

Ministry of Agriculture, Livestock, Fisheries and Cooperative

1 MAINTAIN A HEALTHY DIET DURING COVID 19 PANDEMIC

1.1 INTRODUCTION

The COVID 19 pandemic has caused a lot of changes in our daily lives. However, it is possible to maintain a healthy lifestyle during this difficult time. All Kenyans should follow the Ministry of Health guidelines on COVID 19 management to protect against COVID 19 infection and transmission (Annex 1). **Physical distancing and good hygiene are the best protection for yourself and others against COVID-19.**

Maintaining a healthy diet is an important part of supporting a strong immune system. A **Healthy diet** is a diet that is of adequate quantity and quality to achieve optimal growth and development of all individuals and support functioning and physical, mental and social wellbeing at all life stages. Healthy diets are diversified, balanced, and safe and should limit the intake of saturated and trans fats, added sugars, and salt. They also help to protect against, undernutrition, micronutrient deficiency, overweight and obesity as well as related Non-Communicable Diseases such as diabetes, heart disease, stroke and cancer.

1.2 GENERAL GUIDELINES FOR HEALTHY EATING DURING COVID 19

1. **Eat a variety of foods:** Eat foods from at least 4 to 5 food groups daily (figure 1). To achieve this, stock adequate non – perishable foods and improve the shelf life of perishable foods.
 - a. Examples of non - perishable food stocks;
 - *Dry grains and grain flours: Sorghum, millet, maize, rice, amaranth seeds, wheat e.t.c.*
 - *Dry Legumes and pulses: Dolicos (Njahi), beans, lentils, green grams, pigeon peas, cowpeas, soya bean, split peas e.t.c.*

- *Nuts and seeds: Groundnuts, cashew nuts, peanuts, pumpkin seeds, sesame seeds, macadamia, coconut*
- *Eggs*
- *Sour milks e.g. yoghurt*
- *Long life milk*
- *Dried fruits or vegetables*
- *Dried fish such as omena and obambla / mgongo wazi.*
- *Dried meat*

Note: Extend the shelf life of fresh foods through cooling and proper storage.

Refer to <http://www.health.go.ke/wp-content/uploads/2020/03/Final-Nutrition-messages-for-Population.pdf.pdf> for nutrition messages for special groups (pregnant and breastfeeding mothers, infants and young children).

- 2. Eat plenty of fruits and vegetables:** Fruits and dark green vegetables are popular and tasty; they are rich in minerals and vitamins like beta-carotene and Vitamin C that are important for boosting immunity. Cool fresh fruits and vegetables to extend shelf life (procedures in section 2)
- 3. Consume a diet rich in whole grains, nuts and other foods that are rich in healthy oils:** Eat foods rich in healthy oils such as fish, avocado, nuts and seeds. Such foods may support your immune system and help reduce inflammation. Do not give nuts and some types of fish to family members who have allergies.
- 4. Eat lots of pulses:** Dry pulses such as green grams, cowpeas seeds, pigeon peas, dolicos (njahi), beans, etc. are a great source of plant-based protein, are high in fiber, low in fat and contain no cholesterol. They are also rich in minerals such as potassium and iron. Having a good stock of pulses during emergency will ensure a constant source of protein when households can't access animal source proteins. **Note:** To enhance absorption of iron, eat pulses with vitamin C rich foods e.g. lemon/orange.
- 5. Watch your intake of fats, sugar, salt and high calories foods:** Excess intake of foods that are high in fats, sugar and salt content can lead to excessive weight gain, diabetes and high blood pressure. Watching the intake of these ingredients can help prevent excessive weigh gain and related health risk when physical activity is limited.
- 6. Continue to practice good food hygiene:** Keep clean; separate raw and cooked foods; cook meats thoroughly; Store food at appropriate temperatures to prevent growth of microorganisms; use safe water and raw materials.

