- **Meal C** has the biggest variety and consists of consists of rice, starchy vegetable, an animal food and a green vegetable.

*To be healthy we need to eat a variety of different foods to ensure that we get enough of all the different nutrients that our body needs. The number of food groups consumed is an indication of dietary variety, also called dietary diversity. Variety means “different” or “several”. We should eat foods from different groups at each meal. We should also eat a variety of foods within a group of similar foods. Eating a variety of foods does not mean that we need to eat processed foods and fast foods.*

---

Eating a variety of food does not mean that we need to eat more food. The three meals shown all have more or less the same amount of food, but the variety differs. Poor households may find it difficult to eat a variety of foods because of limited resources. Under such circumstances, families should be encouraged to choose the cheapest instead of the most expensive food in any one group.

- **The dietary diversity score**

The tool used to assess the diet diversity is called the Household Diet Diversity Score (HDDS). This tool provides information about households' ability to access food and to utilize a diversity of foods in their diet. It should be noted however that this tool cannot be used to calculate the amount of nutrients consumed or the adequacy of the food intake or consumption of a person or child.

The dietary diversity score is an indicator we use to assess the nutritional quality of a person's diet. How do we use the dietary diversity score? We count the number of different food groups that people consume, and the answer (i.e. the sum of the number of food groups) is called the "dietary diversity score". We can calculate the dietary diversity score for a group of individuals, and then calculate the average score for the group.

Dietary diversity can be calculated for different periods for example for a month, a week, 3 days or 1 day. For the purpose of this programme we will work with one day, as it becomes more difficult to collect accurate information on what people eat over a longer period. However, keep in mind that people do not necessarily eat the same foods every day, and using the dietary diversity score for an individual based on one day's food intake is not recommended.

We will therefore define the dietary diversity score as the number of food groups that a person consumed during the 24 hours of the previous day. This includes all foods consumed during the day and at night, plus food consumed at home and away from home.

#### • **How do we calculate the dietary diversity score?**

To be able to calculate the dietary diversity score, we use the 16 different groups that were described in Table 2.2. Although "savory snacks" are not included we add this group to the list as savory snacks are widely consumed in South Africa. We therefore work with 16 food groups as already explained earlier in section 3.3. The groups are:

1. Cereals
2. White roots and tubers
3. Dark-yellow and orange fleshed vegetables and tubers
4. Dark-green leafy vegetables
5. Vegetables other than dark-green leafy and dark-yellow / orange
6. Yellow / orange fruits
7. Fruit other than yellow / orange fleshed
8. Organ meat
9. Meat and poultry (flesh meats)
10. Eggs
11. Fish
12. Legumes, nuts and seeds
13. Milk and milk products
14. Fats and oils
15. Sugars and sweets
16. Spices, relishes, and beverages include highly flavoured savory snacks, for example, Simba chips, Niknaks, Doritos etc Fried snacks contain fat or oils.

To determine the dietary diversity score we count how many of the food groups the person ate the day before. It is important to note that although we note down all the groups eaten by

an individual or household we count only the **first 14 nutritious food groups** when we calculate the dietary diversity score. We do not include/count the last three food groups (i.e. “sugars and sweets”, “spices, relishes and beverages”, and “savoury snacks”) as they do not add to the nutritional quality of the diet. If we eat too much of these foods, we can become overweight. We do not need to consume foods from these groups.

