Food&Nutrition

Training of Trainers

-> Nutrition education

Target: to assist rural population to improve and diversify food consumption for adequate nutrition.

Objectives of training

1. How is the nutritional situation of Namibia?
2. What does malnutrition mean? And what does it means to health and human development?
3. What is the relation between nutrition and health?
4. What is the nutritional value of different foods?
5. How do you store, prepare and preserve your food?
6. How can you improve your daily diet?

Contents

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH,
P.O. Box 8016 Windhoek, Namibia

E franziska.breuer@giz.de

I www.giz.de

Author Franziska Breuer, Adaptation of Agriculture to Climate Change in Northern Namibia (ACN)

September 2018

1 Content

Why do we do this training??

Making money with agriculture is good, but the farm must provide also enough good food for your family. For this reason we want to tackle this issue.

→ Healthy nutrition reduces expenditure for medical care-Expenditure
→ for food during hunger season or season of high food prices can be reduced
→ Well-nourished adult farm family members are healthy and can do a good job in agriculture
→ Children of smallholder families are less ill and perform well in school

1 Modul 1: Nutritional Situation - Current Condition on site

- **Targets:** 1. Capture the Namibian nutritional situation, 2. Get an overview of available food, 3. Know partners and counsels for assistance and exchange
- **Contents:**
  - Definition of Food and Nutrition Security
  - Nutrional Facts of Namibia
  - Global Hunger Index
  - Wasting and Stunting
  - The first 1000 days of life
  - Fieldtrip Results
  - Food Groups – Available food on site
  - Partners and Counsels for Assistance and Exchange
- **Time needed:** 45 min
- **Materials needed:** Flipchart, small cards, glue, 4 different coloured markers, 3-4 small tables

1.1 Definition of Food and Nutrition Security

Food and Nutrition Security exists when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life.

1.2 Nutrition Facts of Namibia

Nearly 30 % of the Namibians are affectetd by nutritioninsecurity:

➔ don´t have that food what they need for their diatery needs for optimal growth and development

➔ most rural inhabitants consume diets that have very limited variety and are typically inadequate in fruits and vegetables (IDDS under 5)

1.3 Global Hunger Index 2016

A German aid organisation, the Welthungerhilfe, measured every year the global hunger situation. It is measured with the Global Hunger Index (GHI). The GHI shows the hunger situation worldwide as well as single regions and countries.

Calculation of GHI: aggregation of 4 indicators to the index

- **Undernutrition/ Undernourishment**
  (share in undernourished people of population)
- ***Wasting*** (children under 5 years too light related to size)
- ***Stunting*** (children under 5 years too small related to age)
- **Infant mortality** (mortality of children under 5)

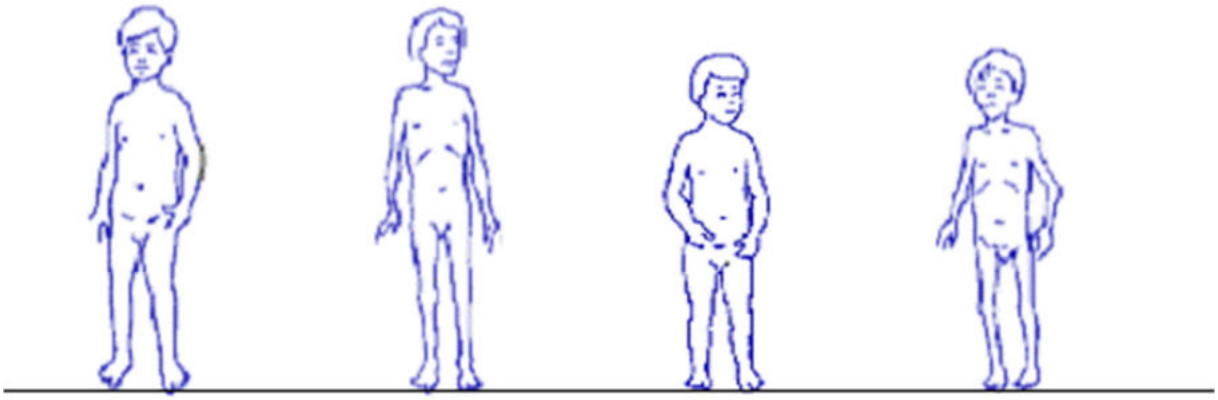
In 50 countries the hunger situation is still „very seriously" (GHI 2016).

➔ Hunger situation of the Namibians is **seriously.**

GHI	1992	2000	2008	**2017**
	´90-´94	´98-´02	´06-´10	´12-´16
Namibia	**35,4**	**30,8**	**30,9**	**25,7**

➔ 23,1%, **nearly every 5th child** under 5 years is **stunted**.

1.4 Wasting and Stunting by children (under 5 years) as the sum of undernutrition



➔ *Stunting* alloys the cognitive development

➔ Children with *stunting* shows less effort at school

➔ In adulthood they have also reduced physical capacity and get importantly less money

1.5 The first 1000 days of life

The first 1000 days means from the beginning of pregnancy until approximatley second year. This period is also called **„Window of Opportunity".**
What does it means?

Pay Attention
<u>During the first 1000 days the adequate diet of a mother and her child has the highest impact</u>
- to the whole physical and cognitive development of a child.
- to the child´s chance to grow, to learn and therefore to get out of poverty.
<u>→ In this period of life defaults are mostly irreversible!</u>

<u>Group question to discuss with neighbour</u>: (10min)
What are the feeding recommandations for pregnants and children? -> <u>Ask pairs to share their discussion with the group</u>

=> Recommendations for the first 1000days:

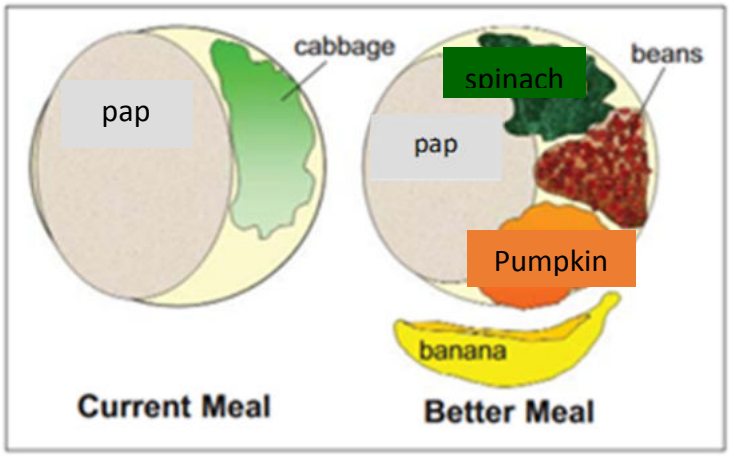
1. When you are **pregnant**, you need to eat **one extra meal per day.**
2. **Eat many different types of colourful foods** to be strong and healthy in your pregnancy.
3. **Exklusive brestfeeding, minimum till 6th month**. No water, milk powder or other liquids or food, for the first six months of their life.
4. **Continue with brestfeed + complementary food between the 5th-8th month**:
   - introduce soft balanced food twice a day that are almost same consistency as breast milk as you continue breastfeeding until they are two years old or older.
   - Start with introducing a few spoonful of complimentary food twice daily and increase to three times daily as the child grows older and give a variety of fruit puddings (mashed mixed fruits) as snacks in between as you continue with breast feeding.
5. **Transition to family meals at the end of the 1st year:** nutritious family foods plus one or two snacks that include solid foods to guarantee good nutrition status and growth.

1.6 Fieldtrip Results

Interviews and group work with lead farmer in the region of Zambezi (Katima Mulilo) and Kavango West (Rundu, around Dosa):

- 1-2 meals per day
- Very one-sided
- Famoust preserving method: drying
- Storage in baskets
- Insecurity about meaning of health
- Ignorance of diseases conditioned of malnutrition
- Less knowledge about nutrition

– Interest and curiosity in nutrition education



Targets

→ **1. more proteins**

→ **2. more vitamins**

→ **3. more minerals**

Example for better meal

1.7 Food Groups – Available food on site

Warm up (20 min)

→ Use the food, that the participants brought with!

Brainstorm activity 1.7.

– Which food is good for you? (sign with +)
– Which foods is not so good for you? (Sign with -)
– Tell us, why do you think so?

Materials: 2-4 Flipchart papers, small cards, pencils, glue

Instructions:

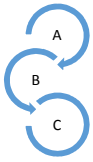
1. Write the food name on a card!
2. Make a list with three columns on a paper; sign the column with 1. food, 2. symbol + or –, 3. Argument
3. Stick the food card on the paper.
4. Every participants, who brought a food, should tell about his decision.
5. Every answer should be argued. →Possible answers are: ...rich in nutrients, rich in a special nutrient as vitamin or protein or fat or…, good medicin, medical helpful in case of…
6. Are there any further available food which you can name? Write on a card!

❖ **Food groups** – What is it? For what needed?

When we talk about Food Groups there is an intererst in the quality of our daily diet. The Food Groups can differ due to the countries, regions, habits, but mainly it is a division into the macro- and micro nutrients- givers.

Example of a Food Group division:

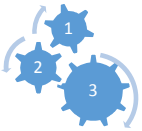
Food Group	Food
1. meat, fish	
2. fat,oils	
3. offal	
4. milk and its products	
5. seeds and nuts	
6. legumes	
7. Dark green leafy vegetables	
8. orange coloured fruits or vegetables	
9. other vegetable and fruits	
10. Grain, white roots and tubers	



Group work
Classification of the available food into food groups
Time needed: 15 min
Materials: 2 Flipchart papers, food cards from Brainsorming 1.7 , pencils, glue

→ Brainstorming cards 1.7. will be divide in half for 2 groups
→ Flipchart paper will be lettered with the food groups in a table (Paper1 with food group1-5; paper2 with food group 6-10)
→ First group put the cards of Brainstorming 1.7. to the food groups and the second will check. (Then for the second group the same way reversed.)

1.8 Partners and counsels for assistance and exchange



Brainstorming activity:
- From where do you get help in question about nutrition?
- Do you like to exchange about food and nutrition? Who could be a good counsel?
- Where and when could you have an exchange?

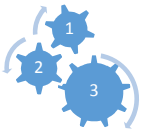
2 Modul 2: Meaning of Health and Malnutrition

- **Targets:** 1. Know what health means, 2. Understand the connection between nutrition and health
- **Contents:**
  - Definition of health
  - Malnutrition and its specifications
  - Diseases in relation to nutrition
  - Diseases in relation to malnutrition
  - HIV/AIDS and alcohol abuse: nutritional implications
- **Time needed:** 45 min
- **Materials needed:** Flipchart, small cards, glue, 4 different coloured markers, 3-4 small tables

2.1 Definition of Health

What is the WHO definition of health?

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.



Brain storming activity – 5 min

What do you need to be healthy?

→ Write down on a paper.

Some possible answers: …

→ Saved income

→ Hygiene, hygienic behaviour: clean water, good sanitation, cleaning the hands with water and soap after toilet, before meal preparation, before eating, after pamping change, cleaning the tool directly after

→ Diverse foods with every meal: proteins, starches, fat, vitamins +minerales

→ Family, social care givers, good working neighbour hood

→ Education

→ …

2.2 Malnutrition and its specifications

Malnutrition can be caused by many factors, including environmental conditions such as a lack of clean water and poor sanitation, social factors such as a lack of education about nutrition and hygiene, fitness and poor access to health care and economic factors such as a lack of income and ability to buy food.

Cultural beliefs may also play a part. For example, some communities believe that children should not eat eggs. It is important to discuss the causes of malnutrition in the community that you are working with so that they can identify and address these issues.

Malnutrition

- **is related** to poor quality or insufficient quantity of nutrient intake, absorption, or utilization.
- **includes** undernutrition, micronutrient deficiencies, overweight and obesity and conditions that can arise separately or coexist.

Definitions:

hunger, undernourishment:
subjective hunger of an human after a certain period without food

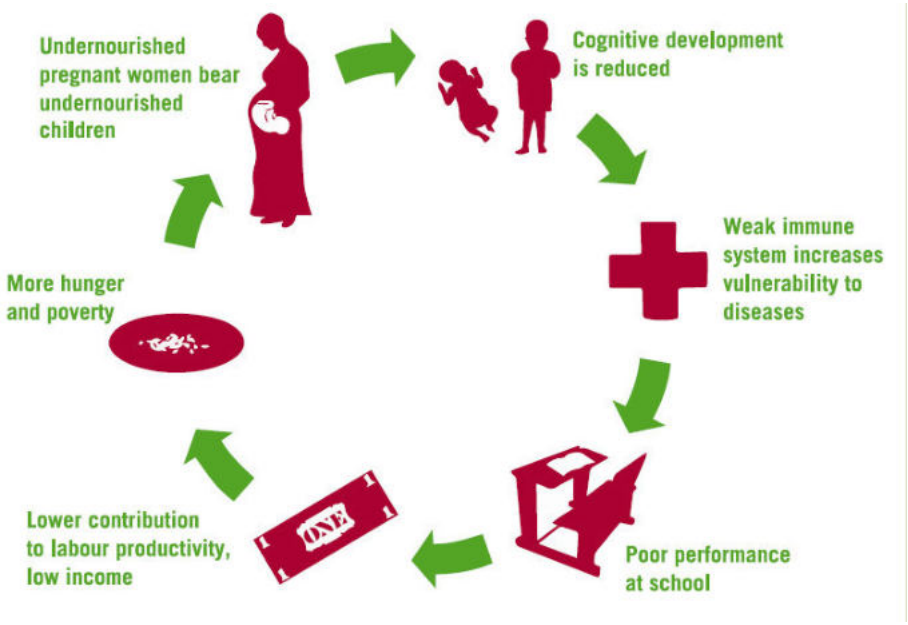
Malnutrition and its specifications:

Undernutrition
= consequence of deficient intake of food energy and/or nutrient by the body; also due to deficient health- and hygiene conditions

Overweight & obesity
= consequence of too much intake of food energy for any length of time

Micronutrient deficiencies, hidden hunger
= consequence of deficient feed with vitamins (e.g.Vit.A) and/or mineral nutritients (e.g. iron, iodine)

Vicious Cycle of Malnutrition



2.3 Diseases in Relation to Nutrition

Brain storming -5 min
Do you know any diseases in relation to nutrition or malnutrition?
→ Write down on a paper.