7. **Drink water regularly:** Stay well hydrated, drink 6-8 glasses of clean water per day for adults. Avoid sugar-sweetened beverages/drinks such as commercially prepared juices, carbonated drinks such as soda and energy drinks.
8. **Limit consumption of alcohol:** alcoholic drinks, have little nutritional value and are often high in calories. Excess consumption is linked to numerous health problems.
9. **Avoid intake of other processed foods** such as processed meats including sausages, hot dogs, salami, ham, cured bacon, salted meat, canned meat, deep fried chicken and sugary products such sweets, biscuits, cakes and ice creams
10. In addition to a healthy diet, other lifestyle factors are critical part of maintaining wellbeing and a healthy immune system. A healthy lifestyle includes additional strategies such as:
 - a. **Not smoking;**
 - b. **Exercising regularly;**
 - c. **Getting adequate sleep; and,**
 - d. **Minimizing and coping with stress.**

FOOD GROUPS

1. **Grains and grain products** and all other starch foods (cassava, Irish potato, rice, maize/maize flour, bananas (matoke), millet, sorghum/sorghum flour, rice, chapatti, pasta, arrowroots)
2. **Legumes and pulses, nuts and seeds** - Alternate between pulses that are harvested at maturity and dried such as peas, beans, lentils, cowpeas, pigeon peas, soya, nuts, edible seeds and **lean meat, fish/seafood and poultry** in your daily meals. Vary within the sources such as peas, beans, e.t.c.)
3. **Milk and milk products** – consume fresh milk, sour milk or yogurt daily.
4. Vegetables (alternate between **dark green leafy vegetables** such as indigenous vegetables (managu, terere, saga, kunde), spinach, Sukuma wiki; **vegetables that are yellow or orange** which are rich in vitamin A for immunity (carrots, pumpkin, sweet or bell pepper/hohos e.t.c) and **other vegetables** that do not fall in these two classes such as hohos, courgettes, cabbage and french beans
5. **Fruits** – eat plenty of fruits daily. Consume **yellow or orange fruits** such as mangoes, pawpaws that give us vitamin A for immunity, **citrus fruits** such as oranges, lemons that are rich in vitamin C for immunity and quick healing and **other fruits** like passions, melons, pineapples.

Figure 1: Food groups

2 PRESERVE FOODS AND AVOID FOOD WASTAGE DURING COVID 19

2.1 INTRODUCTION

Households can maintain healthy eating during COVID 19 pandemic by ensuring constant availability of nutritious foods. This can be achieved by prolonging the shelf life of perishable foods which will enable households maintain social distancing by reducing the frequency of market visits. Preserving foods also avoids food loss and saves money spent on food.

Fresh green leafy vegetables and fruits start to lose their quality immediately after harvest, becoming damaged, wilted and eventually rotten due to;

1. Enzymes within fruits and vegetables
2. Exposure to micro-organisms (including bacteria and mould). Sources of microbes:
 - Dirty water
 - Dirty hands
 - Coughs, colds and diseases
 - Dirty equipment
 - Over-ripe and damaged fruit
 - Exposure to animals, insects, and rodents
 - Exposure to animal and human waste (feces)
3. Environmental factors, including temperature, moisture and sunlight

Storing fresh vegetables and fruits in cool conditions allows them to stay in good condition for a longer period.

2.2 PROCEDURES OF PRESERVING VEGETABLES AND OTHER FRESH FOODS

Fresh food	Storage and preservation guide
Dark green leafy vegetables: cowpeas leaves, managu, mitoo, terere, Sukuma – wiki, pumpkin leaves e.t.c.	Cooling leafy vegetables for household use <ol style="list-style-type: none">1. Discard wilted, discolored or blemished leaves.2. Wash the vegetables with clean, cool running water to remove dirt and any other contaminants. They keep fresher if washed before storage.3. Allow water to drain out

4. Wrap in paper towel or non-woven carrier bag and put in airtight container or sealed plastic bag and store in the refrigerator or cooling pots (Figure 2 and 3). The vegetables remain fresh as long as they have no moisture. Paper towel or the non-woven carrier bags absorbs the moisture.



