REPUBLIC OF KENYA

MINISTRY OF AGRICULTURE
MINISTRY OF PUBLIC HEALTH AND SANITATION

APPLIED BASIC AGRI-NUTRITION RESOURCE MANUAL FOR TRAINERS

USAID
FROM THE AMERICAN PEOPLE

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This Resource Manual for Trainers was produced under the USAID-funded Kenya Horticulture Competitiveness Project (KHCP).

Contents

ABBREVIATIONS AND ACRONYMS

ACF	-	Action Hunger International
AIDS	-	Acquired Immunodeficiency Syndrome
CIP	-	International Potato Center
COPD	-	Chronic Obstructive Respiratory Disease
C-MAD	-	Community Mobilization Against Desertification
GDP	-	Gross Domestic Product
FAO	-	Food Agriculture organization
FCI	-	Farm Concern International
FPEAK	-	Fresh Produce Exporters Association of Kenya
FTF	-	Feed the Future
GAIN	-	Global Alliance for Improved Nutrition
HDL	-	High-density lipoprotein
HIV	-	Human immunodeficiency virus
IQ	-	intelligence quotient
KCJ	-	Kenya Ceramic Jiko
KDHS	-	Kenya Demographic and Health Survey
KHCP	-	Kenya Horticulture Competitiveness Project
KHSSP	-	Kenya Health Sector Strategic Plan
KRC	-	Kenya Red Cross
LDL	-	Low-density lipoprotein
MCHIP	-	Maternal and child Health Integrated Program
MDDs	-	Micronutrient deficiency disorders
MDGs	-	Millennium Development Goals
MOA	-	Ministry of Agriculture
MOPH&S	-	Ministry of Public Health & Sanitation
RDI	-	Recommended Daily Intake
SUN	-	Scaling Up Nutrition
TB	-	Tuberculosis
TFA	-	Trans-fatty acids
TOT	-	Trainer of Trainers
UCCS	-	Ukamba Christian Community Services
UN	-	United Nations
USAID	-	United States Agency for International Development
WHO	-	World Health Organization

Measurements

Cup	-	250ml
Glass	-	250ml
Lts	-	Liters
gms	-	grams
hrs	-	Hours

FOREWARD

Lack of basic knowledge on the importance of nutrition – both at the household and community level – remains a big challenge. Malnutrition is caused by a shortage or surplus of calories and/or specific nutrients. The two major forms of malnutrition are undernutrition and over nutrition. Half of the world's population has diets that are inadequate in protein, calories, and/or micronutrients.

One of the major causes of malnutrition is inadequate knowledge on nutritional matters. This applies to the sources of key nutritional elements in diets and the quantities needed to meet the normal dietary intake for proper functioning of the body, be it a child or adult. The "Applied Basic Agri-Nutrition Resource Manual" has been developed for use by trainers to help pass key nutritional messages to households and communities. This will go a long way in addressing malnutrition, both as a cause and consequence of food and nutrition insecurity, with the devastating effect of poverty, hunger, disease and eventually death of infants and children. In addition, the realization of UN Millennium Development Goals (MDGs) and the Kenya National Vision 2030 remain a challenge, yet the constitution states that food and nutrition security is every Kenyan's constitutional right.

It is for this reason the "Applied Basic Agri-Nutrition Resource Manual and Nutrition Toolkit" have been developed by the Ministry of Agriculture, the Ministry of Public Health and Sanitation, and other stakeholders, with the support of the USAID Kenya Horticulture Competitiveness project (USAID-KHCP) to help trainers educate and inform the general community on the importance of applied nutrition in their day to day lives. Integrating nutrition and agriculture is one of the ways of transformation from food security to food and nutrition security.

To effectively integrate nutrition and agriculture, there is a need to optimally utilize resources such as environment, technology, and the human resources. This will address the underlying causes at the household level in order to ensure adequate dietary intake to minimize incidences of disease and malnutrition and thus death and disability. To improve nutritional status, there is a need for increased production of diverse and safe foods, increased household food availability, and access throughout the year to ensure adequate food consumption through right quantity and diversity. To make agriculture work for nutrition, there is a need to have improved nutrition as an outcome that is specific, measurable, attainable, realistic, time-bound, and gender sensitive.

Building capacities through targeted trainings can mainstream nutrition in national agriculture and food security investment plans and the Kenya Health Sector Strategic plan. It is for this reason that USAID-KHCP, the Ministry of Agriculture, and the Ministry of Public Health and Sanitation, in collaboration with stakeholders, have developed this training manual and toolkit. We therefore wish to call for co-operation and commitment of all trainers and service providers to embark on integrating applied basic nutrition and agriculture through providing knowledge and skills on selecting, preparing, cooking, and consumption of healthy foods for a healthy and prosperous nation.

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Ian Chesterman
USAID-KHCP Director

EXECUTIVE SUMMARY

Kenya currently faces chronic and growing food insecurity. According to the findings of the 2008 Kenya Demographic and Health Survey (KDHS), 35 percent of Kenyan children are stunted, while 14 percent are severely stunted. Wasting is also on the rise in Kenya, with a 1.4 percent increase from 2003.

Kenya's high rates of under-nutrition are particularly due to poor maternal micronutrient status and consequent low birth weight, poor infant feeding practices, lack of access to adequate water and sanitation, and unsafe hygiene practices, as well as malaria and HIV/AIDS. Under-nutrition reduces GDP by 2-3 percent, which predicts Kenya could lose $38.3 billion between 2010 and 2030.[1]

Fortunately, nutrition has become a major focus at the global level with multi-stakeholder efforts now scaling up nutrition activities, known in Kenya as the "Scaling up Nutrition (SUN) movement." This effort promotes more focused attention on nutrition within donor-funded initiatives and encourages countries, as well as regional and international stakeholders, to work together to improve national nutritional uptake.

The Ministry of Public Health and Sanitation, in collaboration with nutrition partners, launched the SUN at a symposium in November 2012. This initiative aligns well with the Nutrition Action Plan recently drafted by USAID-KHCP that is being rolled out in phases across all Feed the Future (FTF) counties. It relies on effective collaboration with the Ministry of Agriculture and Ministry of Public Health and Sanitation by utilizing the services of the personnel within the existing structure to provide practical training on household nutrition and dietary diversity with communities supported by the project. The collaboration with the two ministries will draw from their existing expertise, the community strategy, and the country nutrition focus, and will utilize and strengthen already existing structures.

The involvement and utilization of skilled human resource and mobilization capability of the various Government of Kenya Ministries – including Agriculture, Health, Water, Cooperatives, and Education – through effective and clearly defined public-private partnership activities is fundamental to maximizing the outreach and impact of USAID-KHCP activities.

[1] Kenya government department for nutrition

INTRODUCTION & PURPOSE

This Trainer of Trainers (ToT) manual provides a theoretical and practical framework to support the Applied Nutrition Toolkit. It supports and motivates the trainer to be actively involved ingroup discussions while delivering the Applied Nutrition Toolkit to individuals, specific groups undergoing training, and the community.

The manual will provide the trainer with further knowledge on applied nutrition to enable them to diverge from the Toolkit and expand the knowledge of the participants while encouraging active discussions through questions and answers.

For example:

- If you are an experienced worker within the health environment, you could use it to refresh your skills and knowledge and use the resource as a tool for passing on this information to colleagues.
- If you are a Community Based worker, the resource book will aid you in passing on knowledge to benefit the community members with whom you are working with.
- If you are a trainer in an area other than nutrition, this booklet will provide background information and act as a reference guide.

The information within this manual has been developed in alliance with the World Health Organization (WHO) and all food types, sizes, and servings are the recommended daily intake required to maintain a healthy body system. As a trainer in Basic Applied Nutrition, it is your responsibility to deliver the correct information on nutrition as written within this manual. Under no circumstances should advice be given on a client's health that is beyond your level of understanding. In this case, the clients should be advised to seek medical attention.

The ToT manual has been written to be used in conjunction with the Basic Applied Nutrition Toolkit flip chart. It is set out to be delivered in order of sequence with expanded information written after each of the picture charts. It is advised that the trainer read through this manual several times before delivering the Basic Applied Nutrition Toolkit to any trainee.

Delivery Plan for the Trainer of Trainers Resource Manual on Applied Basic Nutrition

Delivery Outline/Purpose:

The delivery duration should take from 60 to 120 minutes depending on trainee interaction.The purpose of the delivery is to educate and inform participants of the general community on the importance of Applied Nutrition in their day-to-day lives. At the conclusion of the training the participant should be able to recognize the 5 food groups for maintaining a healthy body system, suitable cooking methods for retaining the optimum level of nutrients, possible health repercussions of not taking a balanced diet, importance of practicing good hygiene and recommended serving sizes of each of the food groups.

Nutrition Toolkit Use and Purpose:

The NUTRITION TOOLKIT is to be used as a visual tool and all participants should have a clear view of this. The picture carrying certain nutritional messages should face out to the participants and the deliverable message facing the trainer. Each deliverable message should be read out clearly and confirmation of understanding received by the participants before moving onto the next chart.

Resource Manual Use and Purpose:

The resource manual is for the use of the trainer to gain further knowledge and understanding of each of the flip chart messages. The resource manual is also to be used as a reference guide to enable the trainer to answer participant questions they may ask in reference to the flip chart message. Delivery should always be given with the resource manual on hand.

SUPPORTING DOCUMENTS – These tables are designed to quickly and easily answer participant questions in reference to the nutritive value of commonly consumed foods. This will enable the participants to make informed food choices in reference to high nutritive value.

Additional Resources required carrying out the Training:

- Sufuria
- Colander
- Lid
- One Bunch of Leafy Green Vegetables
- One Dessert Spoon and One Teaspoon
- 20 ml Oil and 5g Salt

Training Plan for Community Delivery of Nutrition Toolkit

TIME	OUTLINE	RESOURCES/ACTIVITIES
Start 5-10 minutes	Welcome to group Introduction and purpose of the Nutrition Toolkit	Name tags Sign on book Resource Manual Nutrition Flip Chart
5-10minutes	What is Applied Nutrition? And why do we need to know about Applied Nutrition?	Group Discussion
45-95 minutes	-Start at chart number 1 and work through the Toolkit in numerical order – ask the participants what they think the photos on each page stand for. -**Steaming** method of cookery is a mock practical demonstration on how the steaming of vegetables is undertaken. -**Serving Sizes** of fats and salt is to be measured to clearly show amounts	-Encourage **BRIEF** group discussions on each of the charts to ensure participant understanding -Read out trainer notes on the back of each flip chart to the participants - colander, Sufuria, lid, bunch of leafy greens - 20ml oil or fat - 5g salt - dessert spoon - teaspoon
5 minutes	Review of Toolkit	Group discussion – question and answer time Trainer to refer to the Resource Manual to answer basic questions on Nutrition

CHAPTER ONE - Importance of Nutrition in Communities

CHART 1: What Is Applied Nutrition?

SELECT

PREPARE

COOK

HEALTH

What Is Applied Nutrition?

*It is what you '**select**' to eat, how you '**prepare**' the food and how you '**cook**' the food*

SELECT:

Select a variety of foods from each of the food groups: Starches (carbohydrates), fruits & vegetables, proteins, water, fats &oils.

- **Starches (Carbohydrates)** – Select a variety of carbohydrates throughout the day including roots, tubers, grains, legumes and pulses. Make starchy foods the basis of most meals
- **Proteins**- Select a variety of protein from both animal and plant sources. Each week select proteins from sources such as beans and lentils, fish, chicken, beef, goat, rabbit and eggs.
- **Fruits & Vegetables** – by selecting a variety of fruit and vegetables, that include at least 5 different colours, you will be eating necessary vitamins and minerals to maintain a healthy body.
- **Fats & Oils** – these are necessary for the body to function, however they should be used in small quantities.
- **Water**– Consume at least 8 glasses of water daily
- **Salt & Sugar**- Reduce your intake of salt and sugar

PREPARE:

- Wash your hands- Attend to personal hygiene before preparing food
- Use only well washed utensils and cooking vessels
- Wash fruit and vegetables in clean safe water very well to remove all dirt that may cause diarrhoea or gastric upset (vomiting)
- Only remove the skin off the fruit and vegetables if necessary or inedible
- Wash, chop leafy greens just before cooking as this will retain most nutrients
- If you need to chop leafy green vegetables, make sure you do not chop the vegetable too finely as this will also reduce the nutrient retention when cooking
- Pre-Soak legumes and pulses to release nutrients and save on fuel since soaked legumes and pulses take shorter time to cook

COOK:

- Animal products- Ensure well-cooked to avoid food borne infections (i.e. diarrhoea)
- Avoid over cooking vegetables as this will increase the loss of nutrients
- Only cook vegetables just before meal times to retain as many nutrients as possible. The longer cooked vegetables sit in the water the more nutrients are lost
- Use alternative food cooking methods to make meals interesting and ensure diets contains sufficient nutrients. Cover food that require long periods of cooking to retain nutrients and save energy

CHART 2: Benefits of Healthy Eating

Benefits of Healthy Eating

By eating the right quantities and variety of foods this will improve the health of your body and mind.