We count how many food groups the person ate. The lowest possible score is zero (no foods consumed from the first 14 food groups yesterday), and the highest possible score is 14 (ate foods from all the 14 nutritious food groups). The higher the score obtained, the higher the dietary diversity and the bigger the chance that the diet provides enough micronutrients for a healthy life. A low dietary diversity score is an indication that the individual is at risk of micronutrient deficiencies and the consequences of these. Remember we said that vitamin A and iron are two very important nutrients. If we look at the food groupings used to calculate the dietary diversity, the following food groups are relevant for vitamin A and iron:

**Table 3.3 Food sources containing Vitamin A and Iron.**

Nutrient	Food groups
<b>Vitamin A</b>	<p><b>Plant-based food groups:</b></p> <ul style="list-style-type: none"> <li>- vitamin A rich vegetables and tubers</li> <li>- dark-yellow and orange fleshed vegetables and tubers</li> <li>- dark-green leafy vegetables</li> <li>- dark-yellow / orange fleshed fruit</li> </ul> <p><b>Animal-based food groups:</b></p> <ul style="list-style-type: none"> <li>- organ meat</li> <li>- eggs</li> <li>- fish</li> <li>- milk and milk products</li> </ul>
<b>Iron</b>	<p><b>Animal-based food groups:</b></p> <ul style="list-style-type: none"> <li>- Organ meat e.g. liver, kidneys, heart etc</li> <li>- Meat and poultry (flesh meat)</li> <li>- Fish</li> </ul>

(Adapted from FAO 2011)

Before you do a dietary diversity assessment with households you need to practice. You will accomplish this by first completing the following activity and then doing a trial diet diversity assessment with a group of fellow students.

**Table 3.4 Food groups consumed in Mozambique by at least >50% of households during the mango season.**

<b>Lowest dietary diversity score (less &lt; 3 food groups)</b>	<b>Medium diet diversity score (4 and 5 food groups)</b>	<b>High dietary diversity score (more than 6 food groups)</b>
Cereals	Cereals	Cereals
Green leafy vegetables	Green leafy vegetables	Green leafy vegetables
Vitamin A rich fruit	Vitamin A rich fruit	Vitamin A rich fruit
	Oil	Oil
		Other vegetables
		Fish
		Legumes, nuts and seeds

(Adapted from FAO, 2011)

### **Activity 3.11 - Assessing and analyzing Sipiwe's diet.**

**Do this activity in your study guide**

#### **What to do**

You have to assess the diet of the household in which Sipiwe lives. Sipiwe was interviewed and indicated he ate the following foods at different times the previous day (NB - not a weekend day). The information collected is captured in the table below:

<b>Sipiwe's meals</b>	<b>Foods</b>	<b>Diversity Food groups</b>	<b>No times eaten</b>
<b>Morning meal:</b>	Brown bread with margarine	Cereal	
	Tea with sugar	Beverages	
<b>Mid-day meal:</b>	Samp and beans	Cereal	
	Water	Legumes Water	
<b>Evening meal:</b>	Rice	Cereal	
	Cabbage cooked with oil	Other vegetables Fat	
	Water	Water	
<b>Evening snack:</b>	Tea with sugar	Beverages	

1. Use the food groups table 2.2 to help you list the food groups Sipiwe ate and how many times he ate each food type.

.....  
.....  
.....  
2. Calculate the dietary diversity score by adding the number of food groups consumed, count each group only once. (Remember that we do not include the last two groups when we calculate the dietary diversity score). Explain why we do not count these three groups.

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.....  
3. What is the dietary diversity score for Siphwe? Show how you calculated it.

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4. Did Siphwe eat any foods from the groups that are good sources of vitamin A? Explain.

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5. Which food groups include foods that are good sources of vitamin A?

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6. Did Siphwe eat any foods from the groups that are good sources of iron? Explain.

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7. Which food groups include foods that are good sources of iron?

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8. If Siphwe eats the same foods every day, will this diet keep him healthy? Explain.

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9. By adding the total scores as indicated in your workbook or portfolio one can assess the quality of the diet. Comment on the diet. See Table 3.5

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.....  
.....  
**Comments Activity 3.11**

*If the different food groups have been calculated (each once) the answer is 4 (Cereal, Legumes, Other vegetables, Fat and Oil). One can say the HDDS is 4 for this household. Usually one uses for the score an average obtained from a sample of households. If the previous day was a normal day the score obtained is likely to be similar of that for three normal days in the household. The HDDS indicates how accessible food is and is a (proxy = indication) of dietary quality.*



### Activity 3.12 Assessing and analyzing a household's dietary diversity

**Do this activity in your work book**

**Aim:** Apply your knowledge and understanding of the use of the dietary diversity as indicator for nutritional quality of the diet.