Figure 2: Paper towel



Figure 3: Non-woven carrier bag

5. The vegetables can be stored for 2 weeks

Note: do not mix leafy vegetables and fruits in the same container during storage. Some fruits produce chemicals that make the vegetables turn yellow

Freezing vegetables for a longer period

Freezing: dark green leafy vegetables can be blanched and frozen. This requires boiling the whole or cut up pieces of the vegetable for 1-2 minutes and then immediately place in cold water to stop the cooking process. Blanching will also keep vegetables from getting freezer burn. The vegetables are then put in storage containers and stored in the freezer. Frozen vegetables will be fine for up to one year.

Tomatoes:

- Ideally, tomatoes should not be washed before storage because they have a natural protective coating and washing will make them spoil faster. This practice can work well if tomatoes are from own production in areas with limited exposure to contaminants. *If tomatoes are stored before washing do not mix*

	<p><i>them with clean foods during storage.</i> NB: Wash tomatoes just before you eat or prepare them</p> <ul style="list-style-type: none"> • During COVID 19 pandemic, households should always wash tomatoes before storage especially if they are acquired from markets where they are exposed to various contaminants. • Store tomatoes with the stem scar facing up to reduce softening and darkening of the fruit, store at room temperature away from direct sunlight. This will help them ripen evenly. • Once they are ripe, they can be placed in the fridge or cooling pot, however cooling makes them loose flavor and so they should be removed from the fridge or cooling pot a few hours before preparation to allow them to restore their original flavor.
<p>Carrots:</p>	<ul style="list-style-type: none"> • Remove carrot tops/stems, clean them well, drain off moisture and put in a plastic container or non - woven carrier bag and store in cooling pots or in the refrigerator. • The carrots can last for 3-4 weeks. • Storing carrots with fruits will make carrots taste bitter. Carrots absorb odors from apples and pears. They can also easily rot if stored with fruits that produce chemicals that cause ripening such as ripe bananas, avocados, melons etc. <p>Storage in boxes</p> <ul style="list-style-type: none"> • Choose a shallow cardboard box, wooden box, or crate. Line the bottom with newspaper, or similar material, and spread a thin layer of moist sand, untreated sawdust or wood shavings. • Remove carrot tops/stems, clean them well, drain off moisture and arrange the carrots side by side on the covering material. The carrots should not touch each other (Figure 4). • Hide the carrots with more covering material and repeat until the container is full. Finish with a layer of covering material to exclude light. Store in a cool, preferably dark place such as a store or spare room for 1 month or more depending on temperature. Use as required, ensuring the remaining carrots are kept covered.

	<ul style="list-style-type: none"> • This method is ideal if temperatures are cold or very cool. If it is not very cold, regularly check saw dust to ensure it is not getting warm as this may affect the freshness of the carrots. Alternatively use moist sand.  <p style="text-align: center;">Figure 4: Arranging carrots on sawdust</p> <p>Other tips of storing fruits and vegetables</p> <ul style="list-style-type: none"> • Do not store ripe bananas, melons and apples together with carrots, potatoes and cucumber. Doing so will lead to faster ripening and spoilage. • Do not store cucumbers with bananas, melons, tomatoes or apples.
<p>Onions:</p>	<ul style="list-style-type: none"> • Onions should be stored in a single layer, in mesh bag in a dry, cool, dark, well ventilated location. • This way they can last for 3 to 4 weeks. • Onions should not be refrigerated. • Onions should not be store with apples, pears and vegetables as they absorb odor from the fruits and moisture from the vegetables, which can make them decay. • Onions can be regularly spread in the sun to dry, this way, they last longer.
<p>Irish potato</p>	<p>General guidelines of storing Irish potato for consumption:</p> <ul style="list-style-type: none"> • Brush off any excess soil