Improved Studies:

- Children grow and develop in a healthy way.
- Health of your children will result in better performance in their studies.

Improved Productivity:

- This will enable one to physically work harder, make positive decisions, in turn leading one to make more money.

Healthy Family:

- The possibility of family members becoming ill is reduced when eating a balanced diet, this results in less money being spent on medical costs.
- This will result in more money to buy healthy food for the family.

The Basic Principles of Nutrition

Our basic needs

People have a number of basic needs in life. These are:

- Food
- Water
- Clothing
- Shelter
- Safety/security

Food and water are essential for survival. The foods we eat must meet our nutritional requirements; contribute to our physical health, wellbeing and capabilities. It is important that families have access to and consume a variety of nutritious, safe and acceptable foods in amounts that meet their energy and nutritional needs.

Food contains nutrients that produce energy to keep the body warm and working well; others that build muscles, bones and other parts of the body; repair and heal injuries in the body; others that help the brain and body function properly and those that help the body resist and fight disease.

Nutrients are broadly classified into two categories;

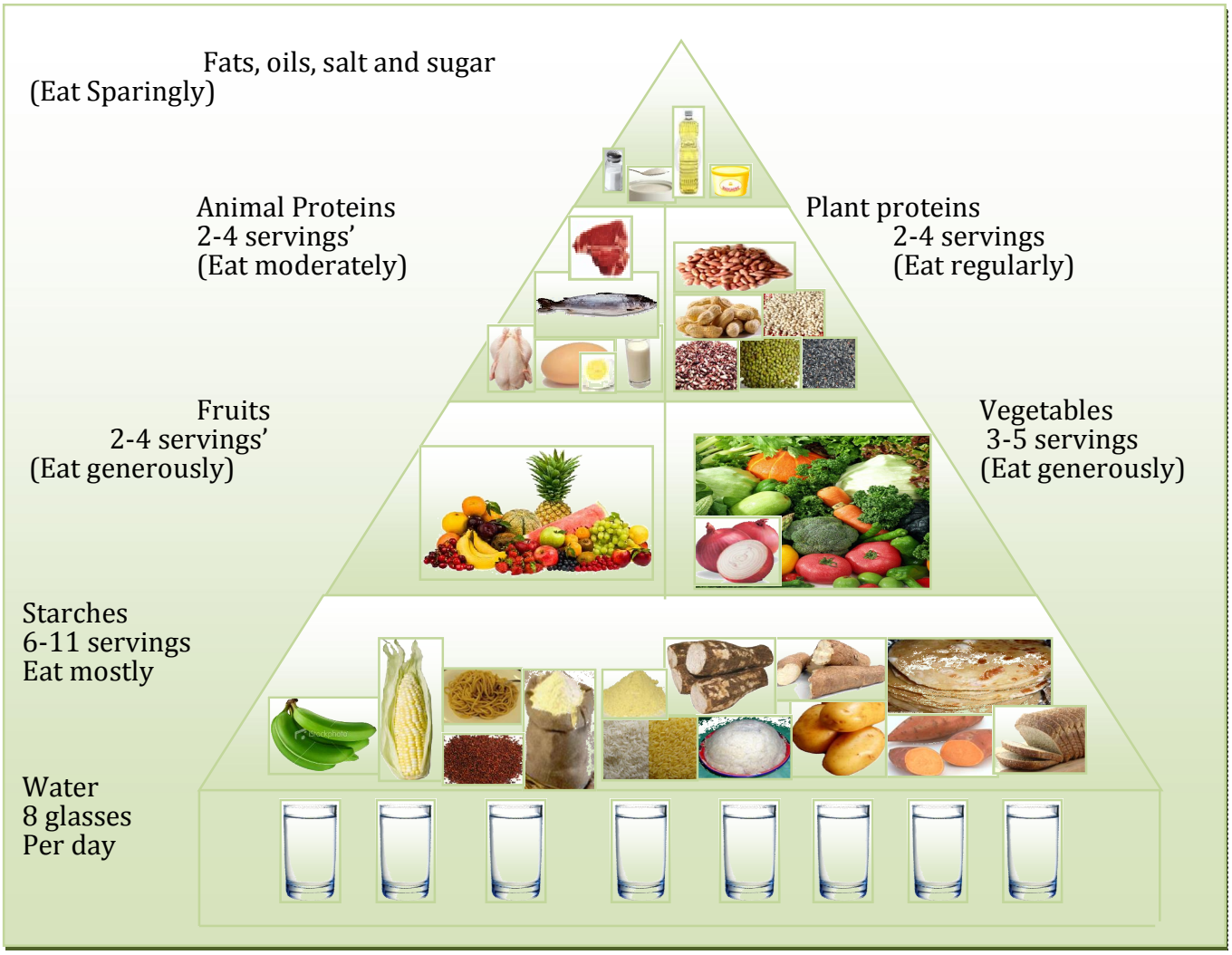
- Macronutrients – They include carbohydrates, proteins, and fats
- Micronutrients – they include vitamins and minerals

Various foods need to be combined and served together to enable the body obtain all the required nutrients which are important for normal body functioning.

The Healthy Food Guide

The 'Healthy food guide' is a food selection guide that can help you as the trainer to advise the community members in the selection of foods. The food guide will assist you to organize foods into groups according to the energy and the nutrients that they supply, so that the prepared meals are balanced and nutritious. The food guide illustrates how foods should be selected and indicates the foods that should be eaten more (at the base of the food guide), moderately and generously (center) and in small amounts (at the top of the food guide). The food guide also recommends consumption of a minimum of 8 glasses of clean safe water per person per day.

CHART 3: The Healthy Eating Pyramid



The Healthy Eating Pyramid notes

WATER

- Drink at least 8 glasses of clean safe water daily

STARCHES 6 – 11 servings each day

- Starches (carbohydrates) provide the body with energy, vitamins and minerals
- Keeps the body warm and working well

VEGETABLES3 – 5 servings and FRUIT 2-4 servings each day

- They are low in fat and rich in fibre
- High in vitamins and minerals which strengthen the body's immune system

ANIMAL AND PLANT PROTEINS 2 – 4 servings each day

- Helps in building and repairing body tissue including muscles
- Provides vitamins and minerals for function of body systems
- Milk, yoghurt and cheese- 2-3 servings each day. They provide proteins, vitamins and minerals

FATS, OILS, SALT AND SUGAR

- They are necessary but should be eaten in moderation.
- Provide mostly energy
- Large amounts of these foods will cause a nutritional imbalance in the body
- These foods can cause health issues such as Diabetes type 2, obesity, hypertension (blood pressure) and some cancers

How the food guide is divided

Base of the food guide - Eat most

These are foods that provide complex carbohydrate (starch), and small amounts of vitamins, protein, minerals and water. The foods in this group include roots, tubers and cereal grains.
They form the main part of any meal and should therefore be consumed mostly. Eating a variety of these foods each day provides adequate amounts of energy from carbohydrates to keep the body warm and working well.
Foods in this level include:

- Rice, maize, maize meal, wheat, wheat flour, millet, sweet potatoes, plantains, pasta, arrow roots breads, cereals and grains, preferably wholegrain

In order for Individuals to meet their daily requirements for energy, they should consume 6 – 11 servings of starch per day. One (1) serving is equivalent to half cup of cooked cereal, ugali or rice.

Water

Water is important

- To regulate the body temperature.
- Dissolve, absorb and transport nutrients around the body.
- Removes waste products from the body
- Acts as a lubricant which lubricates joints and mucous membranes

Take adequate amount of water per day (for adults approximately 8 glasses a day and reduce intake of caffeinated and sugary products such as coffee, sodas

Mid-lower section of the food guide - Fruits and Vegetables.

These are foods that are low in fat and rich in dietary fiber. They provide vitamins and minerals, which strengthen the body's immune system. They are a good source of fiber and water for bowel movement. Food sources include dark green, yellow and orange vegetables and fruits, such as traditional vegetables, carrots, sweet potatoes leaves, spinach, mangoes, and pawpaw.

Eat generously- Individuals should consume 2 – 4 servings / portions of fruits and 3 – 5 portions / servings of vegetables daily. (1) serving is equivalent to (1) medium fruit, ½ cup of cooked vegetables and (I) cup of raw vegetables.

Mid-lower section of the food guide -Proteins

Foods in this section of the food guide are required for building and repair of body tissues (including muscles). They are rich in protein, and are also good sources of vitamins (especially B12) and minerals (calcium, Zinc and iron). Protein foods are derived from animal and plant sources. Animal proteins include meat, milk and milk products, poultry, eggs, fish, liver, kidney, offal (matumbo), and edible insects such as termites.

Plant based proteins include beans, peas, lentils, green grams, soya beans and products made from soya, seeds and nuts e.g. simsim seeds, unsalted nuts and peanut butter. Animal proteins contain some fat, hence the need to be eaten in moderation.

The recommended daily intake of proteins is 2 – 4 servings per day. Example: (1) serving is equivalent to any of the following, ½ cup of cooked legumes or pulses, 1 egg, and 1 glass of milk, Palm size piece of meat or fish

Top section of the food guide –Fats, oils, salt, sugar

Eat only a little (sparingly)

Foods at the top of the food guide should be limited because they lack a good supply of the nutrients for growth and good health. While small amounts of fats, sugar and oils are acceptable, larger amounts of these foods will cause an imbalance that will result in the health problems such as Obesity, Type 2 diabetes, Hypertension, cancers, etc.
Foods in this level include:

- Margarine, butter, ghee, cooking fats and oils,
- Sugar and sugar rich foods such as sweets (chocolate), jam and soda, squashes
- Salt

The recommended daily intake for salt should not exceed 5g. Recommended sugar intake (World Health Organization) - 6-10 percent of total daily calories

Nutrients

The following nutrients are recognized as key in building the body and the immune system within the body and assisting in growth and development. These nutrients are the most commonly known and will help the trainer answer questions from the learner in relation to what foods are rich in certain nutrients and what affect that nutrient has on the body.

Sources and Functions of Different Nutrients in the Body

Nutrient	Functions	Food sources	Nutritional Disorder
Starches (Carbohydrates)	• Main sources of energy • Provide bulk/roughage in the diet. • When consumed in excess are converted into fats and stored in body reserves.	• Maize, • Rice, • Sorghum, • Millet, • Wheat • Green banana, • Cassava, • Irish potato, • Sweet potato • Pasta	• Tissue wasting • Slowing of body functions • Reduced growth and development
Proteins	• Body building • Repair and maintenance of body tissues	**Animal sources** • Meat • Eggs • Fish • Poultry • Milk and milk products. **Plant sources –** • Legumes, • Pulses • Whole grains and cereals, • Nuts and seeds	• Stunting, • Underweight • Kwashiorkor
Fats	• Concentrated forms of energy • Essential for the absorption of fat-soluble vitamins. • Give support to the vital organs like the heart, kidney and intestines. • Provides insulation against cold. • Add taste to the foods.	• Ghee • Butter • Cheese • Lard • Fish oil • Fatty meat • Poultry • Fish **Vegetables fats** • Corn oil • Groundnut oil • Soya bean oil • Sunflower oil • Coconut oil	• Unable to carry certain vitamins through the body
Fiber	• Aids in bowel movement as it absorbs water thereby increasing the bulk of the stool. • Has cholesterol-lowering effect. • May play a role in weight reduction	• Whole grain and cereals • Legumes • Roots and tubers • Oil seeds • Fruits and vegetables.	• Constipation, • High levels of cholesterol in the blood **May contribute to a number of diseases:** • Cancers • Coronary heart diseases • Bowel diseases • High blood cholesterol

Minerals			
Calcium	• Build strong bones and teeth • Important for functioning of heart and muscle, blood clotting and immune defenses	• Milk, • Dark green leafy vegetables • Dried fish • Shrimp • Beans • Lentils • Peas • Whole grain millet • Oil seeds • Okra	• Osteoporosis – bone breakages in adults • Osteomalacia (reduced quality of the bone) • High blood pressure
Iron	• Transports oxygen to the blood • Eliminates old red blood cells and builds new cells.	• Red meat • Liver • Poultry • Shellfish • Egg • Ground nuts • Leafy vegetables • Lentils • Beans • Cowpeas • Soybean • Cereals • Dried fruits	• Anaemia • Low Iron stores • Extreme tiredness
Sodium	• All body fluids contain salt(sodium chloride) and it is essential for life • It is a key element in the regulation of the body water • It aids in nerve transmission and muscle contractions • It prevents muscle cramps • It flavors food thereby enhancing appetite	• Salt • Milk • Cheese • Salted butter • Shellfish • Meat fish • Poultry • Cereals • Fruits and vegetables	• Lethargy • cramping • weakness • seizures
Potassium	• Heart muscle activity • Helpful in reducing blood pressure and preventing stroke	• Irish potatoes, • milk • oranges • pineapple • banana • yam • tomato • nuts • avocado • beans greens • yoghurt • apple	• Muscle cramping • Weakness • Heart to beat out of time
Magnesium	• Strengthens the muscles • Important for nervous system function • Involved in bone development and maintenance of teeth	• Cereal • dark green vegetables • seafood • nuts • legumes • groundnuts • soybean	• Nausea • Muscle weakness, • Irritability • Mental derangement
Iodine	• Ensures the development and proper functioning of the brain and of the nervous system.	• Fish and other seafood, • animal products • plants from soil rich in	• Goitre