Some possible answers: …

→ High blood pressure→ too much sugar, too much animal fat (=unsatured fatty acids)
→ Diabetes → too much sugar (cane sugar, sweets, sweet drinks)
→ Cancer
→ Alcohol Abuse

→ Food intolerances
→ Wasting/Stunting
→ …

❖ High blood pressure - „BP“

We talk about BP (Hypertension), over 140/90 mm Hg.

BP is dangerous because it makes the heart work harder to pump blood out to the body and contributes to hardening of the arteries, or atherosclerosis, to stroke, kidney disease, and to heart failure.

One of the most dangerous aspects of hypertension is that you may not know that you have it. The only way to know if your blood pressure is high is through regular checkups. This is especially important if you have a close relative who has high blood pressure.

Causes
The exact causes of high blood pressure are not known, but several things play a role, including:

- Smoking
- Being overweight or obese
- Too much salt in the diet
- Insufficient intake of potassium, calcium, and magnesium
- Too much alcohol consumption (more than 1 to 2 drinks per day, without a break/week)
- Family history of high blood pressure
- **risk factors**: diabetes and high cholesterol
- increased cardiovascular risk, if the abdominal girth increases: men > 102 cm, women > 88 cm
- …

Symptoms
If your blood pressure is extremely high, there may be certain symptoms to look out for, including:

- Severe headache
- Fatigue or confusion
- Vision problems
- Chest pain
- Difficulty breathing
- Irregular heartbeat
- Blood in the urine
- Pounding in your chest, neck, or ears

→ Prevention and therapy, High blood pressure
The diet is simple:

- Eat more fruits, vegetables, and low-fat dairy foods

- Cut back on foods that are high in saturated fat, cholesterol, and trans fats as heavily processed foods
- Eat more whole-grain foods, fish, poultry, game and nuts (not salted!)
- Eat curd or cottage cheese (low fat)
- Limit sodium (not more than 6g/day(= ½ teaspoon), less bread!
- Limit sweets, sugary drinks and red meats
- Limit or stop alcohol drinks (max. 1 glas per day with 2 breakdays per week)
- Use vegetable oils (manketti oil, canola oil, olive oil, Baobab, Marula)
- vegetarian diet

→ After 2-3 weeks the first results are shown: normalization of the blood pressure (if the BP depends only on nutrition).

→Diet example: Potassium rich and low salt

Bananas, fruits, potatoes, cabbage, tomatoes, spinach, mushrooms, dried fruits

Furthermore

→ Weight reducing by overweight or obesity
→ lifestyle modifications, such as eating a healthier diet, quitting smoking, and getting more exercise.
→ Treatment with medication is recommended to lower blood pressure to less than 130/80 in people older than age 65 and those with risk factors such as diabetes and high cholesterol.

Summary
Diet with less salt, sweets and sugared drinks, lots of vegetable and fruits, stop smoking, reduce alcohol consumption

❖ Diabetes - „sugar“

There are two types of diabetes: Diabetes mellitus Typ 1 and Typ2. Type 1 diabetes can develop at any age, though it often appears during childhood or adolescence.
Type 2 diabetes, the more common type, can develop at any age, though it's **more common in people older than 40.**
→it can lead to excess sugar in your blood
→Too much sugar in your blood can lead to serious health problems.
Symptoms

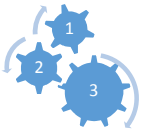
- Increased thirst
- Frequent urination
- Unexplained weight loss
- Fatigue
- Irritability
- Blurred vision
- Slow-healing sores
- …

→ Prevention and therapy, Diabetes

- Eat healthy foods
- Avoid sugared drinks and heavily processed foods (rich in added sugars, salt and unsaturades fat acids)
- Get more physical activity.
- Lose excess pounds. Don't try to lose weight during pregnancy, however. Talk to your doctor about how much weight is healthy for you to gain during pregnancy.

2.4 Diseases in relation to Malnutrition

Malnutrition includes undernutrition, micronutrient deficiencies, overweight and obesity.



Brainstorming activity -5min
Which diseases in relation to malnutrition do you know?
→Write down on a paper.

❖ **Undernutrition**

Symptoms: underweight, wasting, stunting
→resulting from deficiencies in any or all nutrients, namely proteins, carbohydrates/starches, fat/oils and the micronutrients vitamins and mineral nutrients.

❖ **Micronutrients deficiensies**

- **Vit.C** → Scurvy, characterized by swollen bleeding gums and the opening of previously healed wounds
- **Iodine** →Infantile brain damage, limited cognitve capability, crop
- **Vit.A** → Blindness
- **Zinc** → Dicreased immunity, impaired growth, inflammatory skin diseases such as acne, eczema, fatigue,…
- **Iron** → Anemia, disruption of physical and cognitive development, higher risk of mother death, preterm birth, less birth weight, fast fatigue,...
- **Niacin (Vit. B3)** → Pellagra (symptoms: Dermatitis, Diarrhea, Dementia)
- **Thiamin (Vit.B1)** → Beriberi (can cause heart failure. Can damages the nerves and can lead to decreased muscle strength and eventually, muscle paralysis. Beriberi can be life-threatening if it isn't treated.
- …

Pay attention
→ especially HIV and Alcoholoics suffer from micronutrients deficiency.
→ People with overweight can also suffer from micronutrient deficiency.

❖ **Malnutrition due to**

- cancer
- increased demand e.g. in the child development, pregnancy, HIV infection, alcohol abuse
- …

2.5 HIV/AIDS, Alcohol abuse: Nutritional Implications

❖ **HIV/AIDS**

Group questions to discuss with neighbour – 10min

1. What do you know about the „4 Letters“ in the framework of nutrition?/What happens to an infected human?
2. What kind of food can mitigate the accessory symptoms?

Instructions:

→ divide the group in 2-3 parts and let them discus

→ after 5 min ask the participants to share their discussions.

- **Typical symptoms of HIV/AIDS** are:

Herpes zoster, oral candidans, eczema, seuylly transmitted infections, skin rashes, malaria, headaches, tubercolosis, weight loss, malnourished, flu, fever, diarrhoea, coughing ans swollen glands.

- **Non-typical symptoms of HIV/AIDS** are

red lips, impaired vision, red eyes, big head, small pox, stress, unfriendliness, painful joints, change in body colour, stiff neck, high blood pressure, dizziness and loss of hair.
(Chinsembu et al., 2011)

Causes of malnutrition in HIV include: inadequate dietary intakes; nutrient losses; metabolic changes, increased requirements of macro- and micronutrients

➔ The metabolic changes associated with HIV infection lead to increased energy and protein requirements together with inefficient utilization of nutrients.

➔ **HIV/AIDS and malnutrition have a double severe effect to health**
➔ **Fortify eachother the negative nutritional impacts**
➔ **In both malnutrition and HIV/AIDS there is a reduced immun system**

Vicious cycle of HIV and malnutrition

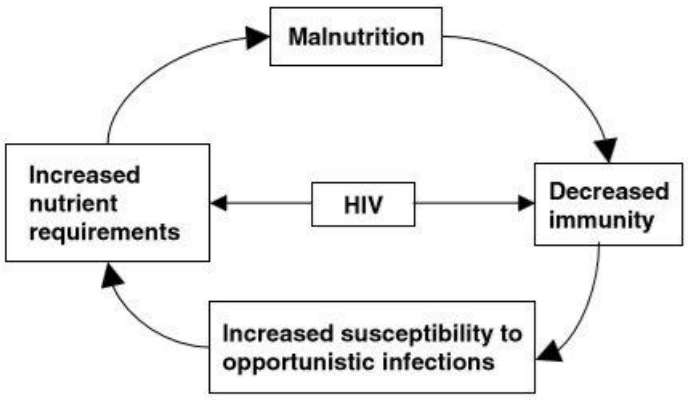


Fig. 1. Vicious cycle of HIV and malnutrition. (From Edwards[23].)

❖ Food recommandation for people with HIV/AIDS

Your body will undergo changes, both from medications and the disease itself.

For example extreme weight loss, infections, or diarrhea. Another common change is lipodystrophy (fat distribution syndrome) which can cause body shape changes and increases in cholesterol levels. →Making improvements in your diet can improve your health and how well you feel.

The Basic Principles of Nutrition and HIV

- Eating a diet high in vegetables, fruits, whole grains, and legumes
- Choosing lean, low-fat sources of protein
- Limiting sweets, soft drinks, and foods with added sugar
- Including proteins, carbohydrates, and a little good fat (fats of vegetal sources) in all meals and snacks

➔ To add protein to your diet

Protein-rich foods include meats, fish, beans, low-fat dairy products, and nuts.

To boost the protein in your meals:

- Spread nut butter on toast, crackers, fruit, or vegetables.
- Eat hard-boiled (hard-cooked) eggs
- Eat beans and legumes (pinto and other beans, lentils, etc), nuts, and seeds

Gluten- free sorghum products, fortified or not, depending on the specific needs of the individual, is a good choice **for people with HIV/AIDs.**

William Clay of FAO's Food and Nutrition Division may well be justified:
'Food isn't a magic bullet. It won't stop people from dying of AIDS, but it can help them live longer, more comfortable and productive lives'.

❖ Alcohol abuse and Nutrition

Group question to discuss with neighbour – 5min

What do you know about alcohol abuse in the framework of nutrition?/What happens to an alcoholic?

- **Nutritional behaviour of Alcoholics:**

Alcoholics often eat poorly.
Alcohol is energy rich, so that Alcoholics replace a meal by alcohol.
Some alcoholics ingest as much as 50 percent of their total daily calories from alcohol, often neglecting important foods.
→ limiting their supply of essential nutrients

- ***Alcohol, Malnutrition, and Medical Complications***

Liver Disease
Although alcoholic liver damage is caused primarily by alcohol itself
nutrients normally found in the liver, such as carotenoids, which are the major sources of vitamin A, and vitamin E compounds, are known to be affected by alcohol consumption
Pancreatitis
Alcohol inhibits the breakdown of nutrients into usable molecules by decreasing secretion of digestive enzymes from the pancreas
Brain
Nutritional deficiencies can have severe and permanent effects on brain function. Specifically, thiamine deficiencies, often seen in alcoholics, can cause severe neurological problems such as impaired movement and memory loss seen in Wernicke/Korsakoff syndrome.
Pregnancy
Alcohol has direct toxic effects on fetal development, causing alcohol-related birth defects, including fetal alcohol syndrome (FAS).
Alcohol itself is toxic to the fetus.
Accompanying nutritional deficiency can affect fetal development, perhaps compounding the risk of developmental damage
Alcohol itself can also restrict nutrition flow to the fetus.

- ***Nutritional Status of Alcoholics***

Many alcoholics do experience severe malnutrition:
→ alcoholics tend to eat poorly

→ often eating less than the amounts of food necessary to provide sufficient carbohydrates, protein, fat, vitamins A and C, the B vitamins, and minerals such as calcium and iron.

→ alcohol interferes with the nutritional process by affecting digestion, storage, utilization, and excretion of nutrients.

→ a major concern is that alcohol's effects on the digestion of food and utilization of nutrients may shift a mildly malnourished person toward severe malnutrition.

=> The combination of an adequate diet and abstention from alcohol is the best way to treat malnourished alcoholic patients

Conclusion

- Families or carers can help people suffering from loss of appetite by:

sitting with the sick person when they are eating, so that they still feel part of the family
- helping them to sit upright in bed when eating
- preparing their food for them.
- offering them their favourite foods and new things to eat with different flavours, such as spices like ginger and garlic and sour fruit like masau, tomato, orange and pineapple.
- giving them small, light meals and snacks throughout the day
- making sure they get lots of fluids between meals but not during or just before meals

- making them herb teas such as basil tea and mint tea, which stimulate the appetite.
- avoiding giving them fizzy drinks, cabbage, beans, beer and junk food.
- discouraging them from smoking
- encouraging them to brush their teeth after a meal
- helping them to get light exercise and fresh air

3 Modul 3: F&N-Education

- **Targets:** 1. Know the different nutrients, 2. Know how to get a balanced diet, 3. Understand the necessity of a daily diverse diet
- **Contents:**
  - Needs of body and brain
  - Main nutrients, vitamins, mineral nutrients
  - „Full is not enough"- Food and their nutritional value
  - Diverse Diet - Gain and added value of a diverse diet
  - Available Food – Needed Food
  - Brestfeeding
- **Time needed:** 140 min
- **Materials needed:** Flipcharts, small cards, glue, 4 different coloured markers, 3-4 small tables

3.1 Needs of body and brain

HOW our bodies use nutrients

Food contains nutrients - substances which the body uses for growing and functioning.