	<ul style="list-style-type: none"> • Do not store bruised/damaged Irish potato, instead, use them quickly to avoid wastage. • Do not refrigerate potatoes since the water inside freezes and spoils the potato. • Store potatoes in a dark place. Light cause potatoes to produce poisonous chemical that makes them turn green. If potato turn green cut off the green parts before use. • Store in gunny bag/paper sacks (Figure 5 and 6), leave the neck slightly open for moisture to escape. • Do not use plastic bags as they make the potatoes sweat and turn rotten. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Figure 5: Gunny bag</p> </div> <div style="text-align: center;">  <p>Figure 6: Paper sack</p> </div> </div> <ul style="list-style-type: none"> • After the potatoes have been in the store for about a month, empty them and check for signs of damage or insects
<p>Sweet potatoes and yams</p>	<ul style="list-style-type: none"> • Store sweet potatoes and yams whole. • Store uncovered at room temperature in a dry, cool, dark and in a well-ventilated location. • Do not be mix with fruits such as avocado during storage as this causes them to rot. • Can be stored up to 2 weeks in this condition.
<p>Cassava</p>	<p>Traditional Methods:</p> <ul style="list-style-type: none"> • Bury the roots in trenches covered with plant material and soil.

- Pile the roots in heaps and keep them moist by watering them daily.
- Apply a thick coating of soft clay or mud.
- Keep small quantities of cassava in water.

Note: The practices limit moisture loss and only extends the storage life for a few days.

Improved low-cost storage methods include:

1. Storage in boxes lined with moist sawdust or wood shavings

- Put alternate layers of sawdust and cassava roots, starting and finishing with a layer of sawdust (can also use wood shavings or peat) (Figure 7). The material must be moist not wet
- The roots remain acceptable after four weeks in store, provided the roots were packed immediately on the day of harvest



Figure 7: Lining a box with pile/sawdust for cassava storage

2. Storage in plastic containers or plastic film wraps

- Cassava roots kept in airtight plastic container or wrapped with plastic cling film can be stored for two to

	<p>three weeks. This method can be applied in urban setting.</p> <p>3. Urban – Store peeled cassava root in water in the refrigerator. This way, it will last for 1 month if you change the water every two days. You can also wrap tightly with a cling film and freeze for several months.</p>
<p>Grain and pulses storage: Rice, dry maize, wheat, millet, sorghum, dry pulses</p>	<p>Storage in sacks/bags</p> <ol style="list-style-type: none"> 1. It is recommended that households use hermetic bags. 2. The bagged grains must be kept off the ground to prevent spoilage by moisture and/or termites. 3. Bags can be placed on low platforms or tarpaulins; but if there is a risk of damage by rodents or other animals, high platforms fitted with rodent barriers should be used. 4. If there is a risk of rain during the temporary storage period, the bags should be covered with waterproof sheeting. 5. Second-hand sacks must be thoroughly cleaned and disinfested before use.
<p>Pulse e.g. Dolico (Njahi), beans, lentils, green grams, pegin peas, cowpeas, soya bean, split peas</p>	<p>Tips for storing pulses for household consumption.</p> <ol style="list-style-type: none"> 1. Dry pulses: store dry pulses in airtight containers away from light and heat. This way, they can be stored up to 1 year 2. Cooked pulses. After pulses have cooled completely, drain any excess liquid and store in single serving portions in sealed airtight containers or freezer bags. They can be stored in the freezer up to 6 months. 3. To thaw frozen pulses or meals, place in refrigerator overnight or warm over gentle heat just before preparing.

2.2.1 PRESERVING FRESH GREEN LEAFY VEGETABLES AND FRUITS USING COOLING POTS

When water evaporates from a surface it has a cooling effect. You can use this fact to make a simple cooling unit. This technology only works in areas with dry air and low humidity, such as arid areas.

Materials needed

1. Two clay pots, one smaller than the other so it fits inside the large one. There are several designs for the pot cooler, it depends on what materials are available locally.
2. Sand
3. Water

Construction method

1. Place sand in the bottom of the larger clay pot. Sit the small pot inside the large one and fill the space between the two with sand or earth.
2. Soak the whole structure in water, then place in the breeze so that the wind causes the water to evaporate. The evaporation causes the inside of the pot to cool down.
3. Carefully harvest/buy vegetables and fruits and wash them with clean water to remove any dirt, sand, stones, or other impurities.
4. Loosely pack the vegetables or fruits in the pot. (Figure 8). Preferable arrange them in plastic containers or non-woven carrier bags then place them inside the pot.
5. Cover the two pots with a wet muslin cloth or a damp sack to keep it cool.