	• Important for growth and metabolism • Accelerate the combustion of nutrients that provide energy.	iodine • iodized salt	
Fluorine	• Prevents dental caries	• Seafood • tea • Water	• Dental caries
Zinc	• Tissue growth, maintenance, healing and development • Metabolism of carbohydrates, proteins and fats • Important in cell division • Immune system function • Smell and taste acuity • Wound healing • Helps in diarrheal management	• Organs and meat of mammals • fowl • fish • poultry • whole grain cereals • milk • yoghurt • vegetables • corn • guavas • pumpkin seeds • shell fish • eggs • dairy products • nuts and seed • cereals • legumes	• Reduced resistance to infection • skin ulceration • Stunted growth.
Selenium	• Prevents impairment of the heart muscle • Enhances the body's immune system • Antioxidant	• Seafood • liver • meat • nuts • unrefined grains • brown rice • wheat germ • whole-grain cereals • carrot • onion • milk • egg • cooked sunflower seeds	• Reduced resistance to infection • joint deformities in children • damage to heart and skeletal muscles • lightening of skin • Hair pigmentation.
Vitamins **1. Fat Soluble Vitamins**			
Vitamin A	• Normal functioning of the visual system • Growth and development • Immune function and reproduction • Ensures proper bone growth.	• Liver • eggs • fish oil • whole milk • mango • pawpaw • orange-fleshed sweet potato • pumpkin • carrot • red palm oil • dark green leafy vegetables	• Poor dark adaptation - night blindness • growth failure - stunting • Reduced resistance to infection.
Vitamin D	• Helps the body absorb calcium in the intestine, as well as its storage in the bones	• Fish liver (cod) • fish meat • milk • butter	• Rickets • Osteomalacia (softening of bones in adults) • bone pain

		• egg yolk • lettuce	• muscular tenderness • delayed closure of fontanelle (soft section in the front of a babies skull) • delayed teething • enlargement of joints
Vitamin E	• Protects cell structures and facilitates resistance against diseases • Antioxidant • Takes part in the formation of reproductive cells • Stimulates the immune system	• Cereals germ, • Leafy vegetables • vegetable oils • groundnuts • egg yolk • nuts • liver • milk fat • peanuts • corn oil • whole grain products • soya • sunflower seeds • cotton seeds • coconut • tomatoes • sweet potatoes	• Anaemia in infants • Abnormality of nerves and muscles • irritability • oedema – retaining fluid in the body
Vitamin K	• Helps with the coagulation of blood. • Acts in the prevention of hemorrhaging (bleeding heavily)	• Broccoli • cabbage • lettuce • spinach • peas • cheese • milk	• Haemorrhage – characterized by Prolonged blood clotting time • Hip fractures in older adults
2. Water Soluble Vitamins			
Vitamin B1 (Thiamine)	• Important for energy metabolism • An essential factor in the function of the nervous system • Supports appetite	• Whole-grain cereals, • beans • meat • fish • chicken • egg • milk • oil seeds • legumes	• Beriberi • muscle weakness • anorexia • oedema –body fluid retentions • enlarged heart • confusion
Vitamin B2 (Riboflavin)	• Important for energy metabolism • Supports normal vision, health and good skin	• Milk. • Egg, • liver • yoghurt • meat • dark green leafy vegetables, • whole-grain cereals • fish • beans	• Inflammation of the tongue, • swollen stomach, • oedema – body fluid retention
Vitamin B3 (Niacin)	• Essential for energy metabolism • Support health and good skin, nervous and digestive systems	• Milk • egg • poultry • groundnuts • whole-grain cereals	• Dermatites – skin rashes and other skin conditions • Diarrhoea • Dementia - forgetfulness

		• fish • mushrooms • peanuts	
Vitamin B6 (Pyridoxine)	• Helps with the metabolism and absorption of fats and proteins • Help make red blood cells	• Sweet potato • white beans • avocado • cabbage • broccoli • meat • green leafy vegetables • fish • poultry • watermelon • oil seeds • maize • broccoli	• Inflammation of the tongue • lesions on the lips and corners of the mouth
Folate – Folic Acid	• Required for building new cells, especially red blood cells and gastrointestinal cells	• Liver • red meat • green leafy vegetables • fish • legumes • groundnuts • whole-grain cereals • egg yolks • avocado	• Anaemia • Neural tube defects in newborns.
Vitamin B12 (Cobalamin)	• Important for new cell development and maintenance of the nerve cells	• Red meat • fish • poultry • seafood • cheese • eggs • milk • whole-grain cereals	• Anaemia • inflammation of the tongue • deterioration in sight • sensitive skin • dementia • weakness • confusion
Vitamin C (Ascorbic acid)	• Contributes to the formation of defenses against infections • Helps with the healing of wounds • Helps the body to use calcium and other nutrients to build bones and blood vessel walls • Important for protein metabolism	• Orange • lemon • tangerine • mangoes • guava • tomato • spinach • fresh peas • cabbage • green leaves • tomatoes • peppers • Potatoes • yams • fresh milk	• Scurvy • poor appetite • fatigue • retarded wound healing • bleeding gums

Relationship between Nutrition, Health & Development

The body depends on nutrients for:

- Growth and development
- Repair
- Energy
- Renewing of cells
- Blood development
- Fighting Illness
- Preventing disease
- Longevity of life

Without the correct amount of nutrients your body can suffer from many conditions such as:

- Diabetes type 2
- Heart disease
- Wasting
- Blindness
- Stunting
- Skin infections
- Organ failure
- Constant illness
- Viral infections
- Depression
- Extreme tiredness
- Neural tube defect
- Cancer
- Reduced performance

CHART 4: THE EFFECTS OF POOR NUTRITION

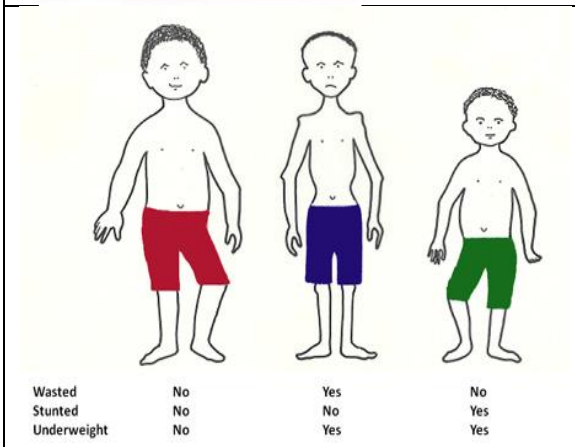
	**Wasting** - from not eating enough food containing essential nutrients for the body to develop. Extreme losses of fat and bone density to the body. Causes organ failure, bone breakage and heart failure
	**Stunted growth** - from babies not being fed exclusive breast milk for the first 6 months of life and from not receiving adequate nutrients for growth and development after 6 months All the children here are same age (Photo Adapted from Waterlow (1992)
	**Frequent sickness** -from not eating adequate foods containing a variety of vitamins and minerals
	**Rickets**- from not receiving adequate, calcium, vitamin D and other important nutrients for the body to develop. Causes abnormal formation of bones while children are growing

CHART 5: THE EFFECTS OF POOR NUTRITION

 Vitamin A deficiency complicated by measles (Rubeola)	**Blindness** - from not receiving adequate Vitamin A
	**Obesity**- from taking too much high fat processed foods and carbohydrates, coupled with lack of physical activity. Increases risk for Diabetes Type 2, heart disease, high blood pressure and some cancers
	**Skin infections** - from not receiving enough of the Vitamin B group Causes the body not to be able to repair damaged skin due to infections or cuts
	**Heart disease** - from having too much cholesterol from fatty foods and carbohydrates or from a genetic problem with the heart. Causes heart attack and stroke

Diet-Related Nutritional Disorders

Diseases and disorders related to nutritional imbalance

Diseases and disorders linked to nutritional imbalance in the diet play a significant role in Africa's public health problem. Nutritional imbalance can cause or contribute to exacerbating a wide range of diseases and disorders.

Malnutrition

Malnutrition is defined as a state when the body does not have enough of the required nutrients (under nutrition) nor has excess of the required nutrients (over nutrition).

There are several forms of malnutrition:

- **Chronic under nutrition (or stunting**): characterized by failure to reach linear growth potential because of inadequate nutrition or poor health. A child is considered stunted when they have not reached their expected height for their given age.
- **Acute under nutrition (or wasting**): describes a recent or current severe process leading to significant weight loss, usually a consequence of acute starvation or severe disease.
- **Under weight:** refers to low weight for age. A child is considered underweight when they have not met their expected weight for their age.
- **Overweight**: Excess weight relative to height
- **Micronutrient deficiency disorders (MDDs):** this covers a wide range of disorders that are due to an insufficient intake or use of vitamins or minerals. Different symptoms and disorders are associated with each deficiency. For example, iron deficiency can cause anemia; iodine deficiency can cause mental impairment, goiter, and cretinism; vitamin A deficiency leads to increased child mortality and night blindness; and vitamin C deficiency causes scurvy. Each deficiency can cause a range of symptoms according to the severity of the deficiency, and many MDDs are associated with an increased risk of morbidity.

Common causes of nutritional disorders

Over nutrition and related disorders are also commonly referred to as lifestyle disorders.

- Obesity
- Overweight
- Hypertension
- Type 11 diabetes
- Heart diseases

Caused by diets that are high in:

- Fat or cholesterol
- Carbohydrates
- Sugar
- Fats and salt or
- Diet low in fibre
- Lack of physical activity

'Lifestyle' disorders arise specifically from poor nutrition or food intake patterns, and are frequently also linked to other poor lifestyle choices like lack of physical activity.

For over nutrition related conditions, a change of diet is necessary to either prevent the disease or disorder from occurring or becoming worse.

Diabetes

Diabetes is a condition that occurs when there is too much glucose in the bloodstream.

- Glucose – is a sugar that the body makes when we eat carbohydrates such as breads, cereals, grains, fruits, vegetables and milk.
- When we eat carbohydrates, our body breaks them down into glucose.
- Glucose – is the main source of energy the body needs. It is carried around the body in the blood stream and the level must not be too high or too low.
- For the body to obtain energy from glucose, the glucose has to move from the blood stream and into the body tissues such as the brain, heart and muscle tissues and the liver. Glucose moves from the blood stream into the tissues by the hormone insulin. Insulin is a hormone that is made by the pancreas. Insulin allows glucose to enter body tissues by opening the doors (glucose channels), which allow glucose to move from the blood stream and into the tissues of our body. This is where energy is made.

In Diabetes, the pancreas suffers one of these problems:

- Cannot make insulin or
- Makes insulin but doesn't make enough of it so it cannot work properly or
- Makes insulin but the cells in the body do not recognize it

Type 1 Diabetes - insulin dependent

There is strong evidence that individuals who come from a family with a history of Diabetes may be more susceptible to developing type 1 Diabetes. It is only thought to develop when something triggers the immune system to destroy the cells that produce insulin (beta cells) inside the pancreas. These triggers are thought to be caused by factors in the environment; however it is not yet well understood. A viral infection, for instance, can destroy beta cells in the pancreas.

Type 2 Diabetes – non-insulin dependent

This is the most common form of Diabetes occurring in 85 – 90 percent of individuals with Diabetes.

Type 2 Diabetes – generally affects adults however today it is affecting more and more young children. Individuals whom have type 2 Diabetes are generally insulin resistant. This means that their body makes insulin, although the insulin is not working as well as it should be. The body makes more insulin and eventually it can't make enough to control blood glucose levels anymore.

People who are most likely to get type 2 Diabetes

- A family history of Diabetes.
- Age – the risk increases, as we get older.
- Women who have given birth to a child over 4.5kgs or had gestational Diabetes when pregnant.

- Women who have a condition known as polycystic ovarian Syndrome.
- Persons who have had a diet history of high levels of carbohydrates and sugars.

Often there are no symptoms at all, or they can go unnoticed as they are put down as symptoms of getting older. By the time symptoms are noticed, often complications of type 2 Diabetes are already present.

Common symptoms

- Feeling thirstier or more hungry than normal.
- Passing more urine
- Feeling tired and lethargic
- Having cuts that take a long time to heal
- Gradually putting on weight (type 2)
- Unexplained weight loss (type 1)
- Blurred vision, headaches, feeling dizzy
- Leg cramps
- Mood swings
- Itching, skin infections

Gestational diabetes

Gestational diabetes occurs during pregnancy and usually disappears after the baby is born. Type 2 Diabetes usually occurs from approximately the 24-28th week of pregnancy. The risk of type 2 Diabetes within 5-10 years is possible.