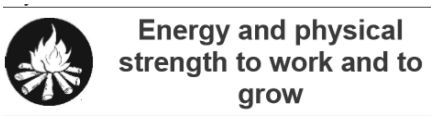
Food gives us energy to move, think and work. Food also contains important substances which keep our bodies strong and healthy, help to boost our immune system and protect us from infections.

Once ingested, food must be digested (broken down into small components) so it is available for energy and maintenance of body structure and function. Digestion begins in the mouth and continues in the stomach and intestines, with help from the pancreas.

The nutrients from digested food are absorbed from the intestines into the blood and carried to the liver.

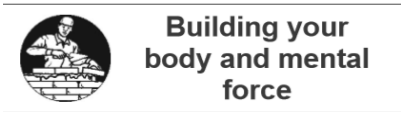
Also, when we eat, our bodies absorb useful nutrients into the blood where they are transported to areas where they are needed. These include the bones, the muscles, the brain and the organs. The waste material is removed from the body when we go to the toilet.

❖ Functional Food Groups



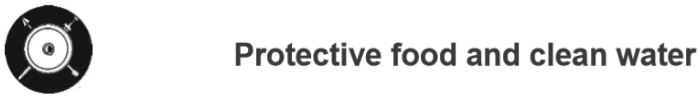
1. Energy providing food

Staple food and fats (starchy food / energy giving foods)
= Carbohydrates and fats/oil



2. Body building food

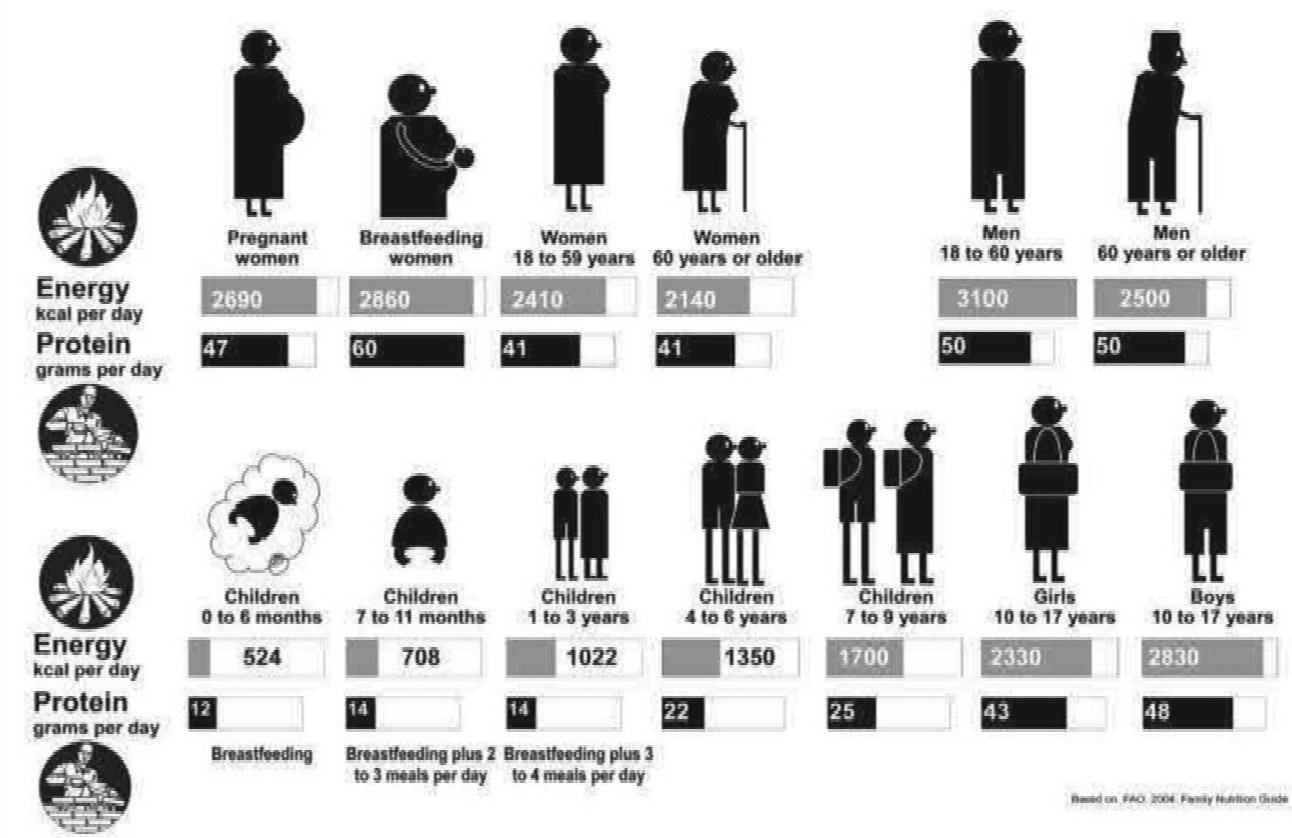
Food that help us to build our body and make/keep us strong
= protein



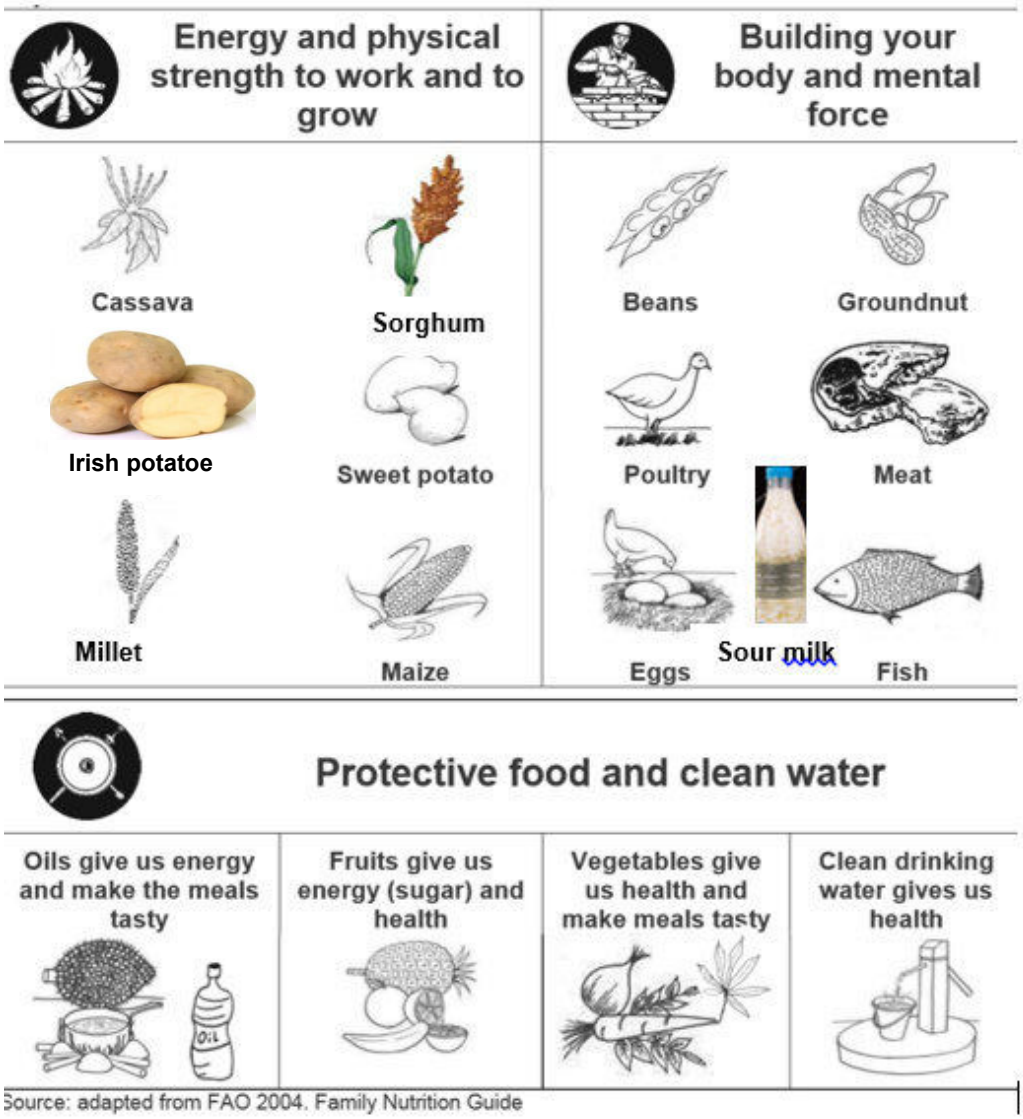
3. Protective food

that keeps us healthy and provides vitamins and minerals

❖ Different needs in different ages, sex and life of times



❖ Examples for functional food groups and their food products



Key messages

→ Body Building, Energy Foods and Protective Foods are different food types. They are all required for healthy nutrition

→ All the different type of foods must be present in the meal in the right proportion

→ Eat three diversified meals per day using every time food from each of these groups

3.2 Main nutrients, vitamins, mineral nutrients

→ The nutrients that are important for our body can be divided into four Nutrient Groups:

- **Carbohydrates –Starches**

These include starch and sugars. These foods give our bodies energy to move, work and think. They also help to keep us warm.
We get most carbohydrates from **grain crops** such as wheat, maize, sorghum, millet and rice, and root crops such as potatoes, sweet potatoes and cassava.
Carbohydrate that is not used immediately by our bodies is stored as fat. Too much stored fat can be unhealthy for the body.
Eating large amounts of refined carbohydrate such as refined maize meal, white bread, white rice and white sugar is unhealthy.
Refined foods are processed in factories to make them look tastier. Unfortunately, the refining process removes most of the important fibre, protein, minerals and vitamins these foods naturally contain.

It is much better to eat unrefined staple foods with every meal as a cheap, healthy source of energy and fibre, as well as some protein, vitamins and minerals.

- **Fat**

Fats can come from animal products such as milk (butter) meat and fish or processed plant products such as seeds and nuts (sunflower oil and peanut butter).
→ prefer the vegetable fat and oil. They have mono- or poly unsatured fat acids. They are much more healthier than the animal fats.

- **Proteins**

These help our bodies to grow, maintain and repair themselves. Also called body-building foods, they come from plants (beans and other legumes), processed plant products (peanut butter and soya mince), processed animal products (cheese, sour milk and yoghurt) and animals (eggs, meat, milk).

- **Vitamins and minerals**

Vitamins and minerals are also called micronutrients. Our bodies need small amounts of these substances to help different parts such as the blood, eyes, bones, skin and hair work properly. Many of these substances help to strengthen the body's immune system and keep us strong and healthy so that we resist infection. We get most vitamins and minerals from eating **fresh fruit and vegetables.**
Some vitamins (A, D, E and K) are fat- soluble, so the body needs fat in order to absorb them. Vitamin A is an important immune system booster. Most of the B vitamins and vitamin C cannot be stored by the body because they are water-soluble, so we need to eat foods that contain these vitamins every day.

Fibre

Apart from nutrients in food our body also needs other substances. Among these is fibre, also called roughage. Fresh fruit, vegetables and unrefined grains and legumes contain fibre. It is important for helping our bodies to digest food and remove waste. It is important to eat fibre with plenty of water.

Summary

1. **Carbohydrates (grain, vegetables, fruits)** give you energy.
2. **Fat (oils, butter, egg yolk)** gives you extra energy (+ is needed for some vitamin resorption).
3. **Protein (milk, meat, fish, legumes, egg, nuts)** builds muscles and a strong immune system.
4. **Vitamins** and **minerals (fruits, vegetables)** regulate body processes and also make up body tissues.
5. **Water** gives cells shape and acts as a medium where body processes can occur.

3.3 „Full is not enough“- Food products and their nutritional value

Food products and their content in energy, protein and fat

Food	Energy kcal per kg	Fat Grams per kg	Protein Grams per kg	
Rice	3610	10	65	
Maize	3530	38	93	
Cassava	1490	2	12	
Plantain	1350	3	12	
Yam	1180	2	15	
Sweet potato	1050	3	17	
Groundnut	5670	450	258	
Beans	3330	8	226	
Fish (dried)	2550	470	74	
Meat	1610	79	195	
Eggs	1580	112	120	
Fruits (oranges)	450	2	9	
Vegetables (carots)	305	0	7	
Leaves (cassava)	230	3	30	

adapted from FAO 2004.Family Nutrition Guide; http://www.nutritiondata.com/facts/fats-and-oils/575/2

Explanation: The kilocalorie (Kcal or 1000 calories) is a measure for the energy of a food. The number of kilocalories of one kg of a given food shows you whether the food is rich or poor in energy

1 g fat = 9 kcal, 1 g carbohydrate = 4 kcal, 1 g protein = 4 kcal, 1 g alcohol= 7 kcal

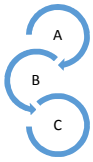
Energy from food

Remember that foods contain a mixture of different nutrients. Our bodies can get energy from carbohydrates, fats and proteins. For example, milk is a source of protein, fat, calcium and several vitamins. Millet is rich in energy, protein, vitamins and minerals.