**Time:** 2 Hours

#### **What to do**

Now you know how to determine dietary diversity. This knowledge can then be used to help improve a household's diet through the use of improved meal planning. Repeat the 24 hour food recall process with 5 members of your group. Use the 24 hour recall table. Then fill in a dietary score for each member or use and summarise the findings in the table your workbook.

---

#### **Comment on activity 3.12**

*Analyse and interpret the diet using the nutrients of the diverse food groups and the score.*

*Give your interpretation and recommendation on which food groups need to be added.*

*Depending on the foods being eaten, one sets a goal to increase the HDDS score and make sure that the food choices added belong to the groups rich in Vitamin A and iron.*

---

The Food based dietary guidelines can be used to plan a meal and test the quality using the diet diversity food groups for the necessary vitamin and mineral content to be included in the food choices.

## **3.4 Planning meals using a variety of foods**

When you plan a healthy meal you need to consider many aspects such as the number of meals, the diversity of foods, meal composition and food combinations.

### **3.4.1 Number of meals**

In the past it was tradition to eat to full meals each day. In rural areas where wood fuel is scarce the morning meal around ten could be leftovers, bread and a drink. The late afternoon meal before dark became the main meal of the day in that food had to be processed by hand and a meal was cooked only once a day. This practice could easily cause vulnerable households to be at risk if there is a food, water or wood fuel shortage.

In the early morning only a snack was prepared or leftovers heated. This is still the practice in rural areas or urban areas where people work from home. When the lifestyle of people changed of going to work early and children to school it became practice to have breakfast as a meal, as the midday meal may become a lunch box or light meal in the canteen. If there is no food then the first meal is eaten in the late afternoon. This meal pattern is a very risky meal pattern for vulnerable groups and if affordable three meals are recommended.

Snacks are foods eaten between meals. Young children cannot eat a lot of food at a time because of their small stomachs; it is therefore important that they have healthy snacks between the main family meals. Healthy snacks are, for example, fresh fruit, fresh vegetables, fruit juice, sandwiches, boiled or roasted mealie cobs, and milk or plain yoghurt or amasi. Leftovers from the main meals could also be used as snack as long as this food has been safely stored.

### 3.4.2 Meal composition

You are aware of the importance of dietary diversity and therefore need to take it into consideration when planning your meals. One cannot prescribe a specific meal composition, as meals are defined by the cultural of the social group and foods are coded as suitable for eating with meals and other between meals or as snacks. In most food cultures the core food is the staple food and then follows the secondary food usually a relish made of meat and vegetables.

Meals should include a starchy food (cereals, roots tubers) in each meal. These foods are readily available, more affordable than most of the other foods and provide a lot of energy. Generally, cereals are the most affordable sources of dietary energy. If there is a choice between refined and unrefined cereals, it is always better to choose the unrefined cereals. For example, we should eat brown or whole wheat bread, rather than white bread.

*Always serve a starchy dish with a meal for energy*

and  
and

A meal containing only starchy foods will provide energy and fill us up (because it is bulky), but it will not provide all the nutrients we need and we therefore need to serve other food items with the starchy foods. We therefore need to add some protein to build and maintain body tissues. This can be done by adding some animal foods (i.e. offal, milk, eggs, meat, chicken, and fish) or legumes (legumes are more affordable). Secondly we need to make sure that the meal provides some vitamins and minerals, and we therefore need to add some vegetables and fruit to the meal.