The women at risk for gestational Diabetes are –

- Overweight women
- Women over 30 with a family history of type 2 Diabetes.

How is Diabetes managed?

- No matter which type of Diabetes they have, individuals must keep their blood glucose levels as closest to the non- diabetic range as possible.
- If individuals stick to the desired level of blood glucose, they can prevent the short-term effects of very high or very low blood glucose levels.
- Keeping blood glucose levels within the desired levels also prevents long term complications such as, eye, kidney, nerve problems, heart disease and stroke.
- Being physically active
- Adhering to medical treatment and dietary plans

What should people with Diabetes be eating?

- People with diabetes are advised to include unrefined carbohydrates such as whole meal cereals in their daily food choices
- Half of the daily food choices need to consist of foods high in unrefined carbohydrates
- Individuals need at least two carbohydrate servings at each meal to prevent hypoglycemia (drop in blood sugar levels)

- Carbohydrates must be considered when choosing foods as the amount have the greatest effect on blood sugar levels.
- Eat generous amounts of vegetables and fruits

Foods rich in unprocessed carbohydrates:

- Wholemeal flours
- Cereal grains (rice, wheat, maize, sorghum, barley)
- Starchy vegetables (sweet potato, potato, green maize)
- Legumes (beans, chickpeas, lentils, green grams, peas)

Refined carbohydrates to avoid:

- White breads, polished rice
- Foods made with white flour such as cakes, biscuits

Special dietary guidelines for individuals with type 1 & 2 diabetes:

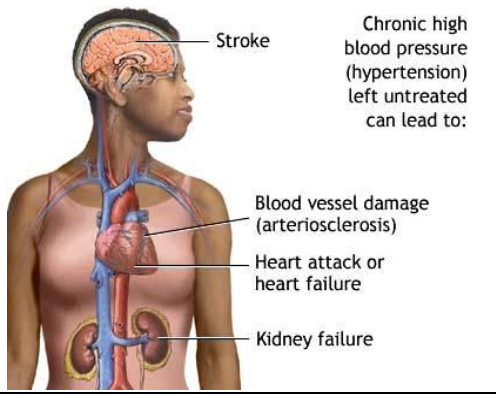
To keep blood glucose within the normal ranges, advise people as follows:

- Eat regularly and spread meals evenly throughout the day
- Eat a low fat diet, reducing saturated fat
- Choose high fibre wholegrain & whole meal carbohydrate foods such as breads & cereals, lentils, fruits and vegetables
- Sugar and foods containing added sugar to be eaten in sparingly.
- Choose slowly digested carbohydrates to gain better control of blood glucose levels – grains, cereals, fruit and vegetables.
- Choose foods rich in insoluble & soluble fibre. Soluble fibre controls blood glucose levels much better in people with diabetes. Soluble fiber is found in fruits and vegetables. Insoluble fibre is found in wholegrain cereals.
- Control weight
- Limit salt intake
- Limit alcohol intake

High Blood Pressure

What is high blood pressure?

When blood pressure is too high, the heart has to work harder to pump blood to all parts of the body resulting in damage to the walls of the blood vessels. High blood pressure can cause heart failure, stroke and kidney damage. High blood pressure often causes **no symptoms** until complications develop.



Some symptoms of high blood pressure may be

- Rapid pulse
- Headache
- Shortness of breath
- Sweating

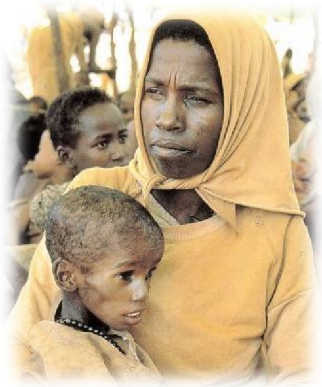
- Dizziness
- Visual disturbances

Some causes of high blood pressure may be

- Smoking
- Stress
- Obesity
- Lack of exercise
- High salt intake
- Oral contraceptive use
- Drug abuse
- Excess intake of coffee, tea or sugar
- Genetics

Some preventative measures to avoid the possibility of high blood pressure

- Eat a high fiber diet
- Eat at least five portions of different vegetables every day
- Eat oily fish such as tilapia
- Reduce table salt
- Avoid sugar
- Shed excess kilos if necessary
- Do regular exercise
- Drink at least 1.5 litres of water every day



Under nutrition

Certain people are more susceptible to under nutrition than others. For example, individuals in rapid periods of growth, such as infants, adolescents, and pregnant and lactating women, have higher nutritional needs. Those living in deprived socioeconomic circumstances or that lack adequate sanitation, education, or the means to procure food are also at risk. Most importantly, those who suffer with a chronic disease such as TB, HIV and AIDS are at greatly increased risk because they require additional energy to support their immune system and often have decreased absorption of nutrients**.**

Undernourished children who survive in to adult years may experience stunted growth, illness, and lifelong malnourishment. Alcohol can interfere with nutrient absorption, so alcoholics may not benefit from the vitamins and minerals they consume. People who abuse drugs or alcohol might be underweight because they don't eat adequate diet. People with anorexia, bulimia, or another eating disorder are also at risk of under nutrition.

What happens to someone who is malnourished?

Under nutrition has effects on physical and mental growth and development of individuals. The signs and symptoms of under nutrition include:

- Fatigue and low energy
- Dizziness

- Poor immune function (which can cause the body to have trouble fighting off infections)
- Dry, scaly skin
- Swollen and bleeding gums
- Decaying teeth
- Slowed reaction times and trouble paying attention
- Underweight
- Poor growth
- Muscle weakness
- Bloated stomach
- Bones that break easily
- Problems with organ function
- Learning difficulties

When a pregnant woman is under nourished she could suffer birth related complications, her baby could weigh less at birth, and consequently have a smaller chance of survival. Intergeneration under nutrition could also occur in the event that the baby is a girl and is also under nourished during her childhood and adolescent years. This would mean that she too could give birth to an under nourished child and suffer similar birth related complications as her mother.

HIV/AIDS and nutrition

Good nutrition can be a problem for many people with HIV. When the body fights any infection, it uses more energy and you need to eat more than normal. But when you feel sick, you eat less than normal. Nutritional deficiencies that occur in HIV and AIDS affected patients are caused by increased nutrient requirements and expenditure that result from frequent opportunistic infections, altered metabolism, nutrient mal absorption.

HIV diet and the importance of nutrients

The following practices are provided as general principles in responding to the nutritional needs of people living with HIV and AIDS. It is recommended that people living with HIV and AIDS adopt them as a lifestyle and not only when there is need to improve nutrition and immune status.

- Eat 2-3 meals and 2-3 nutritious snacks everyday
- Ensure all meals include all nutrients (balanced) in adequate amounts
- Consumption of a diverse diet with foods rich in micronutrients especially Vitamins A, C, B6, B12 and minerals selenium, iron and zinc.
- Eat 2-3 servings of legumes everyday
- Use animal sources of food at least 3-4 times a week
- Eat fruits and vegetables in plenty everyday
- Drink at least 8 glasses of clean safe water every day. This should be spread all through the day and should be taken 30 minutes before or at least 1 hour after meals
- Consume beverages such as tea, coffee, milk 1-2 hours before and after meals
- Exercise as possible. Take 30 minutes every day to engage in a physical activity that increases your breathing rate e.g. brisk walking, jogging etc.

- Nutrient supplements should be used when necessary on prescription
- Consumption of fortified foods e.g. fortified maize flours, fats and oils, salt where available
- Improving the nutritive value of local staples by precooking, soaking, sprouting and fermentation of cereals and legumes. This improves digestibility and increases the bioavailability of nutrients.

Practice food safety

It's very important that those suffering from HIV are protected from infections resulting from poor hygiene. Be sure to wash hands before preparing food and keep all kitchen tools and work areas clean. Personal hygiene should be observed such as regular bathing, clean hair, face and body, nails kept short and clean and the clothes that are being worn whilst preparing food should be cleaned daily. Fresh foods such as fruit and vegetables should be washed well in clean water and prepared on clean surfaces and cut with clean utensils. Don't serve raw or undercooked eggs or meat, clean up juices from raw meat promptly.

Food to avoid

Avoid foods that may inhibit the body's ability to adequately absorb nutrients:

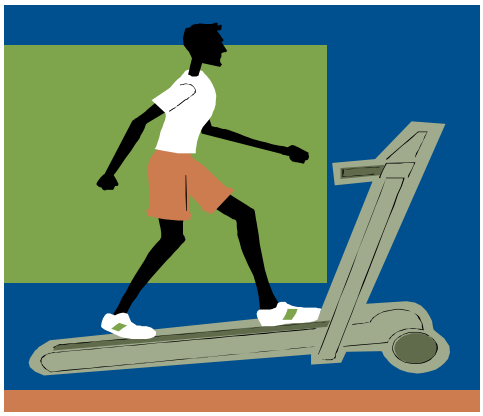
- Alcohol and coffee
- "Junk" foods with little nutritional value (chips, mandazi)
- Foods that aggravate symptoms related to diarrhea, nausea and vomiting, bloating, loss of appetite, and mouth sores (e.g. fatty foods)

Exercise

Maintaining physical activity at all times can restore muscle loss. Even gentle walking will help with keeping muscles flexible.

Physical activity improves:

- Lean body mass
- Body composition
- Bone density
- Strength
- Functional capacity
- Quality of life
- Appetite



CHAPTER TWO - Food & Nutrition at Family level

Food Handling and Preservation

Food Handling and Storage

Harvesting
It is important that fruits and vegetables are harvested at the correct stage before storage or preserving. Careful harvesting will prevent damage and bruising which may allow microbes to enter the fruit or vegetable and reduce the 'shelf life 'of the produce. Produce should be cleaned before storage or processing.

Food Storage
Proper food storage is an important part of reducing the risk of food poisoning. Some foods must be stored in the refrigerator or charcoal cooler and eaten in a short time; other foods, such as flour, pulses, canned and dried foods last much longer and can be stored at room temperature. But even dried foods have limits on their storage time. So watch out for storage instructions and make sure you always store foods:

- In the right place
- At the right temperature
- For the right time.

Care should be taken to make sure that the food store is protected from rats and other pests to preserve their goodness and prevent contamination. The food store should be dry and well ventilated. Fruit and vegetables can be preserved by drying, pickling or storing in a dry place.

Food Preservation

Food preservation is the process of treating and handling food to stop or greatly slow down spoilage caused or accelerated by micro-organisms, while maintaining or improving nutritional value, texture and flavor. Food for preservation should be harvested at its maximum nutritive value.

Food is preserved for:

1. Use when fresh food is out of season
2. Left-over food to be utilised again at a late date
3. Easier transportation
4. Minimising later expenses on buying the same food

The common methods of food preservation include drying, freezing, salting, smoking, sugaring, pickling, canning or bottling, vacuum packing and burial in the ground.

Solar Drying

Drying is an excellent way to preserve food, solar food dryers are an appropriate food preservation technology for a sustainable world. Drying preserves foods by removing excess moisture from food to prevent decay and spoilage. When drying foods, the key is to remove moisture as quickly as possible at a temperature that does not seriously reduce the nutritional value, flavor, texture and color of the food.

Dried foods have a number of advantages:

- Drying is a low-cost way to preserve food that is free from concerns about bacteria
- The dried foods require little storage space.

Nutritional Value of Dried Foods

Drying, like all methods of preservation, can result in loss of some nutrients. Nutritional changes that occur during drying include:

- Calorie content: does not change, but is concentrated into a smaller mass as moisture is removed.
- Fibre: no change.
- Vitamin A: fairly well retained if dried under shade or in a solar drier.
- Vitamin C: mostly destroyed during blanching and drying of vegetables.
- Thiamin, riboflavin, niacin and minerals some loss during blanching but fairly good retention if the water used to rehydrate also is consumed.

For best retention of nutrients in dried food; store in a cool, dark, dry place and use within a year.

Packaging the dried foods

1. Cool food before packaging as warm food produces vapor, which is enough moisture for mold to grow. Seal the dried food
2. Dried foods are susceptible to insect contamination and re absorption of moisture and must be properly packaged and stored immediately. Choose the right containers: Glass jars, metal cans or boxes with tight fitted lids make good containers for storing dried foods. Heavy-duty plastic bags are acceptable, but keep in mind that they are not insect and rodent proof.
3. Pack as tightly as possible without crushing.
4. Pack food in amounts that will be used in a recipe. Every time a package is re-opened, the food is exposed to air and moisture that will lower the quality of the food.

Storing the dried foods

1. Store in a cool, dark, dry place. The nutrition quality is affected by heat. The storage temperature determines the length of storage; the higher the temperature, the shorter the storage time. Most dried fruits and vegetables can be stored for 6 months to 1 year.
2. Check dried foods frequently during storage to see if they are still dry. Foods that are packaged seemingly "bone dry" can spoil if moisture is re-absorbed during storage. Foods affected by moisture, but not spoiled, should be used immediately or re-dried and repackaged. Moldy foods should be discarded.