→ **Legumes are important for Nutrition:**

Protein content of cereals, tubers and legumes

Cereals and Tubers (100g)	*Protein content (%)*
Maize	9.4
Rice (white	7.1
Wheat flour	10.3
Millet	11
Cassava	1.3
Potato	2.1
Legumes (100 g)	*Protein content (%)*
Kidney beans	23.6
Cowpea	23.5
Peanut	25.8
Soy	33.7



Group work 3.3 – 30 min

The nutrient group game

➔to help participants clarify which food products belong in which nutrient category.

Materials:

at least 60 small pieces of paper/cards, four large pieces of paper for the flip chart, marker pens, 3 bowls/small baskets

Instructions

→ Divide into 6 groups = 6 food type

→ Give each group a food type to work on from:

1. carbohydrate crops/starches
2. fat-giving crops
3. protein from plants
4. protein from animals
5. fruit crops
6. vegetable crops

→Give each participant at least three small pieces of paper. Ask them to write the name of an ingredient of his food type on the piece of paper.

→Explain that the ingredient can be an animal product such as beef, a vegetable such as a carrot, a plant product such as peanut butter, a piece of fruit such as a mango, a grain such as sorghum or a legume such as cow pea.

→ Explain that they must not write already mixed ingredients on one piece of paper

→ Meanwhile write the names of the different food types on the four large pieces of flip chart paper. Lay the pages on the floor in the centre of the room.

→Ask each participant to place each piece of paper on one of the flip charts on the floor according the nutrient group that the ingredient is in.

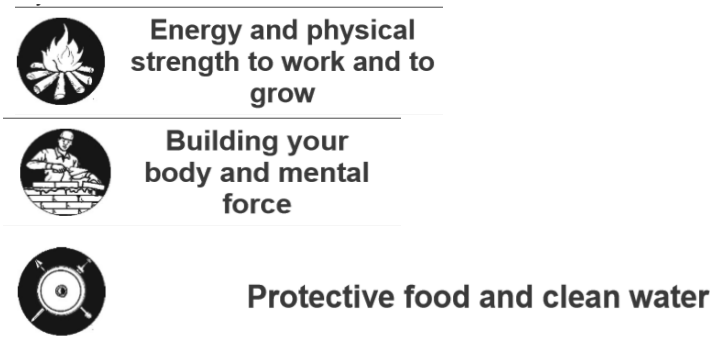
→Ask the rest of the group to say whether they are correct.

→ At the end REMEMBER at the three function groups.
→ Ask the participants to put their ingredients cards into three bowls (marked with the three functions groups)

1. Energy providing food,
= starches and fats/oil

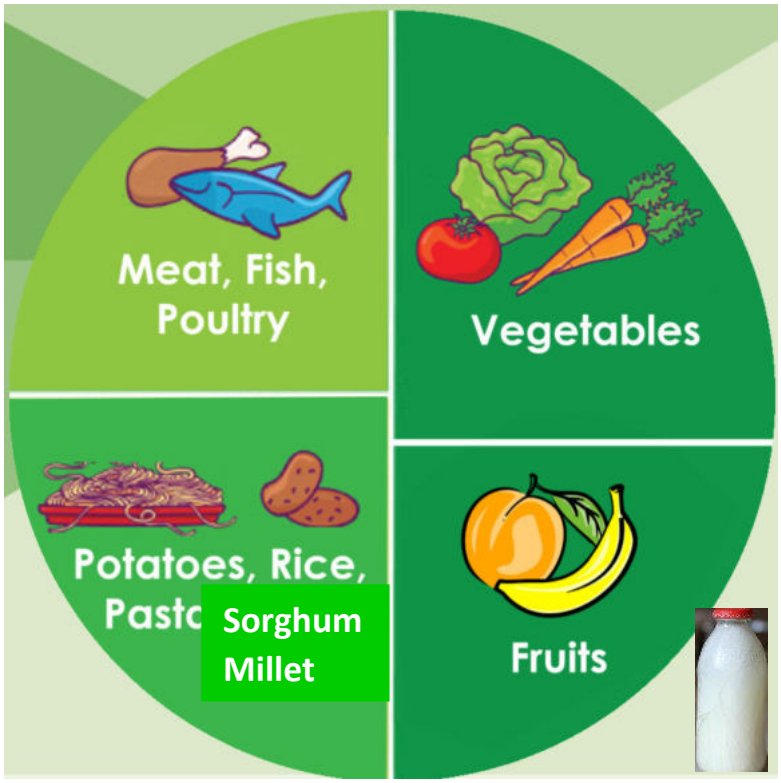
2. Body building food,
= protein

3. Protective food
= vegetables and fruits



My plate

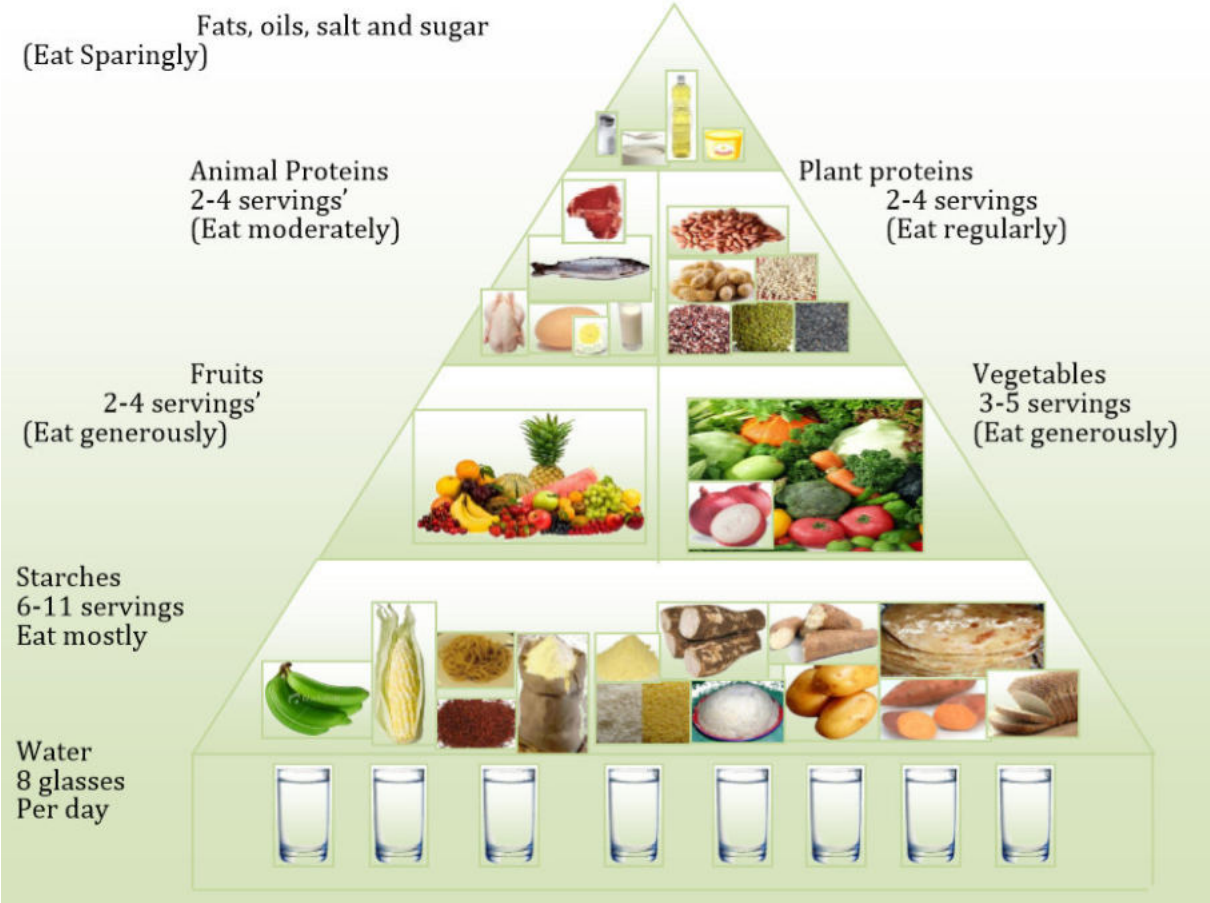
Division of the plate into four sections:
The sections contain grain, protein, fruits and vegetables and a side serving of dairy product.



- Starches/grain: Consume 6 - 11 servings of these foods per day or 180-330g per day. 1 serving of grains group is ½ 250ml cup
- Milk and Milk products group: In this group, 1 serving = 1 cup fresh Milk or yoghurt or Sour milk.
- Vegetables group: give 3-5 servings per day for all and 1 serving is ½ cup cooked vegetables or 1 cup raw vegetables
- Meat, beans & Alternates - 2-3 servings or 180g per day of meat or one serving is 90 g of meat, ½ cups of cooked dry beans is also one serving
- Fruits group – 2-4 servings which are equivalent to 2-4 cups per day

The healthy eating pyramid

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 (200ml) of clean safe water per person per day.



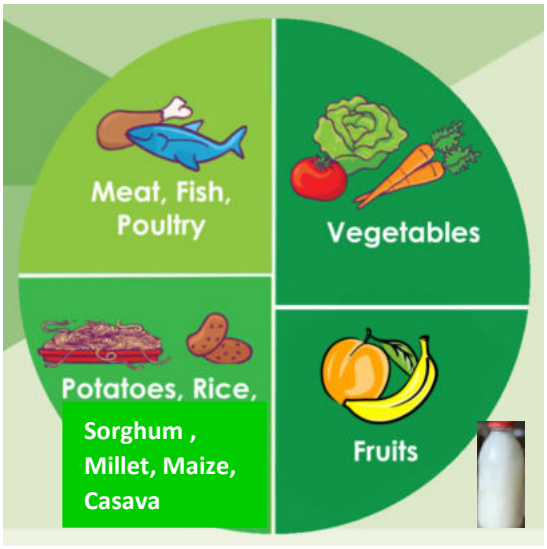
Source: USAID

Group work – 30 min

→ to help participants review the components of a healthy diet so as to get participants to start thinking in terms of healthy meals.

Materials needed: use the pieces of paper with the names of ingredients developed in from Module 3.3, the nutrient group game.

→ Draw a large chalk plate on the floor.



→Ask a volunteer to choose a card from the carbohydrate bowl. Place it on the carbohydrate side of the healthy plate.

→Explain that the carbohydrate will form the basis of the meal. Next, get a volunteer to choose an ingredient from one of the protein bowls and to place it in the protein segment on the plate.

→Repeat the process for all the bowls until you have a healthy, mixed, balanced meal. This activity can be repeated a number of times to show how to combine different ingredients.

A healthy meal should contain no more than 50 per cent carbohydrate (mahangu, maize, rice, potatoes, bread), 15 per cent protein (beans, meat, eggs), a little fat (5 per cent) and the rest vitamins and minerals –vegetables and fruit (30 per cent).

3.4 Diverse Diet - Gain and added value of a diverse diet

- → Healthy nutrition reduces expenditure for medical care-Expenditure
- → for food during hunger season or season of high food prices can be reduced
- → Well-nourished adult farm family members are healthy and can do a good job in agriculture
- → Children of smallholder families are less ill and perform well in school

→ where cassava is the major dietary staple without grains and pulses, children are at risk for protein malnutrition

Recommandations

→ Use produce from the farm in preparing your meals.

→ Add legumes and leafy vegetables to soups and stews. For example add beans to soups, nuts to foods in meals and increase quantity of vegetables used in meals.

→ Eat fruits with all meals.

3.5 Available Food – Needed Food

- Cheap food ←→expensive food

→ Choose vegetables and fruit that are in season. This is when they are cheap.

→ Beans, Soya and lentils are cheaper than meat and chicken and are just as good for you.

→ Make your own fresh meal instead of buying ready-made meals or take-away food.

Over 30 years monoculture in large cereals reduced the diversity of the plants which the diets is abased→ favoured an increasing reliance on heavily processed foods that are rich in added sugars, salt and unsaturades fat acids

Pay attention

Heavily processed foods and drinks are high in fat, salt and sugar: Most people consume snacks high in fat, salt and sugar sweetened drinks.

They are not recommended and not needed for good health.

❖ **Growing nutritious food**

Choosing the right crops:

By planting many different crops for harvesting at different times of year you will have a garden all year round. If you include plants that live for more than one year, such as moringa, pigeon pea, cassava and fruit trees, then your food security will be improved.

Moringa

is a tough, fast-growing tree that produces very nutritious edible leaves and pods. It can also be used for live fencing. The seeds can be used to purify water.

Pigeon pea is a tough bush which lives for about four years. It produces nutritious seeds and the plant helps to improve the soil.

Cassava is a tough bush which can live for two to four years. The roots and leaves may be eaten.

3.6 Questions about different nutritional behaviour after food diversification

→ **Discuss in the group:** Current meal → better meal

- What kinds of healthy drinks can be taken with each meal?
- Was the meal healthy, mixed and balanced?
- How much of your plate contained the different food groups?
- Who does not like eating vegetables?
- Name your favourite vegetables.
- Name your favourite fruit.
- How can we encourage families to eat a wider range of fruit and vegetables?
- How can we encourage families to eat enough protein?