*Combine dried beans or legumes with a starch and vegetables to replace meat protein*

We should also preferably eat a yellow vegetable (e.g. carrot, pumpkin, and butternut) and a green vegetable (e.g. dark-green leafy vegetables, cabbage, green beans) with our main meal. Legumes and vegetables will add fibre to the diet. The different food items may be eaten as is, or may be made into a sauce, stew or relish to make the meal tasty. Food items such as onions, chillies and tomatoes that are needed to make relishes can be planted in the home garden. Herbs needed to make the meals tasty (used as condiments) or to be used as medicine can also be planted in the home garden. Eat a fruit instead of dessert or "pudding" after dinner.

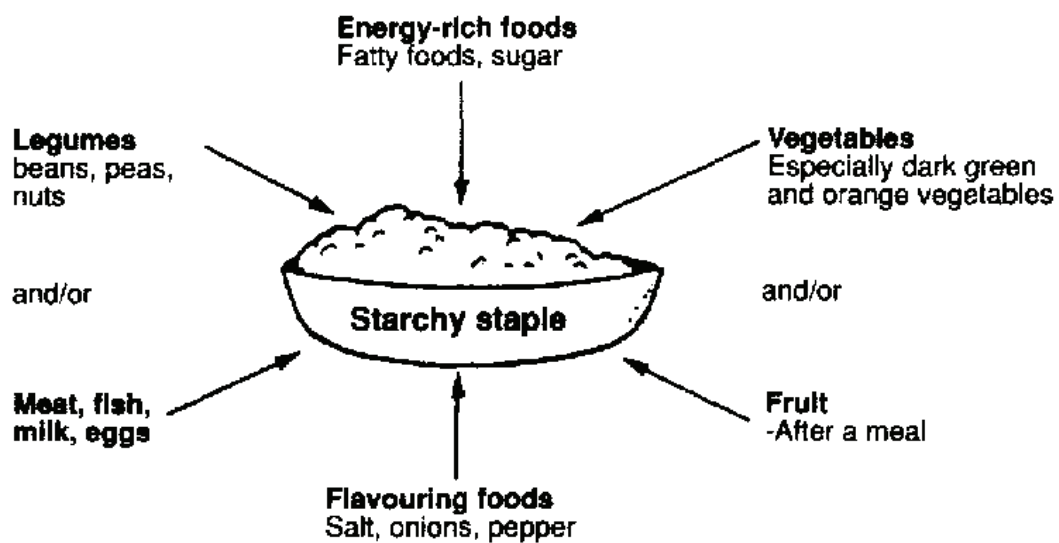


Figure 3.5. A nutritious meal, with a staple as the core and other secondary foods (Adapted from King and Burgess, 1995)

### Activity 3.13 - Planning healthy meals

**Do this activity in your study guide**

#### What to do

The following activity requires you to apply your knowledge and understanding of foods and nutrients to plan meals.

1. Refer to sections 2.5 and 2.6, as well as parts 1 to 4 of the Ndunakazi case study.
2. You need to plan a healthy meal for a family living in Ndunakazi.

You will need to consider the following:

- The time of the year is September.
- For the starchy food, you need to use a food that is regularly consumed in the village (refer to part 1 of the case study).
- The meal must have at least one vitamin A vegetable from the family's own home garden that is in season (refer to section 4 of the case study).

**Table 3.5 Planning a healthy and affordable meal**

Guidelines for planning a meal	Which foods could you consider here
Always include a starchy food	
Add a food that will provide some protein	
Add some vegetables (preferably one yellow and one green one)	
What relishes can you use in the meal	
What will they eat after the meal?	
What will they drink with the meal?	

Answer the following questions in the space provided:

1. How will the meal you planned be similar or different if you plan it for a family living in an urban (city) area?

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

2. How will your meal differ if you use mainly traditional or indigenous foods? Think of a traditional meal that your grandmother used to prepare.