Hygiene in Food Preparation

What Is Food Poisoning?

Food can be contaminated with harmful organism (e.g. bacteria, fungi), which produce toxins. A person eating this food may be infected by the germs and made sick from toxins.

Food poisoning is a common, usually mild but sometimes-deadly illness. Typical symptoms include nausea, vomiting, abdominal cramping, and diarrhea that occur suddenly (within 48 hours) after consuming a contaminated food or drink. Depending on the contaminant, fever and chills, bloody stools, dehydration, and nervous system damage may follow. These symptoms may affect one person or a group of people who ate the same meal.

Food Poisoning Causes

More than 250 known diseases can be transmitted through food. Food usually becomes contaminated from poor hygiene or preparation. Food handlers who do not wash their hands after using the bathroom or have infections themselves often cause contamination. Improperly packaged food stored at the wrong temperature also promotes contamination. Food contamination is not just limited to foods you may consider risky, such as chicken or fish. Prepared fruits, vegetables and salads can also be potentially dangerous. Contaminated food will usually look, smell and taste normal. Food poisoning bacteria can grow and multiply on some types of food more easily than others. High-risk foods include:

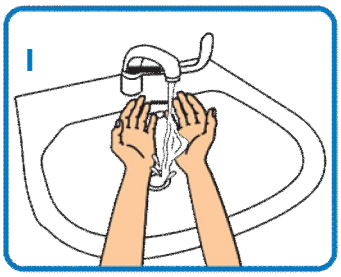
- Meat
- Poultry such as chicken
- Dairy products such as yoghurt
- Eggs
- Fish
- Cooked rice
- Prepared salads
- Sliced fruits

Some people are more at risk of getting food poisoning than others. Vulnerable groups include pregnant women, the elderly, young children, people with chronic illness. Take special care when buying, storing and preparing food for these people.

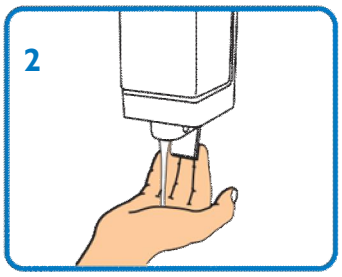
Basic Food Hygiene Guidelines

- Wash raw foods thoroughly – fruits & vegetables contain harmful dirt, fertilizers, pesticides
- Avoid unnecessary human contact and over handling of food. Use spoons or other utensils.
- Prepare raw and cooked food separately; use separate chopping boards and utensils where possible. This prevents Cross Contamination – transferring micro-organisms from contaminated food to uncontaminated food, (by hands, utensils, storage)
- Wash cooking equipment's with soap and clean water before and after use and when preparing different foods using the same equipment.
- Never eat while preparing food
- Minimize time food is at unsafe temperatures during preparation.
- Wash hands after visiting the toilet, blowing your nose, brushing hair or touching your body.
- Wash hands between food preparation tasks.
- Wash hands when coming from the farm.
- Wash hands after handling animals.

CHART 6: Hand-washing technique with soap and water

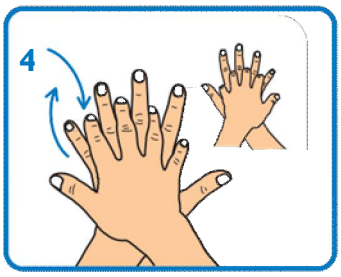


Wet hands with water

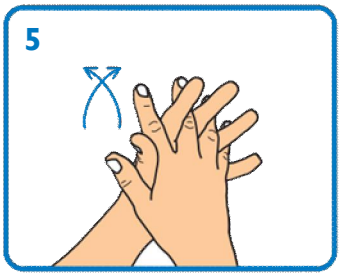


Apply enough soap to cover all hand surfaces

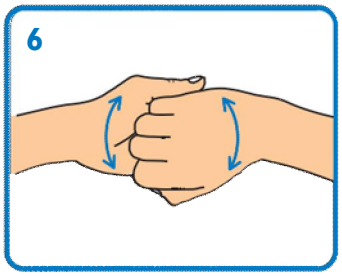
Rub hands palm to palm



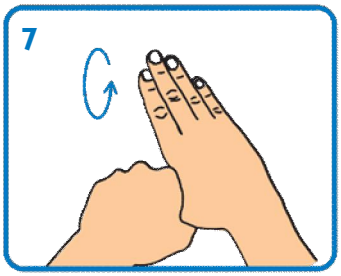
Rub back of each hand with palm of other hand with fingers interlaced



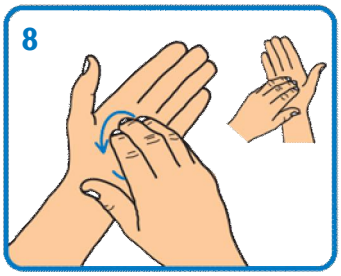
Rub palm to palm with fingers interlaced



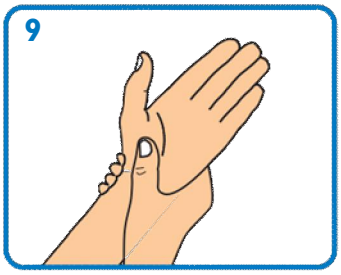
Rub with back of fingers to opposing palms with fingers interlocked



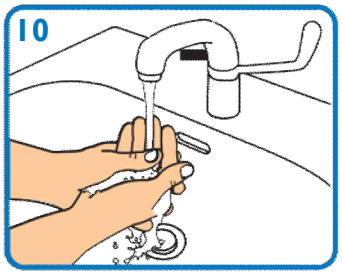
Rub each thumb clasped in opposite hand using a rotational movement



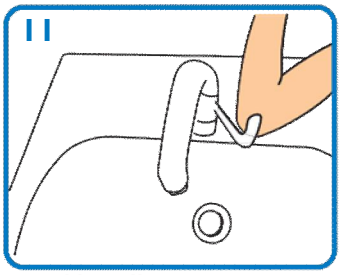
Rub tips of fingers in opposite palm in a circular motion



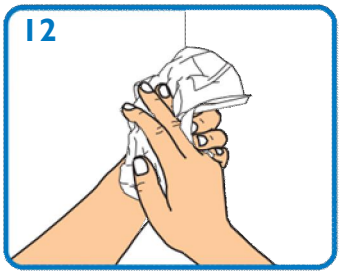
Rub each wrist with opposite hand



Rinse hands with water



Use elbow to turn off tap



Dry thoroughly with a single-use towel

Adapted from World Health Organization Guidelines on Hand Hygiene in HealthCare

Meal Planning and Management

Maximizing nutrition through preparation and cooking methods

Good quality ingredients should result in good quality meals, provided they are handled, prepared and cooked appropriately. If you do not use good quality and fresh supplies, you cannot expect good quality end products.

Some cookery techniques are specially designed to ensure that maximum nutrient values are retained in foods. Vegetables, for instance, can be steamed or dropped in boiling water for a brief period so that they are cooked but nutrition is retained. Poaching is a gentle cookery method that retains nutrition. Stewing foods in their own juices ensures that much of the nutrient is retained. Many vegetables carry much of their nutritional value in the skin; therefore, these vegetables should be washed and rapidly cooked, but not skinned (e.g. carrots, potatoes, cassava, arrowroot).

Food is cooked for a number of reasons:

- Cooking changes and enhances the flavour of many foods
- It increases palatability
- Digestibility of many foods is improved
- Texture and aroma are improved

Optimum cooking methods

The following cooking methods are listed in order of the most- to least suitable for retaining the optimum levels of nutrients.

1. Steaming
2. Sautéing
3. Boiling
4. Stewing
5. Shallow frying
6. Deep frying

CHART 7: The Best Methods for Cooking Food to Retain Nutrients

STEAMING UTENSILS

STEAMING

SAUTEING

BOILING

The Best Methods for Cooking Food to Retain Nutrients

- **Steaming** is a quick method of cookery. Steaming retains the colour, flavour and nutritional value of food. It is a fat-free method of cookery and therefore healthier.
- **Sautéing** is a quick method of cooking that requires only a very small amount of oil, fat or even water. Vegetables only require partial cooking before being consumed. Nutritional value of vegetables remains particularly high. No nutrients are being lost in discarded liquid.
- **Boiling** Root vegetables are placed into cold water and then brought to the boil. The vegetables cook more evenly. Rice and flour for Ugali are placed into water that is already boiling. This sets the starch and stops the food sticking together or lumping.
- **Blanching**- Green and leafy vegetables are placed in boiling water. This reduces the loss of colour and nutrition.

Steaming

Steaming is classified as a wet method of cookery where food is cooked in steam. This can be achieved on a normal pan/sufuria or by placing a colander over a pot of boiling water. A major benefit of steaming is that it retains the color, flavor and nutritional value of food. As a fat-free method of cookery, it is also healthier. Steaming (unlike boiling) will not greatly enhance the flavor of a dish. Care must be taken to ensure that a suitable flavor accompanies the steamed dish, unless it is part of a dish.

Foods most suitable for steaming are:

- Fish, whole or fillets
- Chicken, whole or in pieces

- Rice
- Vegetables

Sautéing

This is a quick method of cooking that requires only a very small amount of oil, fat or water, to prevent the food sticking to the pan. Sautéing is recommended to be used when vegetables only require partial cooking before being consumed. Due to this quick and very hot method of cooking, the nutritional value of vegetables remains particularly high. No nutrients are being lost in discarded liquid.

Foods most suitable for sautéing

- Leafy greens – kale, spinach, amaranth
- Beans, peas
- Carrots
- Cabbage
- Capsicum
- Broccoli
- Cauliflower
- Onions
- Courgette
- Thinly sliced meats – chicken, rabbit

Boiling

Boiling is classified as a wet method of cookery because food is fully immersed into a container of boiling liquid on top of the stove. The liquid used can be water, stock or another suitable liquid.

There are three important things to keep in mind when boiling:

- Root vegetables are placed into cold water and then brought to the boil. The vegetables will also cook more evenly.
- Green and leafy vegetables are placed into boiling water. This cooks them quickly and reduces the loss of colour and nutrition.
- Rice and flour for Ugali are placed into water that is already boiling. This sets the starch and stops the food sticking together or lumping.

Food is boiled to tenderize and make it more palatable and digestible. Boiling also changes the muscular or fiber tissues and enhances the flavor.

Foods most suitable for boiling

- Pasta
- Rice
- Meat –tougher cuts of meat
- Poultry
- Eggs
- Root vegetables
- Legumes and cereal grains
- Green vegetables (beans, peas, leafy greens)

Stewing

Stewing is a wet method of cookery where food is cut into pieces and cooked slowly in the minimum amount of liquid to keep it moist. The juice or sauce is served with the food.

Processes are:

- For brown stews, meat or poultry is sealed by frying in hot fat
- The meat for white stews is usually blanched or sealed without colouring

After these processes, the cooking liquid is added with other ingredients according to the recipe. Rapid boiling must be avoided, as the liquid will evaporate, affecting flavor and texture.

Stewing is a nutritious and economical cooking method. Ingredients are tenderized in the cooking process with maximum flavor extraction and nutrient retention.

Stewing is a slow cooking method used to cook tough cuts of meat, but also used to cook some fruits and vegetables.

Shallow frying

Shallow frying is a dry method of cookery where food is cooked using a small amount of hot oil or fat in a shallow pan. Due to the addition of fat and the high temperatures, the nutritional value of food is lowered considerably.

Deep frying

Deep-frying is the cooking of food that is immersed in hot oil. This gives food a crisp golden coating as well as a distinctive flavor and texture, but is considered to be the least healthy cooking method, as the food retains much of the fat.

Energy Efficient Cooking

Health issues relating to specific cooking facilities

It takes a lot of hard labor and time to find, cut, and carry back the wood that's used for cooking, and this job takes up a major part of the day for women and girls.

Indoor cooking and heating with biomass fuels (agricultural residues, dung, straw, wood or charcoal) produces high levels of indoor smoke that contains a variety of health-damaging pollutants.
Cooking with solid fuels on open fires or traditional stoves creates high levels of indoor air pollution, which is a major risk factor for pneumonia and upper respiratory infections. Indoor smoke contains many pollutants that can damage health, such carbon monoxide and particulate matter levels that may be 20 times higher than accepted guidelines.

- Around 34 million people cook using open fires and leaky stoves burning biomass (wood, animal dung and crop waste) and charcoal.
- Nearly 2 million people die prematurely from illnesses attributable to indoor air pollution from household solid fuel use.
- Nearly 50 percent of pneumonia deaths among children under five years are due to particulate matter inhaled from indoor air pollution.
- More than 1 million people a year die from **chronic obstructive respiratory disease** (COPD) that develops due to exposure to such indoor air pollution.
- Persons exposed to heavy indoor smoke are 2-3 times more likely to develop COPD.