Principles of Nutrition
by eating a healthy, balanced diet. Today many people are turning away from a healthy traditional diet because they think it is inferior to a western diet. This results in people eating less healthy food.

4 Modul 4: Food diversification

- **Targets:** 1. Possibilities of food diversification on site, 2. Improvement and Modernization of nutrition habits
- **Contents:**
  - Status quo of food on-site, possibilities, neglected and underutilized crops
  - Nutrition Value of Indigenous Food
  - Kitchen-/Home garden
  - Keeping small domestic animals (poultry, rabbits)
  - Nutritional calendar
  - Good practice Ghana, Kenya, Ethopia
- **Time needed:** 140 min
- **Materials needed:** Flipcharts, small cards, glue, 4 different coloured markers, 3-4 small tables

4.1 Status quo of food on-site, possibilities, neglected and underutilized crops

Cereal crop options
It is important to choose the right cereal crops to grow and eat. Maize is a crop from South America that was introduced to Namibia by traders about 200 years ago but became wide-spread only about 100 years ago. Before the introduction of maize, most Namibians ate sorghum and millet as their staples. These crops are indigenous.

Maize is a good source of energy, but it contains less protein, vitamins and minerals than millet or sorghum.
Maize needs plenty of water and rich soils in which to grow. It is also susceptible to pests and diseases. Sorghum and millet are tough, nutritious crops that are well suited to our climate and are more drought-tolerant, pest-tolerant and disease-tolerant than maize.

4.2 Nutrition Value of Indigenous Food

- **Energy providing food**
  - **Pearl Millet/Mahangu**

More nutritious than other cereals crops. It contains more proteins and fats than other cereal crops.

  - **Sorghum**

Value of Sorghum:
Sorghum is competitively priced compared to other grains used in food aid. In general, its price is lower than corn, wheat or rice.

  - **Cassava**

Attention: Cassava must be cooked before eaten; can be poissonous
Nutritional value: High in starches, but less in micronutrients, especially in Vitamins

  - **Sweet potatoe** (ngulu)
  - **Oranged flashed sweet potatoe (OFSP)**

Nutritional value: rich in Vit A and starches

→ For the major OFSP variety, Bophelo, 66g consumption can be sufficient to meet the recommended daily allowance for 1-3year old children (300µRE vitamin A).

  - **Manketti** (Manketti nut= Mongongo nut = staple diet)

nuts are only on female trees.
*Use***:** dried fruits can be soaked in warm water, which allows the unpalatable shell to peelled off easily. Fruits are usually boiled and their sweet, soaked flesh mashed. The roasetd stones were cracked and the „nut“ inside there are one or two tasty kernels. Pulp will yield some oil, which is extracted or it can be eten as a thick, cooked sauce.
Nutritional value: nut kernel are rich in vitamins and iron

- **Body building food**
  - **Fish** (kapenta)
  - **Marama Bean**

Nutritional value: Highly nutritious and compare favourable with many existing legume crops. The protein content is about 30 per cent and the oil content varies from 35-42 per cent seeeds can be processed into marama flour and marama milk.

  - **Cassava leaves**
  - **Waterlili** (lisoto/inkuma)
  - **Groundnuts/peanuts** (ndongo)
  - **Cowpeas (**commercial legume)

Use: Leaves and young pods are very popular as green vegetables, used fresh or dried.

  - **Sour milk**

Nutritional value: Fermeted milk is highly nutritious

- **Liver** (chicken, cow)
  Nutritional value: Rich in protein, but also in Vit A and iron
- **Makalani palm fruit**

Use: Fruit flesh is pulped and dried. This can be eaten as a snack or as a meal with roasted pumkin seeds

- **<u>Protective food</u>**

→ Vegetables:

- **Omutete** (= green leafy vegetable)

Use: young leaves and flowers can be boiled and eaten. Some people make jam with Leaves can be quickly bolied for a few minuteas and made into small balls. These balls arethen dried in the air and sun. Can be stored for a year and are soaked in eater bevor being cooked.
Nutritional value: many different nutrients, rich in iron

- **Swiss chard,** *Nutritional value*: Rich in Calcium and Carotene
- **Wild spinach (**green leafy vegetable)

Use: The leaves are taken from teh stem and cooked very quickly without water, like spinach.Seeds can also be cooked.
Nutritional value: Seeds and leaves are very nutritious

- **Sour spinach**
- **Beetroot,** *Nutritional value:* Rich in iron
- **Cabbage,** *Nutritional value:* high in Vit A, B1, B2, C and fibre.
- **Pumpkin, pumpkin leafes** (mapusi,
- **Traditionell peas**
- **Butternut squash/pumpkin,** *Nutritional value:* Rich in Vitamins, but also a source of protein

→ Fruits:

- **Marula**

Only female trees bear the tasty, egg-shaped fruit. The stone is cracked open to remove the kernel, which is either eaten raw or used to extract oil by heating the crushed seeds in a pot and skimming off the oil that floats tot he surface.
Use: Marula fruit can be eaten raw. The crushed <u>kernels</u> can be eaten as a snack. They can also be boiled in eater to take the oil out oft he seeds. Traditional medicine against Headache
Nutritional value: Pulp of marula fruit contains lots if Vitamin C and sugar. Marula seeds are rich in protein and oil.

- **Baobab**

Use: Fruits contains many seeds. Fruit taste is a bit sour, but very good for you. Leaves and seeds are eadible. Seeds are either eaten raw or, after roasting in hot ash and pounded, can be used as a substitue for coffee. Dried, powered, mixed with water = refreshing drink, dried fruit pulp novel food ingredient. Traditional medicine: against stomachache, Headache
Nutritional value: Fruit pulp contains many nutrients. The shells of the fruit have many vitamins (Vit.C) so they are used to feed livestock.

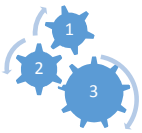
- **Berry** (Muzunzilla)
- **Kalahari Melon** (wild watermelon, veld food, tsama/ etanga)

Nutritional value: Seeds contain a lot of vitamins and proteins, it is also important as a water source during dry months.

Use: The flesh can be made into a pulp and then eaten or drunk. Seeds taste like nuts if you roast them. Seeds are very good for yourlivestock. The oil can be pressed out of the seed and used to keep your skin soft Fruits peels are used for making jam.

→Roots of the shelpherd´s tree (Boscia albitrunca) can be used to preserve meat (indigenous knowledge)

4.3 Kitchen-/Homegarden



Brain storming activit – 5min
Who has experiences with a Homegarden? What is needed?
→ Write on a paper.

→ if you grow your own vegetables, you will always have a fresh and cheap supply of healthy food.
→ Access by all people at all times to the food needed for a healthy life is the essence of food security. Households can obtain food supplies either from their own food production or from food purchases, but more often it is through a combination of both. Enough food should be stored, purchased or preserved for better nutrition.

Households are advised to diversify their traditionally grown crops with multiple other crops such as carrots and orange fleshed sweet potatoes. The cultivation of crops takes place close to the individual household and largely contributes to the food supply of each household. The benefits are food diversification and little distances to fields. Moreover, homegardening provides a visible sign of year-around production and availability of foods, which can influence behavior of community members and encourage them to do so too.

→ Through own crop cultivation households are able to diversify food intake and increase calorie supply.
→ The benefits are food diversification and little distances to fields.
→ Furthermore, diverse crop cultivation benefits soil structure and quality.

The homegardening approach supports the reduction in stunting and wasting rates as well as fight micronutrient deficiencies, through a diversification of food sources on a household level.

Moreover, homegardening provides a visible sign of year-around production and availability of foods, which can influence behavior of community members and encourage them to do so too.

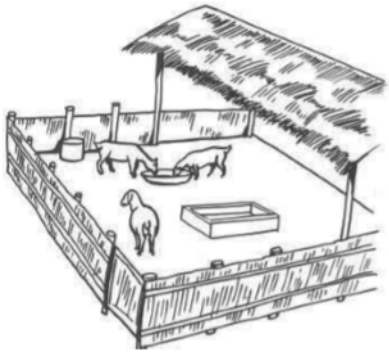
4.4 Keeping small domestic animals (poultry, rabbits)

The family should keep small animals to supplement family diets as well as provide manure to the gardens. Rear poultry and/or small animals to obtain animal foods to help diversify and enrich the family diet. Always keep some milk, eggs, and/or meat to eat at home, particularly if your household includes a woman who is pregnant or lactating or a child aged six months to two years.

Brain storming activity – 5min

Who has experiences in keeping small domestic animals? What is needed?

→ Write down on a paper.



Keep your animals in a fenced place where they also have shade.

Supply regularly water and feed to your animals

- Improve your family's diet by rearing poultry (e.g., ducks and chickens) and small ruminants (e.g. Dairy goats and sheep), others like rabbits, fish and quails.
- If possible, leave space around the house to raise small livestock to provide animal foods (i.e., fish, eggs, chicken, liver, meat and milk) to your pregnant or lactating mothers and to your children.
- Keep animal in a staggered manner (ensure you have different ages) so that they do not all mature at the same time.
- Use animal manure on the kitchen gardens to enrich your cultivation.
- Eggs are rich in protein, vitamins, and minerals.
- Try to set aside at least one or two eggs each day for your family's meal—in particular for the health of pregnant and lactating women and children below two years. Eggs will help them grow strong and healthy.
- Raising poultry will provide additional household income.

4.5 Nutritional Calendar

Groupwork - 30 min
Material needed: Use the print out“Nutritional Calendar“
→ The group will be divided in pairs
→ Every pair works with document, marks and answers the questions

Target:
At the end of this group work participants have an overview about their own food and what more could be possible.

- What do they produce and when is it available?
- Which further foods could the farmers produce in their home garden to get a food diversification?
- Which foods are necessary for an improved diet of farmers family and what is possible in own and indigenous production?

4.6 Good practice Ghana, Kenya, Ethopia

→ **Ghana**: Cocoa production systems
→ **Ethopia: -** different homegardening projects in Ethiopia
- Orange-fleshed sweet potato, OFSP
→ **Kenya:**

Orange-fleshed sweet potato (OFSP) is one of the best known nutrition sensitive interventions to address micronutrient shortages through diet diversification on the one hand and simultaneously improve household’s income on the other. If executed to a high level OFSP has the potential to outperform many other interventions, like it did in our project. During the course of our project we have been impressed by the potential of OFSP. Yet, there have been challenges along the way which makes this short report even more necessary. Such challenges mainly emerged as nation extension service as well as individual households did not pay enough attention to the sensitive growing process of OFSP.
Benefits: The dark orange flesh of the sweet potato is nutrient dense and therefore perfectly suited to support healthy and diversified diets. Moreover, it is especially suited to address micronutrient shortages of mothers during their reproductive years and young children. In particular, OFSP helps to address the Vitamin A deficit among rural populations as it contains a high concentration of beta-carotene. Moreover, it has a high concentration of other micronutrients such as Vitamin C, K, E, B’s and Magnesium.

OFSP has the unique advantage that fully grown plants can be kept within the ground and do not need to be harvested immediately. This largely reduces the need for storage facilities. Moreover, OFSP provides farmers with multiple sets of seeds and thereby imposes little requirements on seasonal seed purchases.

OFSP the reduction of malnutrition in various regions around Sub-Saharan-Africa. Particularly in rural areas, where the number of different food sources is oftentimes limited, OFSP offers a convenient alternative. Especially for young women and children under the age of two OFSP has shown an extraordinary reduction in various health problems related to malnutrition. For

example, 100 grams of OFSP met the daily Vitamin A needs of a young child. Furthermore, households receive the chance to diversify their food and income sources. Therefore, it addresses the problem of malnutrition and income diversification of rural households.

Conclusion

→ Access to diversified and nutritious food is a challenge.

→ Knowledge and Knowhow about food and nutrition is a challenge.

➔ Be a part of that challenge!!

Farm successful, be smart, eat different.

5 Modul 5: Storage of Food and Preserving

- **Targets: 1.** Know different preserving methods, 2. Know the risks and hazards of storing and preserving 3. Understand the dry cooler system
- **Contents:**
  - Methods of food preserving
  - Risks and hazards of storing and preserving: Botulism, Aflatoxin
  - Drawings of dry cooler
- **Time needed:** 60 min
- **Materials needed:** Flipchart, small cards, glue, 4 different coloured markers, 3-4 small tables

5.1 Methods of food preserving

There are many different types of food preserving methods, such as drying, canning, cooling, salting, sugaring, lacto fermentation, …

- **About drying food**

Drying is the oldest method known for preserving food. When you dry food, you expose the food to a temperature that's high enough to remove the moisture but low enough that it doesn't cook. Good air circulation assists in evenly drying the food.

- **About canning food**

Canning is the process of applying heat to food that's sealed in a jar in order to destroy any microorganisms that can cause food spoilage. Proper canning techniques stop this spoilage by heating the food for a specific period of time and killing these unwanted microorganisms. During the canning process, air is driven from the jar and a vacuum is formed as the jar cools and seals.

Although you may hear of many canning methods, only *two* are approved by the United States Department of Agriculture (USDA). These are water-bath canning and pressure canning.

Water-bath canning: This method, sometimes referred to as *hot water canning,* uses a large kettle of boiling water. Filled jars are submerged in the water and heated to an internal temperature of 212 degrees for a specific period of time. Use this method for processing high-acid foods, such as fruit, items made from fruit, pickles, pickled food, and tomatoes.