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

3. If you use the food based dietary guidelines and diet diversity score, how will you describe this traditional meal?

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

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**Commenting on Activity 3.13**

*Traditional meals are usually well-balanced and nutritious and in modern times we often forget some of our ancestor’s wisdom and eat foods that taste good but are not nutritious.*

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**3.4.3 Food combinations**

When planning a meal it is important to remember that in some instances the combination of foods in one meal is important. Some food combinations are beneficial, while others should be avoided. This means that you should consider the following things when planning a meal:

- **Plant protein is an “incomplete” protein**

The protein that we get from animal foods contains enough *essential* amino acids, and is therefore a complete protein. However, the proteins that we get from some plant foods are incomplete, but it does not mean they do not add nutritional value.

Incomplete protein means plants foods need to be eaten in a combination with cereals to act similar as animal proteins in the body. If we combine certain plant foods, the foods “help” each other (we say they “complement” each other) so that together they provide the essential amino acids required. Somp and beans, a dish frequently consumed by many families, is an excellent combination of two plant foods eaten together. Each of these foods provides an incomplete protein, but when they are eaten together they complement each other to provide all the amino acids we need. A good example is the traditional dish of somp and dried beans. Can you think of many more such dishes?

- **Foods affecting iron absorption**

Iron deficiency is major problem, particularly for the children and women in the family. Animal and plant foods can both contain iron, but the type of iron found in the foods differs and this affects the how much of the iron in the food can actually be used by the body. Iron from foods of animal sources such as meat, liver, poultry and fish is well absorbed by the body. The iron that is found in milk, eggs and plant foods (mostly the dark-green leafy vegetables) is not as easily absorbed by the body, but other foods in the same meal may further affect the absorption of the iron. Some foods, such as tea, coffee and whole grain cereals, contain substances that decrease the absorption of this type of iron, so less iron is available to the body.

Message:

Do not drink tea, coffee or milk with meals to enable the absorption of nutrients in food

Meat, fish and vitamin C rich foods (most fruit and vegetables) improve the absorption of iron found in milk, eggs and plant foods. In other words, more iron will be absorbed from these foods if meat, fish or vitamin C rich salads or fruit are eaten in the same meal.

Message:

Include a vegetable or fruit with Vitamin C in each meal or afterwards.

Example: Dark-green leafy vegetables contain iron, but the iron is poorly absorbed. When these leaves are eaten, it is recommended that a citrus fruit (e.g. orange) is eaten with the meal, as the vitamin C in the orange will improve the absorption of the iron from the dark green leafy vegetables so that more of the iron is available to the body. Even eating a small amount of meat in the meal will also improve the iron absorption from the plant foods.

Families often drink tea with their meals. Drinking tea with meals should be avoided as the tannins / polyphenols in the tea inhibit the absorption of iron in plant foods and eggs. Calcium also inhibits iron absorption. If a meal contains only plant foods, we should therefore not drink milk with the meal. (Remember, milk contains a lot of calcium). Milk could be taken as a snack between meals.

A substance called phytate found in grains and legumes also inhibits iron absorption. Therefore eat grains and legumes in a combination with other foods to increase absorption.

- **Foods affecting vitamin A absorption**

If the meal contains yellow / orange fleshed vegetables or dark-green leafy vegetables it is important that the meal contains a little bit of fat, as the fat is needed to improve the absorption of the vitamin A that is in these vegetables.

### **Activity 3.14 Ask food caregivers, friends and households about affordable nutritious recipes and food locally available from the garden, veld or shop**

**Do this activity in your logbook**

**Aim:** To help facilitate food behaviours that will lead to nutritional health ask food caregivers, friends and household members to suggest affordable recipes and food combinations for meals using a variety of food that is locally available from the garden, veld or shops.

**Instructions:**

Note: This activity can be broken down into small individual activities to be used together with household members when they meet after the food learning session in the following week or at home with the family or children. Be innovative.

**Food variety and combinations**

1. Discuss with people the importance of eating a variety of food.
2. Discuss the importance of using dark green and yellow vegetables as part of the food combinations in a dish or a meal.

**Sharing food and meal recipes**

1. Request recipes using nutritious foods they use regularly and are liked by their families.
2. Write in your logbook the ingredients and the amounts used for preparing the recipes.
3. Write down the method used to prepare the recipe.