Lung cancer

Approximately 1.5 percent of annual lung cancer deaths are attributable to exposure to carcinogens form indoor air pollution. As with bronchitis, the risk for women is higher, due to their role in food preparation as well as their comparatively lower rates of smoking. Women exposed to indoor smoke thus have double the risk of lung cancer in comparison with those not exposed.

Other health impacts

More generally, small particulate matter and other pollutants in indoor smoke inflame the airways and lungs, impairing immune response and reducing the oxygen-carrying capacity of the blood.

There is also evidence of links between indoor air pollution and low birth weight, TB, ischemic heart disease and certain cancers.

Along with being very labour intensive and bad for the health, cooking with wood and charcoal isn't exactly good for the environment either. Wood and charcoal are supplied by cutting down trees. With an ever-increasing number of people in Kenya, more wood is needed for cooking every day, and a huge number of trees are being cut down. The loss of trees is causing erosion of the land, and creating a loss in species' habitat. When trees are cut down, the soil that their roots help hold together becomes loosened, and is at the mercy of the wind and rain. This valuable topsoil, which holds nutrients needed for growth of vegetation, gets washed or blown away, carrying with it the hopes of getting another good growth of trees. Many plants, insects and animals that once depended on trees for growth, shelter, and nourishment also perish with the death of the trees.

Improved stoves

Although poverty still limits the choice of how people cook, advancements in smart design have resulted in an improved version of wood and charcoal stoves.

Kenya Ceramic Jiko (KCJ)

The Jiko is a portable stove that uses charcoal as fuel. The metal stove has a ceramic lining in its top half, with the bottom half being a collection box for ashes. The charcoal is placed into the ceramic lining at the top, which is perforated to let the ashes fall to the bottom of the stove. These ashes can then be collected and disposed of safely. The head of the stove has metal rings that hold a sufuria in place for cooking.

With proper use and maintenance, the Jiko has been shown to reduce fuel use by 30 to 50 percent compared to traditional all metal stoves as shown in the centre of the above picture. This means less wood is burned to make charcoal, and fewer trees are cut down. This also means less labour in looking for and chopping firewood. Improved stoves also reduce emissions from incomplete combustion, such as toxic gases and particulate matter, resulting in better overall health of the users but must be used in well-ventilated places.

Fireless cookers

Fireless cookers reduces household dependence on wood charcoal and other forms of fuel.

A fireless cooker is a box, basket or any other container filled with insulating material. Insulating material is anything that heat doesn't pass through easily, such as hay (dried grass), papers, wood shavings, wool or dry banana leaves. After heating the food up in the usual way, the cooking pot is placed in the fireless and covered with a lid, also filled with insulating material. The insulation around the cooking pot stops the heat from escaping, so the food in the pot stays hot and keeps on cooking.

What are the benefits?

- Fireless cookery is a convenient way to cook. Food can be partially cooked using the conventional methods you are used to, put it in the fireless cooker to continue cooking slowly as you do something else.
- Doesn't need constant attention.
- Fireless cookery is a healthy and delicious way to cook. All the nutrients and aroma in the food are retained. It never burns the food; it makes tough meat tender and can keep food warm for a long time.
- Fireless cookery is a cheap and environmentally friendly way to cook.
- It saves time, fuel and money.

How to use the Fireless cooker?

- Put in enough water to cook the food at the start of cooking
- Heat the food in the water until it boils and then let it simmer for the recommended time
- For more efficiency, wrap the pot with cotton cloth or polythene sheet before putting in the cooker

Benefits of a fireless cooker

- Keeps food warm for up to eight hours
- Enhances family bonding

Serving Size Recommendations for All Food Groups

While it is your job as the trainer to advice on nutritional food selections, you also have to ensure that the foods you are suggesting are nutritious and sufficient to meet the dietary needs of the beneficiaries. To help you advice on how much of each food group is required to maintain a nutritionally balanced diet, follow the guidelines set out in the charts.

These guidelines are based on servings over a whole day period, which may include 3 to 4 meals. Understanding what constitutes a 'serve' can sometimes be confusing. To assist in making it easier for people to understand how much of each food group should be eaten each day, using your hand as a measurement will help to explain this.

CHART 8: Tools to Use When Measuring Serving Amounts

Cup 	2 Servings 250 grams
Tub 	2 Servings 250 grams

Tools to Use When Measuring Serving Amounts

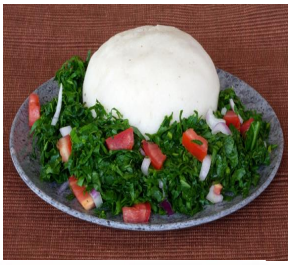
Use the simple measurement tools to help you with selecting the correct amount of each of the food groups to serve.

CHART 9: Serving Size Recommendations – Cereals, Grains, Tubers & Roots

Each day eat 3-5 cups (6-11 servings) of cooked cereals, grains, tubers or roots

Cup **Tub**

250 grams- Equivalent to
2 servings



Select a variety of these porducts to eat each day to provide your body with energy.Try to eat wholemeal grains when possible for fiber to keep your body regular.

- Rice
- Arrowroot
- Cassava
- Wheat
- Potato
- Millet
- Sorghum
- Sweet potato
- Maize

What is fibre?

It is an important component of certain plant foods and is referred to as 'roughage' in everyday language. Fiber is chewed, swallowed and then subjected to stomach acid, yet much of it passes through the body unchanged.

Why do we need fiber?

Fiber is important because it:

- Stimulates the digestive tract and helps it work efficiently
- Encourages the presence of healthy bacteria in the large intestine
- Softens the stool (bowel motion) and helps prevent constipation

Fiber has also been associated with a decreased incidence of certain cancers of the digestive tract.

Foods that are high in fiber include:

FRUITS 	SEEDS 
VEGETABLES 	PEAS, BEANS 
OATS 	BARLEY 

WHEAT 	RYE & RICE 
NUTS 	GRAINS 

CHART 10: Serving Size Recommendations – Vegetables & Fruit

Each day eat 1.5 – 2.5 cups (3-5 servings) of cooked or 3-5 cups of raw chopped vegetables

250 grams- Equivalent to
2 servings

Vegetables are rich in vitamins and minerals to help maintain a healthy body

- Select at least 5 different colours of vegetables each day to receive a variety of vitamins and minerals
- Children from 10 months to 18 months of age should have mashed vegetables.
- Children from 18 months to 3 years should have chopped vegetable
- *1 serving/portion is equivalent to ½ cup cooked vegetables* and 1 cup raw vegetables.

CHART 11: Fruit

Each day eat 1-2 cups (2-4 servings) of chopped or whole fruit

250 grams- Equivalent to
2 servings

Each day eat 1-2 cups of chopped or whole fruit

- Fruits are rich in essential vitamins and minerals to help maintain a healthy body
- Select at least 2 varieties of fresh fruit daily
- Eat fruit with the skin where possible. The skin contains nutrients andfibre to improve digestion.
- Wash the fruit well before eating to avoid contamination

CHART 12: Raw Foods

EAT RAW FOODS OFTEN

1 serving/portion is equivalent to ½ cup fruit or cooked vegetables and 1 cup raw vegetables.

Raw fruits and vegetables contain high levels of nutrients that have not been destroyed by heat. The health benefits of eating raw foods are:

• Increase energy •Clear Skin • Reduced risk of illness and disease

Foods that can be eaten raw may include:

- All fruits
- Tomato
- Lettuce
- Carrot
- Capsicum
- Onion
- Cabbage
- Cucumber
- Carrots

Why Are Fruit And Vegetables Important For Maintaining A Healthy Body?

Fruits and vegetables provide many vitamins and minerals. People will need different vitamins in different stages of life. Most children receive the necessary amount of vitamins and minerals through diet, but children that are underweight, have illnesses that might put them at risk or eat restricted diets will be at risk of suffering from vitamin and or mineral deficiencies.

Through healthy eating, the elderly may not need extra vitamins and minerals but those that are homebound, frail or with chronic diseases will need to have a higher intake of both.

People suffering from illnesses such as HIV/AIDS will require higher levels of Vitamin A as well as those children suffering from malnutrition or wasting who also need higher levels of the B and C vitamin groups.

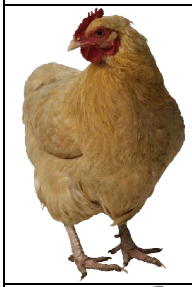
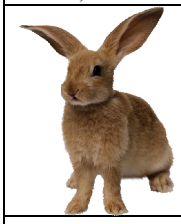
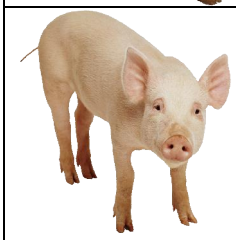
CHART 13: Serving Size Recommendations – Plants and animal proteins

Each day eat 80g-120g (1/3-1/2) cup servings of animal protein or 1-2 cups of plant (2-4 servings)

Cup Tub

250 grams- Equivalent to 2 servings

Animal Protein	Plant Protein
	
	

Each day eat 80g-120g (1/3-1/2) cup servings of animal protein or 1-2 cups of plant (2-4 servings). ***The protein can come from 2 sources – animals or plants***

ANIMAL PROTEIN

- Fish
- Chicken
- Beef
- Mutton

- Goat
- Pork
- Rabbit
- Eggs
- Insects
- Offal (e.g. matumbo, intestines, heart, lungs, liver, kidney, tongue)

When cooking animal protein, avoid deep-frying as this will reduce the amount of nutrients. Use small amounts of oil and cook well, for tougher meats add to liquid and boil gently until tender.

PLANT PROTEIN

ENSURE THAT BEANS ARE SOAKED FOR SEVERAL HOURS BEFORE COOKING – THIS WILL HELP TO RELEASE NUTRIENTS AND SHORTEN THE COOKING TIME

Plant proteins include:

- Red beans
- Green grams
- Cow peas
- Soya beans
- Peanuts
- Cashews
- Pigeon peas
- Black bean

Why is Protein so important?

Protein is one of the basic building blocks of the human body, making up about 16 percent of our total body weight. Muscle, hair, skin and connective tissue are mainly made up of protein. Protein plays a major role in all of the cells and most of the fluids in our bodies. Proteins come from two sources, animals and plants.

The protein content in vegetables is of inferior quality when compared to meat. Therefore, high protein vegetables need to be combined with other protein rich foods to provide the body with its complete protein needs. For instance, if you eat plant protein in the form of vegetable curry along with rice or bread then the required amount of protein is accessible.

How much protein do we need?

- To maintain a healthy body system we need 50 – 90g of protein per day = 100g of stewed rabbit meat and 80g red beans or 1 wholemeal chapatti served with ½ cup soybeans, ½ cup fine beans cooked with tomato and kale.
- A person recovering from sickness, in need of repair of muscles, skin, enzymes and hormones, would need 80 – 100g of protein per day = a serving of 190g of goat meat or 130g rabbit or 180g poultry and a combination of vegetables

CHART 14: SERVING SIZE RECOMMENDATIONS – DAIRY PRODUCTS

Each day take at least 2 cups of milk:

Dairy foods are rich in calcium, which helps in bone and teeth development and strengthening. Calcium will aid in the prevention of Osteoporosis (breaking bones) in old age.

Dairy includes:

- Milk – cow, goat and camel
- Yoghurt
- Fermented milk

Why is Calcium so important?

Calcium is an essential mineral, especially for children. Its primary role is to build strong bones and teeth, but it also helps in the clotting of blood and in the functioning of nerves. We get most of our calcium from our diet.

What events can indicate a need for more calcium foods?

- Rickets (affect bone growth and bone deformities in children)
- Osteoporosis
- Abnormal blood clotting
- Irregular heart rhythms
- Muscle spasm and cramps
- Facial twitching
- Weak muscles

Too much calcium together with excessive amounts of vitamin D may result in the formation of kidney stones, and symptoms like vomiting and stomach pain.

Food sources that are rich in calcium

- Omena (small dried fish)
- Sardines

- Milk
- Most foods made with milk
- Spinach
- Breads
- Broccoli

Fats and Oils

Also referred to as lipids, fats and oils are an important part of our diets. Fats are solids whereas oils are liquids at room temperature. Fats are classified as saturated, monounsaturated or polyunsaturated according to the type of fatty acids that it contains.

- Saturated fats: are sticky and tend to clump together, causing problems for cell health. They are bad fats and are found in red meat, poultry, butter, whole milk and palm oil.
- Trans-fatty acids: have an altered shape as a result of processing (hydrogenation), this result in changes in their function causing irregularities in the cell structure and changing the permeability of the cell membrane. They are bad fats and increase the risk of heart disease.
- Polyunsaturated fats: are not hydrogenated and are good fats. They include corn oil, simsim oil, sunflower and cotton seed oil, as well as omega 3 oils found in fish and soybeans.
- Monounsaturated fats: are also good fats. They are found in peanuts, olives and avocadoes.

Good fats lower the risk of heart disease by decreasing the cholesterol levels in the body while bad fats increase the risk of heart disease as they increase the blood cholesterol levels.