Lacto-fermentation:
is the process that produces traditional dill pickles or real sauerkraut, among other fermented delights. This simple fermentation process requires nothing more than salt, vegetables, and water — no canning, no fancy equipment.

→ In general, firm vegetables, such as beets and turnips, are best for lacto-fermentation. (Cabbage, carrots, peppers, radishes, garlic, cucumbers, turnips, snap peas, cauliflower, green beans,..)

→ lacto-fermentation also increases or preserves the vitamin and enzyme levels, as well as digestibility, of the fermented food.

→Maintaining or creating nutritional value, texture and flavor is an important aspect of food preservation.

→You need heavily hygienic processing and some good preservation recipes. Than it works!

5.2 Risks and hazards of storing and preserving: Botulism, Aflatoxin

❖ Botulism

- Clostridium botulinum is a bacterium that produces dangerous toxins (botulinum toxins) under low-oxygen conditions.
- Botulinum toxins are one of the most lethal substances known.
- Botulinum toxins block nerve functions and can lead to respiratory and muscular paralysis.
- Human botulism may refer to foodborne botulism, infant botulism, wound botulism, and inhalation botulism or other types of intoxication.
- **Foodborne botulism,** caused by consumption of improperly processed food**, is a rare but potentially fatal disease if not diagnosed rapidly and treated with antitoxin**. →Homemade canned, preserved or fermented foodstuffs are a common source of foodborne botulism and their preparation requires extra caution.
- Botulinum toxins are neurotoxic and therefore affect the nervous system. Foodborne botulism is characterized by descending, flaccid paralysis that can cause respiratory failure. Early symptoms include marked fatigue, weakness and vertigo, usually followed by blurred vision, dry mouth and difficulty in swallowing and speaking. Vomiting, diarrhoea, constipation and abdominal swelling may also occur. The disease can progress to weakness in the neck and arms, after which the respiratory muscles and muscles of the lower body are affected. There is no fever and no loss of consciousness.
- The symptoms are not caused by the bacterium itself, but by the toxin produced by the bacterium. Symptoms usually appear within 12 to 36 hours (within a minimum and maximum range of 4 hours to 8 days) after exposure.

--> Foodborne Botulism – Prevention

- Prevention of foodborne botulism is based on good practice in food preparation particularly during heating/sterilization and hygiene.
- Refrigeration temperatures combined with salt content and/or acidic conditions will prevent the growth of the bacteria and formation of toxin.

→ **Preventing food poisoning**- **The *Five Keys*:**

1. keep clean
2. separate raw and cooked foods
3. cook thoroughly
4. keep food at safe temperatures
5. use safe water and raw ingredients.

❖ Aflatoxin

Aflatoxin **is a mycotoxin** and is **produced by Aspergillus**. Aflatoxins are associated with and may cause cancer, liver disease, immune suppression, retarded growth and development and death.
Aspergillus is a fungi/mold, typically found on vegetables, fruits, but also on walls or plasterwork.
Aflatoxin is carcinogen and stable against heat or cold.
→ Sources of Aflatoxin- Major food: maize, groundnut, and animal-source foods
→ kernels of maize were four- and nine-times more likely to be contaminated with Aspergillus than comparable samples of sorghum and pearl millet respectively.

Risks and hazards:

→ Aflatoxin is also dangerious for the unborn baby. Aflatoxin goes through the blodd into the foetus blood
→ levels were influenced by storage structures; it increased markedly during the storage
→ contamination with other mycotoxins, particular **fumonisins** (caused bycommon grain mold), are **more siginificant.**
→ Aflatoxin in animal source food: Milk, liver, eggs,…
→ Contamination of milk is the highest concern for public health (risk for babies, children, pregnant mothers)
→ Contamination in milk is a worldwide occurrent

Attention!
1. Aflatoxin mostly found in maize cake, maize rolls, peanut butter, groundnut cake, groundnut and maize based snacks, mostly eaten by preschool and school aged children.
=> Don´t eat damaged kernels!!
2. Moldy household food, which is maybe heavily contamined
=> Don´t feed modly household to your poultry or cows!

Reducing the risk of aflatoxin/Prevention:
Aflatoxin is the only mycotoxin known to contaminate crops both- pre- and post harvest.
→Improve the plant vigor and reduce plant stress, such as created by pest attack or drought.

5.3 Dry cooler- cooling system due to evaporation

Explanation by presentation of drawings

→ as needed drawings can be handed out.

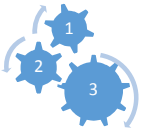
Modul 6 : Cooking demonstration

- **Targets:** 1. Know the hygienic bearing, 2. Know the handling to save nutrients and to support the absorption and resorption of nutrients
- **Contents**
  - Meal Planning
  - Hygiene, hygienic environment for cooking
  - Different cooking methods
  - Save nutrients and support the absorption ans resorption of nutrients
- **Time needed:** 120 min
- **Materials needed:** Flipchart, small cards, glue, 4 different coloured markers, 3-4 small tables

6.1 Meal Planning

This is the decision made as to what is to be cooked and eaten in given period of time.

When planning our meals there are points we must remember to ensure that our meal is acceptable to our family.



Brainstorming activity -10 min

When you plan your meal, about what do you think?

→ Write down on a paper.

Points to consider when planning meals:

→ **Food Value**: Meals should be well balanced nutritionally: Bodybuilding foods, protective and energy foods must be present in good amounts.

→ **Attractiveness**: Food must be eaten and enjoyed; it must therefore be attractive to look at and to stimulate appetite, it should taste good and look colourful.

→ **Texture**: Avoid serving soft and soggy meals all the times. Every meal should contain something that needs chewing, and this is particularly important for children as it helps in the growth of healthy teeth.

→ **Variety**: This stimulates the appetite and it can be achieved by varying the methods of cooking and serving the meals with accompaniments such as salads e.g., tomato salad, and by introducing new recipes with old favourite ones.

→ **Needs of different members of the family**: People with special needs in the family have to be considered in meal planning. Age should be considered. The elderly, toddlers, sick persons, and young boys or girls, who are in the period of rapid growth,

all have to be considered. The right kind and enough food should be prepared to meet the body requirements of each member of the family.

→ **Availability**: Ensure the food is available, accessible and affordable.

→ **Time**: Time available for food preparation taking into consideration the energy tips.

→ **Money available for food**: One should plan for meals whose budget are within the Family income. Bulk buying is recommended while impulse buying should be avoided.

6.2 First Step: Hygiene

→ Clean plates and spoons with soap and water before using to feed babies and young children.

→ Keep your drinking water in a narrow-necked container, and clean the container well before filling, to keep water clean.

→ Always cover your family's food and water to keep dirt and flies away.

→ Milk residues inside of glasses and dishes provide an excellent breeding ground for bacteria, so pay special attention to milk clumps on the bottom. Also the tines of forks provide a protected hiding spot for germs. Take the extra time to scrub between the tines of forks.

6.3 Common cooking methods

There are two main classes of cooking:

- Moist methods, which include boiling, steaming, stewing and braising.
- Dry methods, which are baking, roasting, grilling and frying.

Group question to discuss with your neighbour -5 min

How do we improve our recipes and cooking of our foods?--> Ask pairs to share their discussion with the group.

→ To make family food more interesting we need to try on new recipes and suitable methods of cooking that avail most nutrients.

MESSAGES

- Moist methods of cooking avail the most nutrients
- Always close tightly your pot or pan with a lid.
- Use as less water as possible for steaming, stewing, braising
- Always consume the liquid of steaming or stewing. It contents Vitamins and mineral nutrients.
- Dry methods of cooking such as roasting and deep frying are not suitable for baby foods
- Watch out on how much oil is used during cooking
- Use vegetable oil for cooking
- Always throw away the soaking liquid of lentils! It can content toxics.
- Never let lay the peeled potatoes in water. They loose vitamins and minerals.
- For resorption of fat lubable Vitamins (E,D, K, A) in vegetables add a spoon of fat /oil
- For the resorption of Vit A and E a short moist heat (3-5 min) is nessecary.
- Water soluble nutrients as Vitamins (Vit C, B1, B2, B6, 12, Niacin) and mineral nutrients get out of the food with increasing cooking time.
- Starches food baking, roasting, grilling and frying: only golden coloured, not deep dark. During the dry cooking methods starches with fats develop the carcinogen Acrylamid.
- Never heat the fat or oil until fuming- it can arise a carcinogen toxic Acrolein by reason of high heat.

6.4 Save and improve Nutrient Content

At the storage:

On the same day after vegetable harvest the content of vitamins somewhat decreases.

The nutrient loss for commercially-dried foods varies between 30 – 80% for vitamin C and 10 – 50% for vitamin A. The variation is much greater for fresh food purchased from the store and preserved at home. Although drying destroys some nutrients like vitamin C.[1]

- The food loose moisture, dry out, wither or they get soft and slobbery, loose colour and flavour.
- Vitamins and further nutrients are reduced. (E.g. Vit.C content can be reduced 30- 50 % after 4 days at 20°C).
- Through a cooling system you can slow down the process of vitiation.

→ losses of vitamins depend on cooking time, temperature, and cooking method
→ Never store your fresh vegetables or fruits directly in the sun.
→ Store the vegetable oil at a cool, dark place. The Vit. E in vegetable oil is sensible against light, oxygen and heat.

[1]Effect of Drying Temperature on Nutritional Content of Moringa Oleifera Leave, World Journal of Food Science and Technology 2017; 1(3): 93-96

At the cooking process:

- Foods rich in vitamin C (e.g. Pepper, Green peas, Spinach, Pumpkin, Carrot) be cooked as fast as possible with less heat and small amount of water.
- Vitamin A rich vegetable must be cooked with oil to yield retinol (Carrots, OFSP, orange coloured vegetables and fruits)
- Iron rich foods from animal sources foods are better mixed up with plant sources in order to improve bioavailability of iron.
- Iron rich food from green leafy vegetables are better resorbed from the body with a few drops of Vit. C (after cooking!)
- Use of baking soda (calcium bi-carbonate) in cooking destroys some vitamins e.g. Vitamin B1

→ Steam and stew shortly and gently (3-7min). The food must be crispy and firm to the bite.
→ Oil to help absorb fat soluble vitamins
→ Vitamin C increases availability of iron
→ Put the salt on your meal after cooking, short before consume.

❖ Summary

Best cooking practices

- When cooking, always cover your pot to hold in the steam and heat to help reduce cooking time. Don't let that heat get away by leaving your pot uncovered!

- Avoid trimming and cutting fruits and vegetables into very small pieces. The greater surface area allows oxygen to break down vitamins faster. Steaming, shallow frying or using a pan with very small amounts of water and a tight-fitting lid are best methods of cooking that retain most nutrients. More nutrients are retained when there is less contact with water and a shorter cooking time with less exposure to heat.

- Keep milk away from strong light to prevent loss of Riboflavin or B2 vitamin, which is very sensitive to direct light.

- Do not add baking soda to enhance a vegetable's green colour. Alkaline products destroy vitamins C and B1.

- If food is cooked in water, add it to a small amount of boiling water, cover the pot and cook it rapidly. If possible, save the cooking water for making soup, sauces or gravy. Destructive enzymes are inactivated by heat so it is best to cook foods in a preheated pan or oven or in water that is already boiling. Cooking utensils made of glass, stainless

steel, aluminium or enamel or lined with a non-stick coating have no effect on nutrient content.

- Consider the time and temperature. The longer the cooking time and the higher the temperature, the more nutrients are lost because of the fact that many vitamins are sensitive to heat and air exposure (specifically vitamin C, the B vitamins and folate

- Cook with or add vegetable with oil to avail vitamin A

- Potassium, vitamin C, thiamine and folate are the most easily leached nutrients in cooking

- Vegetables and fruits are more nutritious when eaten raw

- Blanching of vegetables before eating kills germs and conserves nutrients e.g. vitamin C.

- Keep fruits and vegetables cool to prevent enzymes from destroying vitamins

Nutritional Calendar: How do you cover the food needs of your family?

- Mark a square □ if you sell+eat the product
- Mark a circle o in the months you need to buy the product
- Indicate by a line ---- how long the product is available from own production.

➔ What are the months in which you need diversification in your meal?

STARCHES and CARBO-HYDRATES	**Sell+ eat** □	**buy** o	**January**	**Febr.**	**March**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**October**	**Nov.**	**Dec.**
Grains, roots, tubers														
Mahangu/ Pearl millet														
Maize														
Sorghum														
Casssava														
Sweet potatoe														
Irish potatoe														
Root														

Nutritional Calendar: How do you cover the food needs of your family?

- Mark a square □ if you sell+eat the product
- Mark a circle o in the months you need to buy the product
- Indicate by a line ---- how long the product is available from own production.

➔ What are the months in which you need diversification in your meal?

PROTEINS	**Sell+ eat □**	**buy o**	**Jan.**	**Febr.**	**March**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
Legumes/pulses														
Beans														
Groundnut														
Animal Protein														
Meat														
Fish														
Poultry														
Eggs														

Nutritional Calendar: How do you cover the food needs of your family?

- Mark a square □ if you sell+eat the product
- Mark a circle o in the months you need to buy the product
- Indicate by a line ---- how long the product is available from own production.

➔ What are the months in which you need diversification in your meal?