4. If the people involved can write then ask them to write the recipe down, or ask the semi-literate person or children to draw it in pictures. Make it a family or group activity.
5. You can also ask the group of households to bring ingredients and prepare the recipes for each other to observe and taste.

### **Collecting recipes for a community food security recipe book**

Printed recipe books on African Foods and specifically South African are available but are expensive and few in number. Encourage the development of relevant recipe books.

1. Those recipes that will increase the use of the nutritional foods to address micronutrient deficiencies can then gathered into a HFS food security recipe book for the group.
2. The recipe book can be hand written or ask someone to do it with a computer programme and photos.
3. These recipes and cooking tips, even seeds for scarce traditional foods and foods with a high nutritional value to plant and planting tips can be exchanged with those from other HFS groups.
4. Groups can also consider making a recipe book to sell for funds to buy seeds for their home gardens.
5. Recipes can be used during nutritional awareness meetings and campaigns.

NB - It would be good practice to have specific people responsible for specific tasks.

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### **Comment on activity 3.14**

*Use your logbook to note information, who is taking responsibility for which tasks e.g. the time frame and information on each recipe. This will help you to facilitate and motivate the group to make this recipe project work. Do try and focus on traditional foods with high nutritional value and nutritious foods not consumed readily. By exposing people to new foods, tasting dishes and good recipes you can promote the eating of forgotten and new foods with a nutritional value and new tastes. If the foods are not available encourage the making of home gardens with trench beds or plant containers. Distribute seeds if available and give instructions how to plant them. Encourage the use of available foods that are of nutritional value and then to also inform or train people in methods to prepare them and the correct care practices to use.*

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### **3.4.4 Food preparation and food practices**

The way in which food is stored, prepared and cooked is important as it affects the nutrients that are in the food. It also affects the taste of the food. Loss of nutrients from food can be

prevented by using fresh vegetables, using little water for boiling and keeping the cooking time short. Preparing foods properly will make them tasty. To prevent overweight and chronic diseases, salt, oil and sugar should be used sparingly when preparing food.

- **Use fresh vegetables**

Fruits and vegetable are good sources of micronutrients that protect our bodies against infections. Fruit and vegetables that are wrinkled, soft, mushy, bruised, and mouldy or have been damaged by worms or insects will have lost some of their nourishment. If the vegetables are wilted, the household should not throw them away, but should use them to make soups and stews. Buying fresh vegetables is cheaper than buying frozen vegetables.

- **Eat a variety of vegetables and fruit - 5 portions a day**

For good health we should eat five portions of fruit and / or vegetables every day. This is however not the case in South Africa where most people have a low fruit and vegetable consumption. Reasons for not eating enough fruit and vegetables are affordability (lack of household income), availability (and also seasonality) and taste preferences (particularly children and men who often do not like eating vegetables).

- **Consider starting a household garden**

Many people do not eat fruit and vegetables frequently because of a lack of household income which means they cannot afford to buy these foods. This does however not mean that poor households should not eat fruit and vegetables. Households can improve the availability of and access to fruit and vegetables by planting these foods in their own home-gardens. One of the benefits of planting vegetables in home gardens is that the family can harvest from the home-garden as the need arises and as a result the vegetables will always be fresh.

- **Buy fresh food when it is in season**

If we buy fruit and vegetables, we should buy those fruit and vegetables that are currently in season, as these will be cheaper than those that are not currently in season. It is important to wash vegetables well after harvesting and before use to remove pesticides that may have been used.

- **Washing fruits and vegetables**

To ensure that the vegetables that we use are fresh, we should pick or buy the vegetables and fruit on the day we wish to use them and store them in a cool place. The vegetables should be washed and cleaned before peeling and cutting (or chopped). Do this just before cooking them. Do not soak them in water for a long time before cooking them. The same rule applies when we eat fruit; we should clean and cut fresh fruit immediately before it is to be eaten. We should therefore not cut vegetables and fruit and leave them to stand exposed to air for a long time.