Figure 8: Example of pot in pot cooling

3 DRYING FRUITS, VEGETABLES AND MEATS

3.1 SUN DRYING

During rainy season, there are plenty of local vegetables such as, cowpeas leaves, pumpkin leaves, stinging nettle (thabai), managu, mitoo, terere, sukuma – wiki and spinach, in the markets and on our farms. Seasonal fruits also flood the market and are in plenty on our farms during peak season. Such fruits and vegetables are rich in vitamins and minerals that are important for boosting body immunity to protect and fight against disease. During festivities or during COVID 19 lockdown, households may have extra meat stock that could easily spoil if not well preserved.

Households can make use of the STAY HOME time to dry vegetables, fruits and meats to ensure constant availability of the nutritious foods even during lean season. Having adequate stock of dried vegetables, fruits and meat will reduce frequency of market visits and this enhances social distancing during COVID 19 pandemic.

Drying fresh vegetables and fruits also reduces bulkiness and weight, eases storage and transportation, avoids wastage and can be a source of income during lean season.

3.1.1.1 PROCEDURE OF DRYING VEGETABLES

Requirements

- Select fresh high quality dark green leafy vegetables (cowpeas leaves, pumpkin leaves, kales, spinach etc.)
- Basins and Sufurias
- Fuel for boiling water
- Clean water for washing, cooling and blanching the vegetables
- Salt
- Strainer (sieve), knife and chopping board
- Solar dryer or clean sack with net to cover

Procedure

1. **Cleaning:** Thoroughly wash vegetables before chopping

2. **Trimming and chopping**, remove any fibrous or woody portions of vegetables and all decayed and bruised areas. Use a stainless-steel knife and chop the vegetable into equal sizes (thickness) to ensure uniform drying.
3. Prepare only as many vegetables as can be dried at one time. Holding vegetables, even in the refrigerator, after washing and preparing for drying will result in loss of quality and nutrients.
4. **Blanching**: add clean water into a large sufuria up to mid-way point. The water should be enough to immerse the vegetables. Add salt and bring water to a boil. Use 30 grams of salt (3 leveled tablespoons) per 1 liter of water.
5. Add the chopped vegetables to the boiling water.
6. Start timing as soon as you add vegetables into the boiling water. Adjust heat to ensure continuous boiling. Blanch vegetables for 1 to 1 ½ minutes (ensure all vegetables are covered by the boiling water).
7. Quickly drain the vegetables and put them into the cold water to cool them off.
8. Drain and spread the vegetables on a perforated cooling tray/a clean gunia/mat and cover with a net to prevent contamination.
9. Dry indirectly from the sun in a clean safe place (this should be done under a shade avoiding direct sunlight to prevent loss of nutrients).
10. Keep turning the vegetables after every 3 hours.
11. Store the dried vegetables in airtight containers or bags.

NB: 1 kg of fresh vegetables yields 100gm of dried vegetables. When preparing the dried vegetables for consumption, soak for about 1 to 2 hours to restore moisture. Ensure that the water used to soak is not discarded but used for cooking to avoid loss of nutrients.

3.1.2 DRYING MANGO SLICES

1. Wash the mangoes well with water and soap or saline water.
2. Peel and cut into 6 to 8 mm thick slices.
3. Soak slices into water, lemon juice and sugar solution for 15-20 minutes. (50 mls lemon juice: 60 grams sugar :1 litre of water).
4. Drain the slices and place them on stainless steel perforated trays that are coated with a little oil or on a clean gunia. Cover with net and then place them outside on a raised platform under a shade to dry.

5. Keep turning after every 3 hours.
6. The fruit slices should be dry within 1 ½ to 2 days depending on the weather.
7. Dry the slices till half-brittle.
8. The dried slices should be put in airtight containers, labelled and stored in a cool dry place.
9. The product has a shelf life of about 12 months.