VITAMINS and MINERALS	**Sell+ eat □**	**buy o**	**Jan.**	**Febr.**	**March**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
Fruits														
Mango														
Pawpaw														
Oranges														
Vegetables														
Dark-green leaves														
Tomatoes														
Pumpkin														
Cabbage														

Notes

Notes

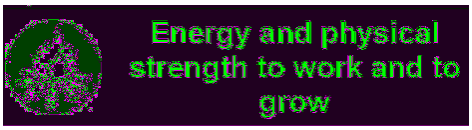
Food & Nutrition

Training of Trainers for Nutrition Educators

by GIZ Namibia – 2018

HANDOUTS & PICTURES

❖ Functional Food Groups - Nutrient groups



1. Energy providing food

Staple food and fats (starchy food / energy giving foods) = Starches and fats/oil

2. Body building food

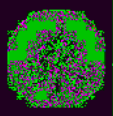
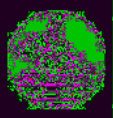
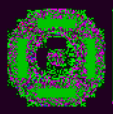
Food that help us to build our body and make/keep us strong = protein

3. Protective food

that keeps us healthy and provides vitamins and minerals

❖ Functional Food Groups - Food products

Food products and their content in energy, protein and fat

Food	Energy kcal per kg	Fat Grams per kg	Protein Grams per kg	
Rice	3610	10	65	
Maize	3530	38	93	
Cassava	1490	2	12	
Plantain	1350	3	12	
Yam	1180	2	15	
Sweet potato	1050	3	17	
Groundnut	5670	450	258	
Beans	3330	8	226	
Fish (dried)	2550	470	74	
Meat	1610	79	195	
Eggs	1580	112	120	
Fruits (oranges)	450	2	9	
Vegetables (carote)	305	0	7	
Leaves (cassava)	230	3	30	

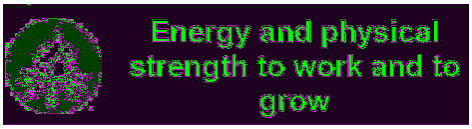
adapted from FAO 2004,Family Nutrition Guide; http://www.nutritiondata.com/facts/fats-and-oils/575/2

Explanation: The kilocalorie (Kcal or 1000 calories) is a measure for the energy of a food. The number of kilocalories of one kg of a given food shows you whether the food is rich or poor in energy.

Energy from food

Remember that foods contain a mixture of different nutrients. Our bodies can get energy from carbohydrates, fats and proteins. For example, milk is a source of protein, fat, calcium and several vitamins. Millet is rich in energy, protein, vitamins and minerals.

Legumes (beans, lentils, peas) are important for nutrition because of their protein content



1. Energy providing food

Staple food and fats (starchy food / energy giving foods) = Starches and fats/oil

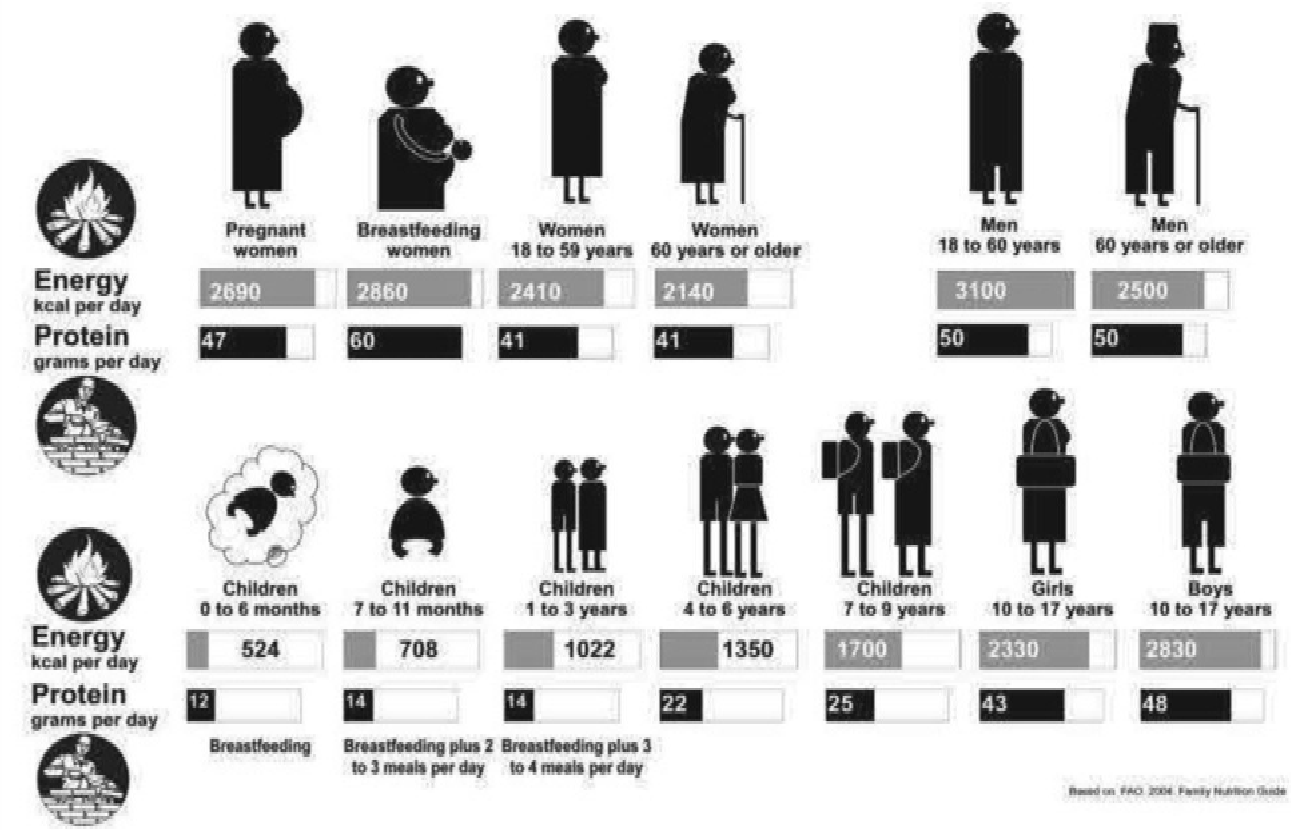
2. Body building food

Food that help us to build our body and make/keep us strong = protein

3. Protective food

that keeps us healthy and provides vitamins and minerals

❖ Different needs in different ages, sex and life of times



Explanation: The kilocalorie (Kcal or 1000 calories) is a measure for the energy of a food. The number of kilocalories of one kg of a given food shows you whether the food is rich or poor in energy.

DIETARY DIVERSITY

LEGUMES/PULSES

Legumes such as beans, lentils, peas, groundnuts, and seeds such as sesame.

ANIMAL PROTEIN

Animal-source foods, including flesh foods such as meat, chicken, fish, liver and eggs, milk, and milk products.

NOTE: Animal foods should be started at 6 months.

CEREALS/STAPLES

Staples: Grains such as maize, wheat, rice, millet, sorghum, roots, and tubers such as cassava and potatoes

FRUITS & VEGETABLES

Vitamin A-rich fruits and vegetables such as mango, pawpaw, passion fruit, oranges, dark-green leaves, carrots, orange-flesh sweet potato, and pumpkin; and other fruits and vegetables such as banana, pineapple, avocado, watermelon, tomatoes, eggplant, and cabbage.

NOTE: Include locally used wild fruits and other plants.

KEY MESSAGE FOR MOTHERS

Enrich the food you give to the baby at each meal with milk, potatoes, avocadoes, vegetables, carrots, egg-yolk among others to help your baby grow and get strong. Feed babies with two to three different types of colourful foods to reduce chances of deficiency diseases.

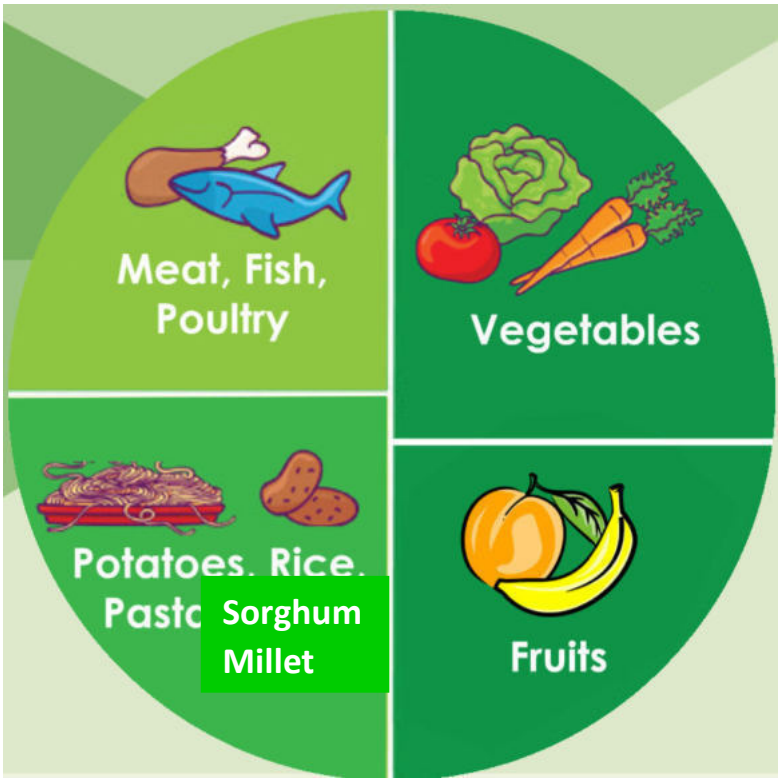
german cooperation
DEUTSCHE ZUSAMMENARBEIT

Published by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

NuSePPP Nutrition-Sensitive Potato Partnership Project

My plate



Division of the plate into four sections:

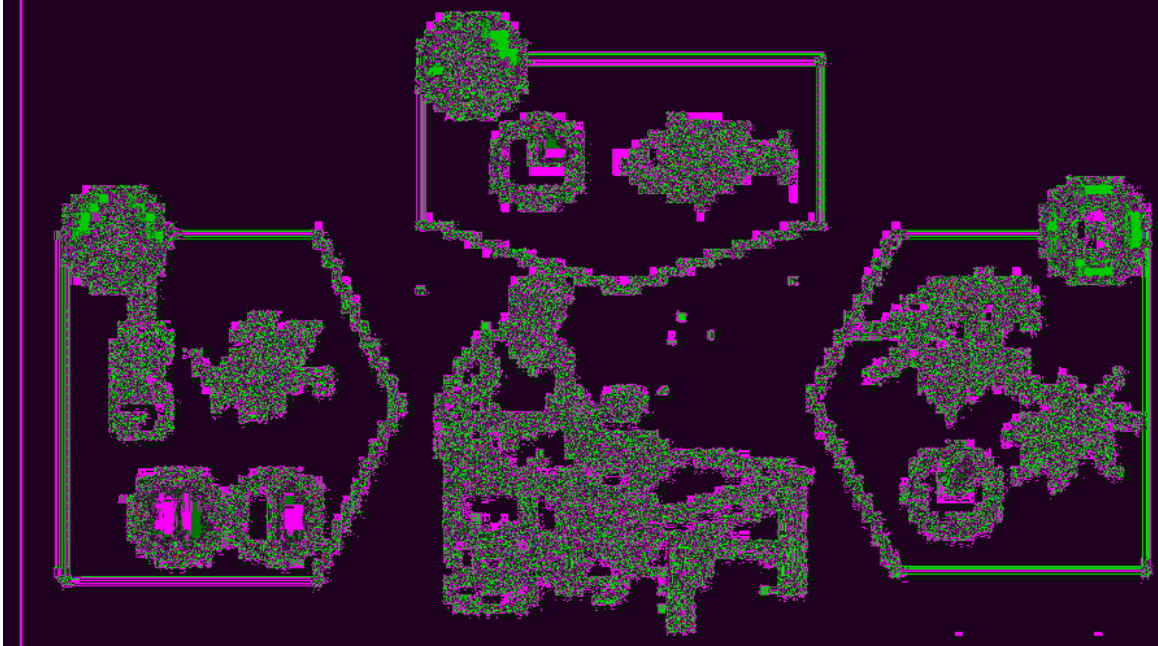
The sections contain grain, protein, fruits and vegetables and a side serving of dairy product.