- **Do not use too much water in cooking**

Vegetables should be cleaned well before cutting or chopping. We should however not soak vegetables in water for a long time as some of the nutrients will dissolve in the water and will be lost. If we use water when we cook food, we should use only a small amount. Let the water boil before adding the vegetables. Only cook the vegetables until they are just tender. If there is some water left in the pot after cooking, do not throw it away. Rather use it to make gravy or soup. Sometimes people add baking soda to the water in which they cook dark green leafy vegetables. This should not be done as the baking soda destroys the vitamin C that is in the leaves.

- **Use salt sparingly**

Salt is commonly used to add flavour to foods. Eating too much salt can result in high blood pressure, which damages the blood vessels and increases the risk for heart disease and stroke. In severe cases high blood pressure can result in death. To avoid high blood pressure, we should use salt sparingly. This means we should add only a little or preferably no salt to foods during cooking and at the table. We should always taste the food before we add extra salt. Table salt is not the only source of dietary salt.

There are certain foods, particularly processed foods that are high in salt. These foods should be eaten in small amounts and not often. Examples of foods that contain a lot of salt are sausages, polony, salami, ham, bacon, take-away chicken portions, Bovril, Marmite, potato chips, salted peanuts and savoury biscuits. Stock cubes, seasoning, soup and gravy powder also contain lots of salt. Ready-made instant and canned foods usually contain a lot of salt.

- **Do not use too much oil / use fat sparingly**

Fat is a very concentrated form of energy, meaning a small amount of fat will provide a lot of energy. There are two types of fat in the diet, namely those that are visible (we can see them with the naked eye), and those that we cannot see (invisible fat or “hidden” fat). Fats that we can see include oils, butter, margarine, Holsum (lard) and fat on the meat. Foods that contain a lot of invisible fat include full cream milk and products made with full cream milk such as cheese, yoghurt and ice-cream. Processed meats and other fast foods (e.g. sausages, polony, viennas, precooked dishes and meals), fried foods (e.g. potato “slap” chips, vetkoek, bunny chows), baked products (e.g. cakes and pies), “rich” sweets such as chocolates and toffees, and mayonnaise also have a high fat content.

*Message :*

*Add a little fat with orange and dark green vegetables or eat with meat for better absorption of Vitamin A*

If we eat too much fat we can gain weight and become overweight, which is associated heart disease, diabetes and certain cancers. We should therefore use fat sparingly by, for

example, spreading margarine thinly on bread, choosing low-fat or lean meats, removing visible fat from meat before preparation, and preparing and cooking foods without added fats and oils. People who are already overweight should use low-fat milk and milk products. Fatty foods (that have hidden fats) should be eaten in moderation, preferably during special occasions only. Fats are needed by our bodies to absorb, for example, vitamin A and should be used sparingly and avoid foods that contain too much fat.

However, we should also remember that fats are a good source of energy for undernourished and sick people. If people (particularly children) are underweight (too thin) adding some fat moderately to their meal will help them to gain weight.

### **Do not use too much sugar**

We should not use a lot of sugar during food preparation, as too much sugar is bad for us. Sugar should not be added to vegetables, but rather the food should be flavoured with herbs from your home-garden. Sugar containing foods and drinks are fine occasionally but should not form part of daily meals.

### **Activity 3.15 Identify and write your own messages to remind you of good food practices**

<b>Do this activity in your logbook</b>
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**Aim:** Identify from what you have learnt so far, messages on good food practices that would serve to ensure the development of food behaviours that will lead to improved nutritional health. A few examples of such have been put in text-boxes in the previous section. There are many more to be found in the text.

#### **What to do**

1. Use any paper (A4 preferably) and black or coloured pens.
2. Identify the messages from the sections above which are important for your household or group.
3. Write one message per page.
4. If you have any pictures cut them out or draw them and use glue to stick the pictures on the relevant messages.
5. Put the messages up where everyone can see and reflect on them.
6. After the activity encourage households to put up messages in their kitchen to serve as a reminder.