Functions of Fats

- Provide energy.
- Stimulate appetite by giving food taste and flavor.
- Assist in the absorption of the fat-soluble vitamins A, D, E and K.
- Maintain the function and integrity of the cell membrane structure – are structurally the major constituent of every cell membrane in the body.
- Supply essential fatty acids to the diet and as such, should not be completely excluded from the diet but should be consumed sparingly, as high intakes have been linked with onset of chronic diseases.

Recommendations:

- Reduce intake of saturated fats, and instead use more of polyunsaturated fats and monounsaturated fats
- *Fats should make up not more than 30 percent of total caloric intake. Saturated fats should provide not more than 10 percent of the total fat intake.*

Food sources rich in fat and oils

- Butter, Ghee, cheese
- Margarines
- Cooking oils both vegetable and animal
- Vegetable shortening

CHART 15: Fats and Oils

REDUCE YOUR INTAKE OF FATS AND OILS TO ONE TEA SPOONFUL EACH DAY

WHEN SELECTING FATS AND OILS, TRY TO CHOOSE THOSE THAT HAVE BEEN FORTIFIED WITH NUTRIENTS

Some common illnesses caused by excess fat in our body

- Obesity
- Heart disease
- Diabetes type 2
- Some cancers
- Hypertension

Salt and Sugar

Salt

Salt provides our body with the vital mineral sodium, that helps maintain normal blood pressure and normal function of muscles and nerves .In addition, iodized salt provides Iodine, a mineral that is vital for fetal brain development and thyroid function. However, it should be used sparingly. This is because sodium is associated with high risk onset of increased blood pressure leading to hypertension and cardiovascular diseases.

Functions of salt

- Helps to regulate fluids in the body
- Plays an important role in nerve transmission and muscle contraction
- Important for the proper functioning of adrenal glands

Recommendations

- Choose foods that are low in salt, and try to avoid adding salt to foods at the table.
- *The recommended daily intake for salt should not exceed 5g*

Sugar

Food and drinks containing sugar are not totally prohibited in a healthy eating plan. However, it is important not to have food and drinks containing sugar between meals, as they suppress appetite. High intakes of foods with added sugars have been linked with increased risks of certain chronic diseases, particularly dental caries and obesity

Functions of sugar

- Provides energy
- Contributes to the color, taste and texture of food.

Recommendations

Foods and drinks containing sugar should be consumed in small amounts

Recommended daily intake of sugar (includes sugar contained in foods and drinks) should be: For Women- 6 teaspoons daily, Men – 9 teaspoons daily, and Children – 3 teaspoons daily .

Sugar intake should be no more than 10 percent of dietary energy.

CHART 16: Sugar and Salt

REDUCE YOUR INTAKE OF SUGAR

HIGH LEVELS OF SUGAR CAN INCREASE RISK TO ILLNESSESS SUCH AS:

- Diabetes type 2
- Obesity
- Heart disease
- Dental caries
- Depression

REDUCE YOUR INTAKE OF SALT

HIGH LEVELS OF SALT CAN CINCREASE RISK TO ILLNESS SUCH AS:

- High blood pressure
- Heart disease

Water

Why do we need water?

Water makes up 50 to 70 per cent of an adult's total body weight and, without regular top-ups; our body's survival time is limited to a matter of days. Water is essential for the body's growth and maintenance, as it's involved in a number of processes. For example, it helps get rid of waste and regulates the body temperature.

Water, which is lost from the body through urine and sweat, must be replaced through the diet. If you don't drink enough, you can become dehydrated, causing symptoms such as headaches, tiredness and loss of concentration. Chronic dehydration can contribute to a number of health problems such as constipation and kidney stones.

Functions of water

- Break down the solid foods you eat
- Helps nutrients move through your digestive tract and into your bloodstream
- The nutrients move throughout your body to nourish muscles, tissues and organs
- Water helps with bowel movements and removing waste and toxins
- You can make your water safe by boiling or by treatment

Recommendations of daily water intake

- Take adequate amount of water per day (for adults approximately 2lts/8 glasses in 24 hrs)
- Avoid taking too much alcohol
- Reduce intake of caffeinated and sugary products such as coffee, sodas etc.,

CHART 17: Water

DRINK AT LEAST 8 GLASSES OF CLEAN SAFE WATER EACH DAY (2 LITERS)

Sources of Fluid in our body

The body gets its fluid from three sources:

- Drinks, either plain water or as part of other beverages including tea and coffee
- Solid foods, especially fruit and vegetables (even foods such as bread and cheese provide small amounts of fluid)

Most healthy adults need between one and a half to three Litres a day, so aim to drink six to eight medium glasses of fluid daily. Beverages such as tea, coffee and fruit juices count towards fluid intake, and may bring with them other nutrients or benefits. A person may require more fluid if they are very physically active or during periods of hot weather.

You can judge whether you're drinking enough by the colour of your urine. If it's a pale straw colour then your fluid intake is probably fine. If your urine is dark yellow, you probably need to drink more.

Nutrition in the lifecycle

Infant feeding

Breastfeeding is a very important part of the life of a new-born child, soon after birth and for the first two years of its life. Breast milk is the best and safest option for a new-born child from birth to the sixth month

Breast milk fights disease– Breast milk, especially the first milk (colostrum), contains anti-bacterial and anti-viral agents that protect the infant against disease. Breast milk also aids the development of the infant's own immune system. The cells, hormones, and antibodies in breast milk protect babies from illness. Baby formula cannot match the chemical makeup of human breast milk. Formula-fed babies also have higher risks of:

- Gastrointestinal infections – vomiting, diarrhoea
- Lower respiratory infections
- Asthma
- Obesity
- Type 2 diabetes

Some research shows that breastfeeding can also reduce the risk of Type 1 diabetes, childhood leukemia, and atopic dermatitis (a type of skin rash) in babies.

Its recommended that infants should be **exclusively breastfed for the first six months** no other food or drink should be given (no pre-lacteal feeds) except for medicines and syrups as recommended by a trained health care professional.

- Infants should be initiated to breastfeeding within an hour after delivery.

Benefits of Exclusive Breastfeeding

- Is nutritionally complete – also contains enough water for the infant
- Is easily digested and utilized by the newborns immature system
- Contains antibodies that protect against diseases- breastfed babies fall sick less often than those not breastfed
- Promotes adequate growth and development in the infant – breastfed babies have a higher IQ than those not breastfed
- Is clean, cheap, safe and readily available at the right temperature whenever needed by an infant
- Helps in the development of jaws and teeth. Suckling helps develop facial and jaw bone.
- Helps to delay a new pregnancy
- Protects the mothers' health – reduces the risks of ovarian and breast cancer and helps the uterus to return to its previous size
- Enhances bonding for mother and baby
- Long term benefit include reducing the risk of diabetes and obesity

Feeding after 6 months to 5 years

After the age of six months, breast milk and other forms of milk alone are not adequate to meet the baby's nutritional requirements. Therefore, appropriate complementary foods should be introduced gradually in addition to breast- milk or other forms of milk. Starting other foods in addition to breast milk at six completed months helps a child grow strong and healthy.

CHART 18: Breast Feeding

Babies should be exclusively breastfed for the first 6 months

0 to 6 months  Courtesy: Let's talk Breastfeeding, Kenya	Give only breast milk – no other foods or liquids
6 months –8months 	Start with thick porridge, well mashed foods. Continue with mashed family foods2-3 meals per day plus frequent breastfeeds. Depending on the child's appetite 1-2 snacks may be offered
9months – 11months 	Finely chopped or mashed foods and foods that baby can pick up. 3-4 meals plus breastfeeds Depending on the child's appetite 1-2 snacks may be offered
Age 12 months to 23 months 	Family foods chopped or mashed if necessary. 3-4 meals plus breastfeeds depending on the child's appetite 1-2 snacks may be offered

If baby is not breastfed, give in addition: 1-2 cups of milk per day, and 1-2 extra meals per day

BABIES SHOULD BE EXCLUSIVELY BREASTFED FOR THE FIRST 6 MONTHS

- The baby receives 100 percent of its nutritional requirements in the first 6 months
- Breast feeding reduces the risk of illness, especially diarrhoea and respiratory infections
- Stimulates growth
- Breastfeeding contributes to food security for the infant

Value Addition

Food processing and storage

Food processing is part of value addition. It is a the set of methods and techniques used to transform raw ingredients into food or to transform food into other forms for consumption either at home (traditional processing) or by the food processing industry (Industrial

Processing). Traditional food processing methods include soaking, fermentation, drying, salting malting and germinating.
Industrial food processing methods include sterilizing, pasteurizing, freezing and adding chemical preservatives.
Examples of food processing include:

- Fermentation of animal products such as milk to produce ghee, yoghurt and cheese.
- Fruits can be made into juices
- Vegetables can be made into sauces or blanched and dried to be stored for long periods.
- Sun drying of roots and tubers like cassavas and sweet potatoes then milling into flour.

Benefits of food processing

- Enhances the bioavailability of micronutrients in plant-based diets e.g. in fermentation.
- Increases seasonal availability of many foods by lengthening the shelf life of the food products.
- Enables transportation of delicate perishable foods across long distances.
- Adds extra nutrients such as vitamins and minerals through fortification.
- Improves the taste of food.Making the food more attractive for the consumer, facilitating its commercialisation. Eases marketing and distribution
- Increase food consistency.
- Toxin removal - makes many kinds of foods safe to eat by de-activating spoilage and pathogenic micro-organisms

Draw backs of Food processing

- May lead to loss of some nutrients e.g. milling leads to loss of fats, minerals and proteins.
- Food safety concern due to food additives added.
- If not effectively done, food gets spoiled during storage and results in introduction of poisonous substances like aflatoxins that may be detrimental to health.

Health risks associated with processed foods

Health complications that are associated with consumption of highly processed foods include:

- Obesity: Processed foods which are rich in calories but poor in nutrition cause obesity, especially in children.
- Diabetes: People who consume processed foods consume more added sugars, significantly increasing the risk of diabetes.
- Heart Disease: Most processed foods are high in salt and contain Trans Fatty acids (TFA). TFAs enhance the LDL (bad) cholesterol and decrease the HDL (good) cholesterol, leading to increased risks of heart disease.
- Cancer: Processed meats such as hot dogs, sausage increase the risk of certain cancers.

Recommendations for food processing and storage

- For industrially produced foods choose fortified foods over non fortified foods they contain minerals and vitamins.
- Store grains and cereals in non humid conditions and use within a short time.
- Read labels on industrially processed foods to know the nutritional contents before buying.
- Cook foods using appropriate methods to conserve nutrients especially for vegetables.
- Vegetables can be preserved by drying.
- Preserve flours, porridge and milk using fermentation.

CHART 19: Value Addition through processing and its Importance

VALUE ADDITION AND ITS IMPORTANCE

- By adding high nutritious foods to your everyday meals will help add important vitamins and minerals to your diet

Some examples are:

- Amaranth flour
- Sweet potato flour
- Sorghum flour
- Moringa powder and leaves
- Cassava flour
- Pumpkin flour and seeds
- Banana flour

When purchasing food products from the markets look for the Kenyan Food Fortification logo

SUPPORTING DOCUMENTS

The following tables show the nutritional breakdown of commonly used foods in Kenya. The nutrients listed are those that play a major part in maintaining a healthy body system in the areas of building the immune system and for growth, development and repair.

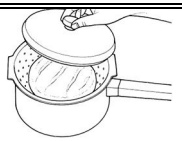
The tables also list the Recommended Daily Intake (RDI) of these major nutrients that are obtained from each of the foods listed. The nutrient content has been calculated on 100gm of the cooked food item.

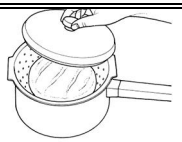
For each of the food items, a recommended cooking method has been listed which is most suitable for retaining the highest levels of nutrient content. These cooking methods should be promoted to all client groups.

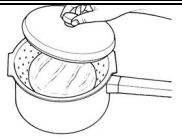
These tables will enable the trainer to be able to easily answer questions from client groups on the nutritional value of commonly consumed foods. For e.g. to look up which food contains high levels of vitamin A it is just a simple task to run your eye down the vitamin A column to view which food has the highest percent of RDI.

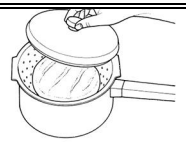
The tables will be a useful tool to help with the promotion of consuming foods of value addition to easily boost nutrient intake.