- Starches/grain: Consume 6 - 11 servings of these foods per day or 180-330g per day. 1 serving of grains group is ½ 250ml cup
- Milk and Milk products group: In this group, 1 serving = 1 cup fresh Milk or yoghurt or Sour milk.
- Vegetables group: give 3-5 servings per day for all and 1 serving is ½ cup cooked vegetables or 1 cup raw vegetables
- Meat, beans & Alternates - 2-3 servings or 180g per day of meat or one serving is 90 g of meat, ½ cups of cooked dry beans is also one serving
- Fruits group – 2-4 servings which are equivalent to 2-4 cups per day

The healthy eating pyramid

Source: USAID

Prepare food well and conserve nutrients and vitamins during cooking



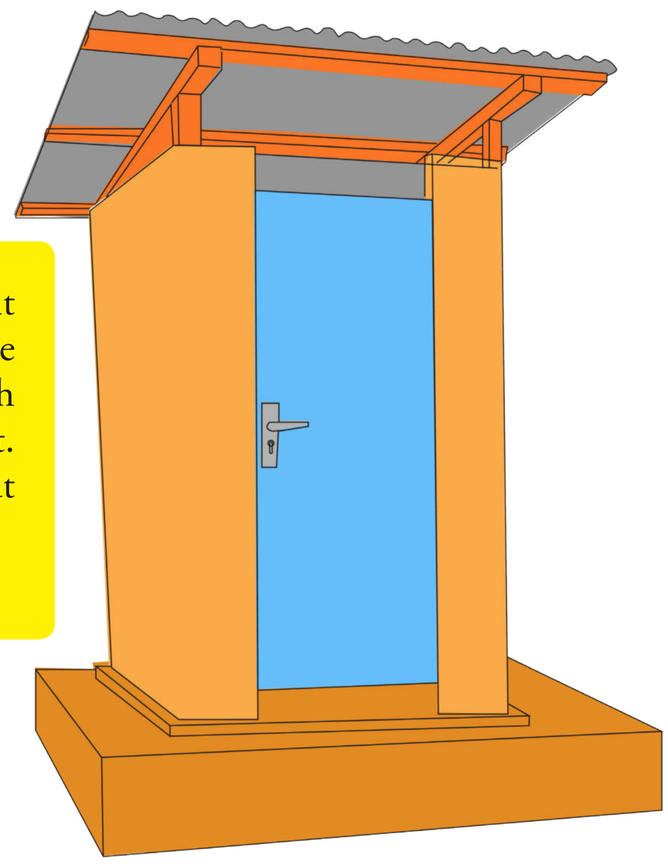
Main Lessons

1. Different food types have different cooking times.
2. Vegetables are Protective Food. Only when cooked shortly they really protect you.
3. Beans, cow peas, groundnuts are Body-building Food. To reduce their cooking time
   - Soak them overnight
   - Cook them without salt.

   By doing so you save also fire wood.
4. Healthy food is prepared in a clean cooking place
5. Wash all fruits and vegetables in clean salt water before eating

ESSENTIAL HYGIENE ACTIONS

ALWAYS USE A TOILET

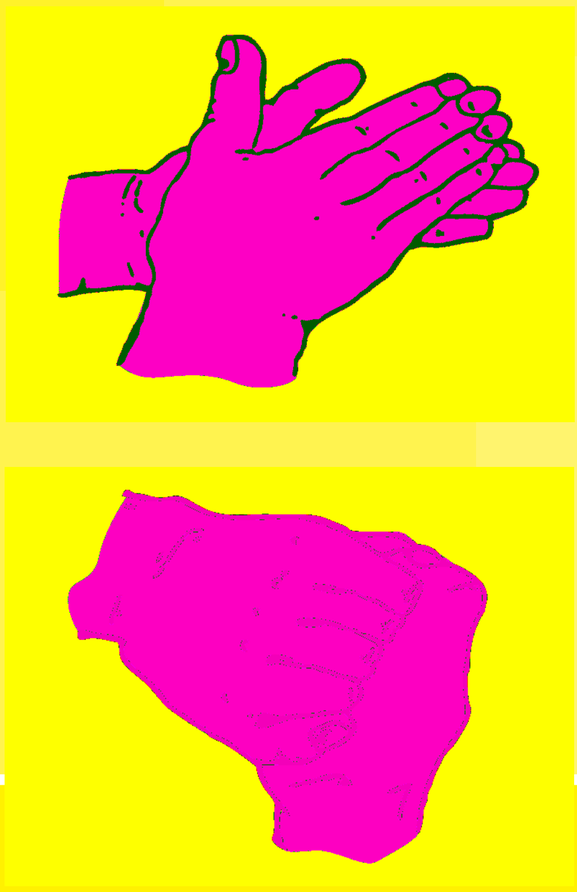


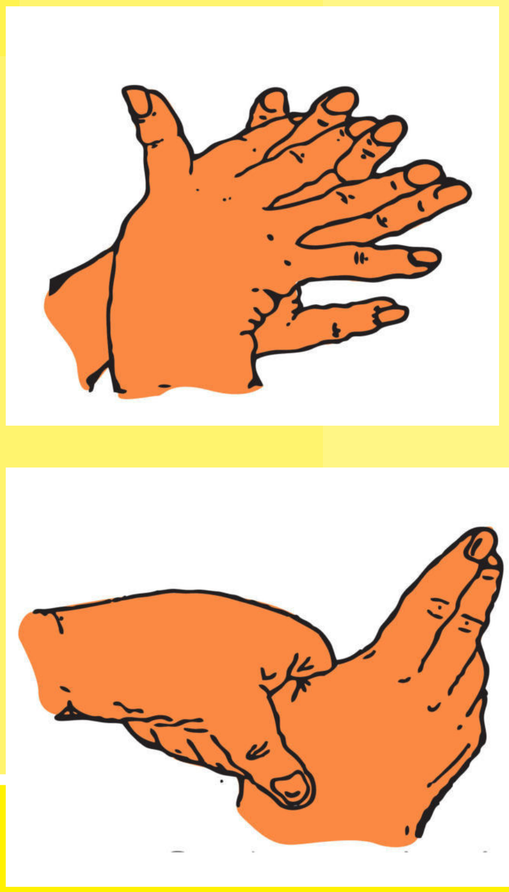
To keep your environment clean and prevent illnesses, use a sanitary latrine, and teach your children how to use it. Keep faeces and garbage out of the environment

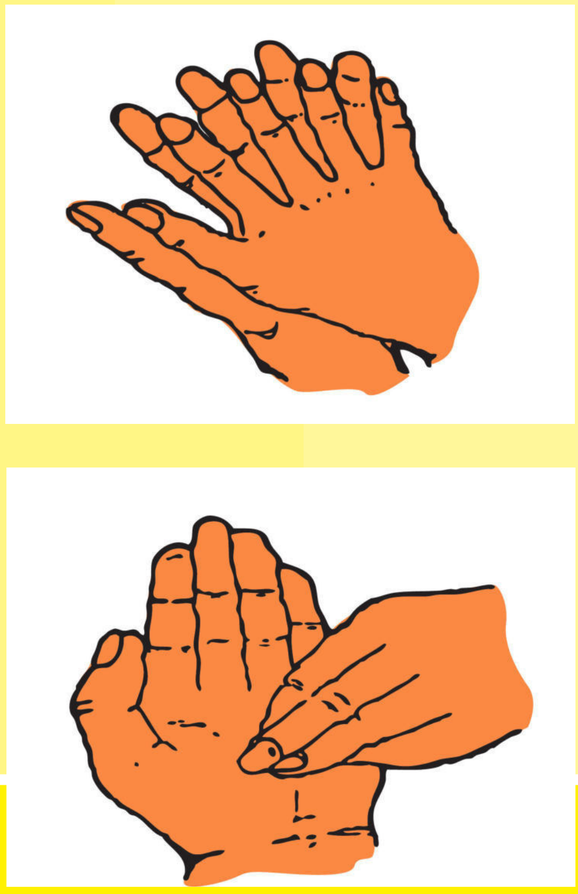
WASHING HANDS WITH MINIMUM WATER: TIPPY TAP

Washing your hands is always important so that you and your family stay healthy and free from disease- Putting a special water source in every location where you need to wash your hands will help you do so, using minimum water.

HAND WASHING STEPS







Wash your hands with water and soap after using the toilet, Wash your children's bottoms after toilet. Ensure you wash hands before preparing food, and before eating or feeding your children and family.

KEEP UTENSILS CLEAN

Danger of food spoilage and food-borne diseases

Bacteria and other micro- organisms in dirty places cause food spoilage and food-borne diseases. Hygiene is the best safeguard against diseases such as diarrhoea, vomiting, typhoid and cholera. All efforts should be made to ensure hygienic conditions in food preparation.

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Published by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
NuSePPP Nutrition-Sensitive Potato Partnership Project

When to plant and harvest

It is important to know at what time of year to plant your vegetables, and when they will be ready. Use this table to help you.

Plant **Harvest**

Fruit or vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cabbage			P	P	P	P	P	P				
						H	H	H	H	H	H	H
Carrot	P	P	P	P				P	P	P		
	H	H		H	H	H	H			H	H	H
Cauliflower		P	P	P	P	P	P					
				H	H	H	H	H	H			
Garlic		P	P	P								
	H								H	H	H	H
Onion	P	P	P	P	P	P						
								H	H	H	H	
Potato								P	P	P		
	H	H	H									
Pumpkin									P	P	P	P
	H	H	H	H								H
Runner bean	P							P	P	P	P	P
	H	H	H	H	H						H	H
Spinach beet			P	P			P	P	P	P		
	H	H			H	H			H	H	H	H
Sweet potato										P	P	P
	H	H	H	H	H							
Sweetcorn									P	P	P	P
	H	H	H	H								
Tomato								P	P	P	P	
				H	H	H	H					H
Watermelon									P	P	P	
	H	H	H								H	H

Your garden calendar

In our sample garden, we are growing tomato plants, beans, spinach beet, carrots, garlic, runner beans, sweet potatoes, watermelons, potatoes and sweetcorn. Harvest from last year's planting is shown in yellow boxes, while this year's harvest is in blue.

Growing nutritious food

Name of crop	Growing area	Time of year they can be grown
millet	fields	rainy season
sorghum	fields	rainy season
rice	wetlands	rainy season
yam (*madhumbe*)	wetlands and gardens	all year
cassava	around fields and gardens	all year
sweet potato	wetlands and vegetable gardens	all year
potato	gardens	all year in cool areas, during the cool dry season in hot areas
Fats		
sunflower	fields	rainy season
groundnut	fields	rainy season
Protein		
roundnut	fields and vegetable gardens	rainy season
pigeon pea	around fields and gardens	all year
sugar bean	with grain crops in fields and in gardens	all year
soya bean	with grain crops in fields and in gardens	all year
butter bean	on fences and walls around gardens and homestead	all year
cow pea	with grain crops in fields and in gardens	all year
groundnut	with grain crops in fields and in gardens	rainy season
Vitamins and Minerals		
tomato	gardens	all year, but dislikes frost & too much rain
carrot	gardens	all year
onion	gardens	all year round but prefers cool weather
green bean	gardens and fields	all year
spinach	gardens	all year, but dislikes too much rain
garlic	gardens	winter
gooseberry	gardens and fields	all year
melon	gardens and fields	rainy season
okra	gardens and fields	rainy season
pumpkin	gardens and fields	all year, except very cold times
butternut and squash	gardens and fields	all year, except very cold times
amaranth *(imbuya, mowa, bongwe)*	gardens and fields	all year
blackjack	gardens and fields	all year
cat's whiskers *(nyevhe, ulede)*	gardens and fields	rainy season
strawberry	gardens	all year
moringa	fields and around gardens or near the homestead	all year
brassicas (rape, covo, *tsunga*, cabbage)	gardens	all year, especially in the cold season
pineapple	gardens	rainy season
granadilla	gardens on fences and walls around the homestead	all year
citrus	near homestead	all year
guava	near homestead, around fields, in gardens or near rivers all year	
banana	near homestead and near rivers	all year

IMPROVING NUTRITION WITH KITCHEN-GARDENING

The family should keep small animals to supplement family diets as well as provide manure to the gardens. Rear poultry and/or small animals to obtain animal foods to help diversify and enrich the family diet. Always keep some milk, eggs, and/or meat to eat at home, particularly if your household includes a woman who is pregnant or lactating or a child aged six months to two years.

Access by all people at all times to the food needed for a healthy life is the essence of food security. Households can obtain food supplies either from their own food production or from food purchases, but more often it is through a combination of both. Enough food should be stored, purchased or preserved for better nutrition

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Published by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

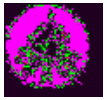
NuSePPP
Nutrition-Sensitive Potato Partnership Project

Poster 11

Nutritional Calendar: How do you cover the food needs of your family?

- Mark a square □ if you sell+eat the product
- Mark a circle o in the months you need to buy the product
- Indicate by a line ---- how long the product is available from own production.

➔ What are the months in which you need diversification in your meal?

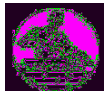


STARCHES and CARBO-HYDRATES	**Sell+ eat □**	**buy o**	**January**	**Febr.**	**March**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**October**	**Nov.**	**Dec.**
Grains, roots, tubers														
Mahangu/ Pearl millet														
Maize														
Sorghum														
Casssava														
Sweet potatoe														
Irish potatoe														
Root														

Nutritional Calendar: How do you cover the food needs of your family?

- Mark a square □ if you sell+eat the product
- Mark a circle o in the months you need to buy the product
- Indicate by a line ---- how long the product is available from own production.

➔ What are the months in which you need diversification in your meal?

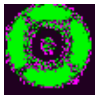


PROTEINS	**Sell+ eat □**	**buy o**	**Jan.**	**Febr.**	**March**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
Legumes/pulses														
Beans														
Groundnut														
Animal Protein														
Meat														
Fish														
Poultry														
Eggs														

Nutritional Calendar: How do you cover the food needs of your family?

- Mark a square □ if you sell+eat the product
- Mark a circle o in the months you need to buy the product
- Indicate by a line ---- how long the product is available from own production.

➔ What are the months in which you need diversification in your meal?



VITAMINS and MINERALS	**Sell+ eat □**	**buy o**	**Jan.**	**Febr.**	**March**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
Fruits														
Mango														
Pawpaw														
Oranges														
Vegetables														
Dark-green leaves														
Tomatoes														
Pumpkin														
Cabbage														