## **3.5 How people develop or change food behaviours**

Do you eat today what you ate as a child? Most probably you do not. As we grow our needs and food choices change. The environment plays a huge role in the kind of food that people

eat and how they prepare and use food. No matter in which part of the world people live, they develop food behaviours that are closely linked to the geographical place in which they live, socio-cultural habits patterns, their socio-economic status and what they learn from their parents and cultural communities.

- **Children develop food behaviour early in life**

A child's eating patterns and food preferences are established early in life. During the first few months of life, babies usually receive milk feeds only. During the weaning period, when foods other than milk feeds are introduced, babies tend to reject a new food given for the first time. However, if the child is given this food repeatedly, the child's preference for the food will increase and he/she will accept or reject the food based mostly on the taste of the food. Babies are born with a natural preference for a sweet taste, and a dislike for sour and bitter tastes. Their natural food preferences can however be modified or changed. When a person develops a liking for the taste of a food through a learning process this is referred to as an acquired taste. Children (and even adults) can learn to like a specific food through frequent exposure (i.e. tasting and eating the food frequently) and social influences.

- **Natural and physical environment**

Changes in food behaviour or eating habits frequently occur when people move to the cities. When these city dwellers lived in the rural areas, they usually ate unrefined foods (high in fibre), few animal foods and little fats. When they move to the cities, they slowly change their food behaviour and start to eat more refined foods, more animal foods and less plant foods, and more fatty foods. This change in food behaviour can contribute to higher levels of heart disease, high blood pressure, diabetes and obesity.

- **Socio-cultural and household influences**

As the child grows older and starts eating the same food as the rest of the family, children learn to prefer food eaten by their parents. Food preferences and the way in which the food is prepared and served by the family are influenced by cultural traditions, beliefs and values. Food behaviour are often passed on from generation to generation.

The setting in which food is consumed and the presence of others during the meal play a role in the development of food behaviour. For the young child, the interaction between the mother and the child during feeding is important. However, as the child grows older, the social context of eating can change dramatically. For example, family members may not always be present when the child is eating. Children who live in households where there is a television set may watch a television programme while eating instead of sitting down to eat with other family members at a table.

- **Individual factors and food behaviour**

Food behaviour is affected by anticipated consequences to eating or not eating. For example, is the child rewarded for eating the food, or is he or she punished for not eating the food? Children will often reject a food if the food is associated with sickness, for example nausea and vomiting. One bad experience with a food can provoke a dislike for the food that will last for a long time. Can you think of an experience that made you dislike a particular food?

With a change in health status, people's food behaviour may change as well. For example, a person with high blood pressure (hypertension) is recommended to eat foods that are low in salt. However, a person with high blood sugar (diabetes) needs to choose foods that are low in sugar and a child suffering from malnutrition needs a nutritious and varied diet. A person who is obese and has to lose weight must eat foods that are low in fat and sugar.

The development of food and eating behaviours and preferences is quite complex. In the early years the most significant influence on a child's eating behaviour is the mother and the household environment. The choices made by the household are in turn influenced by its socio-economic status and cultural customs and practices. We cannot underestimate the power of advertisements in newspapers and television that can influence the choice of foods and eating behaviours of children, young people and adults.

## **CONCLUDING REMARKS**

Now that you have completed this unit, can you describe what a healthy eating pattern should look like? Do you think that your own eating pattern is healthy? Can you think of ways you could improve your eating patterns?

You have learnt about the different food types and their importance for human health and how to plan a healthy meal. You have also learnt how to assess household diet diversity using a diet diversity assessment and a seasonal calendar so as to understand the challenges households face in accessing food.

As a community development facilitator your task is to assist households to assess their own food choices daily (diet), dietary patterns and practices. You can then help them plan and implement interventions to improve their nutritional health and food security.