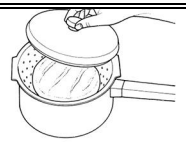
Nutritional breakdown of commonly used foods in Kenya

NUTRITION VALUES RDI PERCENTPER 100G SERVING	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 STEAMING	 SAUTEING	 ROASTI
 Irish potato	3	7	7	0	13	0	12	2	1	0	0	4	✓	✓		✓
 carrots	2	3	12	341	8	0	6	2	3	1	0	2	✓	✓	✓	✓
 beetroot	3	3	8	1	3	0	6	4	2	1	0	2	✓	✓		✓
 sweet potato (red and white)	3	6	10	315	8	0	21	4	3	0	0	4	✓	✓		✓

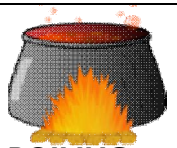
NUTRITION VALUES RDI percent per 100g serving	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 STEAMING	 SAUTEING	 ROASTI
 leeks	2	2	3	4	16	0	6	7	6	3	0	2	✓	✓		✓
 cassava	3	2.4	12	4	0	0	4	34	1	2	0	8	✓	✓		✓
 arrowroot	8	9	5	6	0	0	13	3	12	1	0	3	✓	✓		✓
 onions (red and white)	3	3	6	0	6	0	9	1	2	1	0	2			✓	✓

NUTRITION VALUES RDI percent per 100g serving	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 STEAMING	 SAUTEING	 ROASTI
 yams	3	9	16	2	11	0	20	3	1	1	0	6				
 turnips	1	2	8	0	3	0	19	1	3	0	0	1				

NUTRITION VALUES RDI PERCENTPER 100G SERVING	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 STEAMING
 rice (white)	5	9	2	0	5	0	0	7	1	11	0	7		
 rice (brown)	5	8	7	0	7	0	0	2	1	14	1	6		
 sorghum (white)	23	25	25	0	0	0	0	24	3	0	5	17		
 sorghum (red)	23	25	25	0	0	0	0	24	3	0	5	17		

NUTRITION VALUES RDI percent per 100g serving	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 STEAMING
 finger millet	7	8	5	0	5	0	0	3	0	1	2	6		
 pearl millet	7	8	5	0	5	0	0	3	0	1	2	6		
 Teff	8	7	0	0	5	0	0	0	0	0	1	5		
 Soya Bean	33	3	24	0	12	0	3	29	10	10	14	9		

NUTRITION VALUES RDI PERCENTPER 100G SERVING	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 ROASTING/BAKING
 Maize flour white	10	14	19	0	13	0	0	5	0	2	6	18		
 Maize flour wholegrain	14	26	29	0	18	0	0	13	1	22	8	18		
 Soya bean flour	58	10	32	2	19	0	0	30	17	9	27	18		

 **Cassava flour**	0	30	4	0	0	0	1	9	2	1	2			
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **ROASTING/BAKING**
 **Arrowroot flour**	1	29	14	0	0	0	0	2	4	0	0	18		
 **Sorghum flour**	19	31	32	0	21	0	0	20	1	21	6	22		
 **Amaranth flour**	8	6	8	0	6	0	0	12	5	8	2	5		

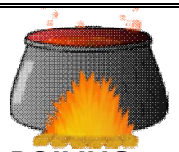
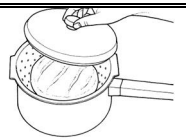
 **Millet flour**	2	24	14	0	19	0	0	22	1	47	7	19		
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **ROASTING/BAKING**
 **Potato flour**	14	28	24	0	38	0	6	8	7	2	1	18		
Sweet Potato flour	9	26	9	30	3	0	28	3	2	0	0	5		

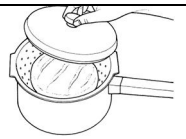
 **Pumpkin & seed flour**	16	6	16	8	6	0	3	83	4	11	71	27	✓	✓
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **ROASTING/BAKING**
 **Wheat flour white**	21	25	11	0	2	0	0	6	1	48	2	18	✓	✓
 **Wheat flour w/grain**	27	24	49	0	17	0	0	22	3	101	3	17	✓	✓

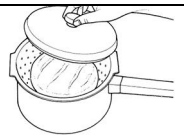
NUTRITION VALUES RDI PERCENTPER 100G SERVING	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 SAUTEING
 maize kernels	19	25	66	0	14	0	0	13	1	0	8	19	 FIRST	
 red bean	17	8	30	0	6	0	2	16	3	2	1	6	 FIRST	
 chick pea	18	9	30	1	7	0	2	16	5	5	4	8	 FIRST	

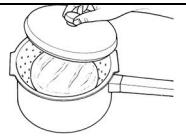
 **black bean (njahi)**	18	8	35	0	3	0	0	12	3	2	1	7	 **FIRST**	
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **SAUTEING**
 **pigeon pea**	14	8	27	0	3	0	0	6	4	4	1	6	 **FIRST**	
 **lentils**	18	7	32	0	9	0	2	19	2	4	1	6	 **FIRST**	
 **haricot beans**	16	7	28	0	8	0	0	13	2	6	1	6	 **FIRST**	

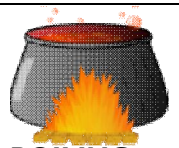
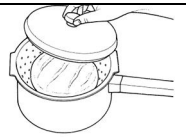
 **cowpea**	6	7	20	16	3	0	4	6	13	4	1	5	✓ **FIRST**	✓

NUTRITION VALUES RDI PERCENTPER 100G SERVING	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **STEAMING**	 **SAUTEING**	 **ROASTING**
 French Beans	14	8	38	0	5	0	2	6	6	2	1	6	✓	✓	✓	
 Garden Peas	7	2	11	21	7	0	80	11	4	1	0	2	✓	✓	✓	
 Nightshade (managu)	7	2	2.2	0	6	0	41	5	15	0	0	1	✓	✓	✓	

 Spider Plant (saget)	5	6	2	72	8	0	70	18	15	1	0	1	✓	✓	✓	
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **STEAMING**	 **SAUTEING**	 **ROASTING**
 Broccoli	5	2	13	31	10	0	108	4	4	2	1	2	✓	✓	✓	
 cauliflower	4	1	9	0	9	0	74	2	2	1	1	1	✓	✓		
 pumpkin leaves	5	1	11	32	10	0	2	18	4	1	0	1	✓	✓	✓	

 spinach	6	1	10	210	12	0	16	20	14	2	0	1	✓	✓	✓	
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **STEAMING**	 **SAUTEING**	 **ROASTING**
 cabbage	3	2	8	2	6	0	62	1	5	1	0	1	✓	✓	✓	
 amaranth	4	1	0	55	9	0	69	13	21	1	0	1	✓	✓	✓	
 kales (sukuma)	4	2	8	272	7	0	68	5	7	1	1	1	✓	✓	✓	
 tomatoes	2	1	3	10	4	0	38	4	1	1	0	1			✓	✓

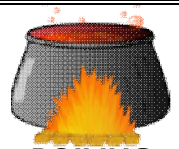
 pumpkin	1	2	4	100	2	0	8	3	1	0	0	1	✓	✓		✓
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **STEAMING**	 **SAUTEING**	 **ROASTING**
 butternut	2	3	0	223	6	0	25	3	4	1	0	1	✓	✓		✓
 green peppers	2	2	5	9	12	0	124	3	1	0	0	1			✓	✓
 red peppers	2	2	5	59	12	0	285	3	1	0	0	1			✓	✓

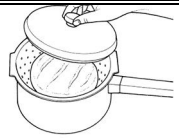
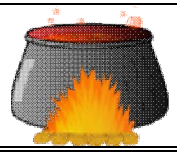
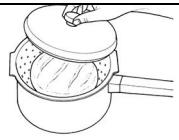
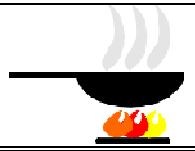
 Okra	4	2	10	6	9	0	27	2	8	1	0	1	✓	✓	✓	
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **STEAMING**	 **SAUTEING**	 **ROASTING**
 aubergine	2	3	10	1	4	0	2	1	1	0	0	2	✓	✓	✓	✓
 courgette	1	1	6	22	4	0	8	2	1	0	0	1	✓	✓	✓	✓
 cucumber	1	1	2	2	2	0	5	2	2	0	0	1	Eaten raw			

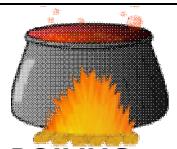
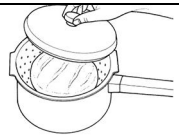
NUTRITION VALUES RDI PERCENTPER 100G SERVING	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 EATEN RAW	 BOILING	 SAUTEING	 ROASTIN
 matoke banana (plantain)	2	10	9	18	12	0	18	3	0	2	0	6				
 sweet banana	2	8	10	1	18	0	15	1	1	1	1	4				
 guava	5	5	22	12	6	0	381	1	2	1	1	3				
 mango	1	6	7	15	7	0	46	1	1	1	0	3				

NUTRITION VALUES RDI percent per 100g serving	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 EATEN RAW	 BOILING	 SAUTEING	 ROASTIN
 passionfruit (yellow)	1	5	1	14	3	0	50	1	0	0	0	3				
 passionfruit (purple)	1	5	1	19	3	0	30	2	0	0	0	3				
 papaya	1	3	7	22	1	0	103	1	2	1	0	2				
 water melon	1	3	2	11	2	0	13	1	1	1	0	2				

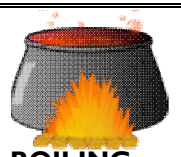
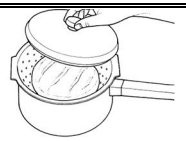
NUTRITION VALUES RDI percent per 100g serving	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 EATEN RAW	 BOILING	 SAUTEING	 ROASTIN
 avocado	4	3	27	3	13	0	17	3	1	1	23	8	✓			
 pineapple	1	4	0	1	5	0	28	1	1	0	0	2	✓		✓	✓
 oranges	2	4	9	5	4	0	99	1	4	0	0	2	✓			
 pumpkin seeds	49	6	16	8	11	0	3	83	4	8	71	27			✓	✓

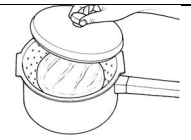
NUTRITION VALUES RDI percent per 100g serving	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 EATEN RAW	 BOILING	 SAUTEING	 ROASTIN
 **macadamia**	16	5	34	0	14	0	2	20	9	5	117	36				
 **peanuts**	27	7	35	0	8	0	0	6	6	6	34	16				
 **cashew**	36	11	13	0	21	0	1	37	4	28	67	28				

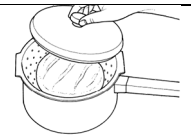
NUTRITION VALUES RDI PERCENTPER 100G SERVING	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 STEAMING	 SAUTEING	 ROAST
 basil	6	1	6	106	8	0	30	18	18	0	1	1				
 coriander	4	1	11	135	6	0	45	10	7	1	1	1				
 mint	7	5	32	85	6	0	53	28	24	0	1	3				
 garlic	13	11	8	0	62	0	52	9	18	20	1	7				
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**				

													BOILING	STEAMING	SAUTEING	ROAST
 chilli	24	19	109	832	123	0	127	43	15	13	27	16			✓	✓
 ginger	4	6	8	0	8	0	8	3	2	1	1	4	✓		✓	✓
 rosemary	7	7	56	58	17	0	36	37	32	0	9	7	✓		✓	✓
 parsley	6	2	13	168	4	0	222	34	14	0	1	2			✓	✓
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **STEAMING**	 **SAUTEING**	 **ROAST**

 sugar	0	33	0	0	0	0	0	0	0	1	0	19				✓
 Salt	0	0	0	0	0	0	0	2	2	0	0	0	✓	✓	✓	✓
 mushrooms	21	23	105	0	5	0	35	80	27	4	3	15			✓	✓

NUTRITION VALUES RDI PERCENTPER 100G SERVING	PROT	CARB	FIBRE	VIT A	VIT B6	VIT B12	VIT C	IRON	CALC	SELENIUM	FAT	CAL	 BOILING	 STEAMING	 SAUTEING	 ROAS

 dried fish (omena)	125	0	0	3	18	307	0	23	81	161	21	19	✓			
 fish (tilapia)	52	0	0	0	6	31	0	4	1	78	4	6	✓	✓	✓	✓
 chicken	44	0	0	6	8	3	0	7	2	28	28	13	✓	✓	✓	✓
 goat	54	0	0	0	0	20	0	21	2	17	5	7	✓			
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **BOILING**	 **STEAMING**	 **SAUTEING**	 **ROAS**

 eggs	22	1	0	11	6	13	0	7	7	32	19	8	✓		✓	
 rabbit	61	0	0	0	17	108	0	13	2	55	13	10	✓			✓
 beef	52	0	0	0	18	41	0	14	1	28	32	15	✓		✓	✓
 pork	59	0	0	0	22	12	0	6	2	64	15	11	✓		✓	✓
NUTRITION VALUES RDI percent per 100g serving	**PROT**	**CARB**	**FIBRE**	**VIT A**	**VIT B6**	**VIT B12**	**VIT C**	**IRON**	**CALC**	**SELENIUM**	**FAT**	**CAL**	 **EATEN RAW**	 **STEAMING**	 **SAUTEING**	 **ROAS**

 cottage cheese	22	1	0	3	2	7	0	0	8	14	7	5	✓			
 yoghurt	7	2	0	2	2	6	1	0	12	3	5	3	✓			
 yoghurt milk (maziwa lala)	7	8	5	0	2	8	0	2	9	10	0	5	✓			

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