3.1.3 DRYING RIPE BANANAS

1. Wash and peel unblemished uniformly colored bananas with care to avoid damaging them.
2. Cut the bananas in 0.5 cm thick slices.
3. Soak slices into solution of 100 mls lemon juice: 60 grams sugar: 1 liter of water for 10-15 minutes.
4. Drain the slices and place them on perforated trays coated with little oil or clean gunia. Cover with net and then place them outside on a raised platform under shade to dry.
5. Keep turning after every 3 hours.
6. The fruit slices should be dry within 1 ½ to 2 days depending on the weather.
7. When the slices are half-brittle, package them in airtight containers and store in a cool dry place.
8. The product has a shelf life of about 6 months.

3.2 MEAT PRESERVATION

Drying meat under natural temperatures, humidity and circulation of the air, including direct influence of sun rays, is the oldest method of meat preservation. It consists of a gradual dehydration of pieces of meat cut to a specific uniform shape that permits the equal and simultaneous drying of whole batches of meat.

1. Only lean meat is suitable for drying.
2. Preferably meat of a medium-aged animal, in good condition, but not fat.
3. Cut meat into long identical strips. The meat must be spilt along the muscle fibers
4. The length of strips may differ, though it should not be less than 20cm and not more than 70cm. Meat cut into shorter strips requires considerably more time for hooking than the same quantity cut into longer strips. However, strips which are too long may break because of their weight.

5. The thickness of the strips determines the duration of the drying process. Since thick strips take considerably more time to dry than thin ones, it is important that strips to be placed in the same batch are of the same cross-section, with only the length differing.
6. Deep the strips in salt solution for 5 minutes (within 5 hours after slaughter) then drain. Draining should be done by placing the strips into a plastic sieve in order to allow the brine to drop off for collection and re-use. Salt inhibits microbial growth and keeps flies away.
7. Suspend the meat strips individually from one end, thus ensuring free air circulation along the whole length of the pieces and fast and uniform drying. The contact of meat pieces with each other during drying must absolutely be avoided, since these areas will remain wet and humid for a prolonged period, thus making them a favorable environment for spoilage, bacteria and flies. Suspend using (A) metal hooks, (B) loops or (C) metal clips. The meat strips are hooked at one end, always the thicker end for stability, and suspended on a horizontal wooden stick, tightrope or wire. If hooks are not available, suspend as illustrated in figure 9.
8. Hang on meat dryer (poles) made of wood or metal and sundry.
9. Dry for 4 to 5 days, after this period, the meat is ready for consumption, packaging or transportation.
10. Under dry climatic conditions two basic shapes of meat pieces proved to be the most suitable for natural drying:
 - a. strips with a rectangular cross-section of 1 x 1 cm; and
 - b. Flat-or leaf-shaped pieces with cross-sections of max. 0.5 cm x approx. 3, 4 or 5 cm.



Figure 9: Meat strips suspended to dry

4 ENERGY CONSERVATION AND TIME SAVING TECHNIQUES DURING COVID 19

These are techniques that help households save on fuel and time spent on cooking and fetching firewood/fuel. Reducing frequency of fetching firewood/fuel helps households maintain a social distance during the COVID 19 pandemic. The techniques also reduce women workload thus allocating more time for childcare. The techniques also save on cost of fuel. The money spared can be used to purchase diverse foods leading to improved dietary diversity and enhanced body immunity to protect and fight against disease.



Figure 10: Fireless cooker



Figure 11: Improved traditional 3 stone jiko



Figure 12: A Kenyan ceramic jiko with thick lining



Figure 13: Kenyan ceramic jiko



Figure 14: Rocket stove



Figure 15: Jiko kisasa

4.1 TIME AND ENERGY SAVING TECHNIQUES

- When cooking grains (cereals, pulses), soak overnight in cold water to soften. This reduces cooking time and increase digestibility while reducing stomach discomforts from pulses.
- Cover foods while cooking, this helps to maintain the hot air inside and fasten cooking.
- Once food starts boiling reduce the heat and let it cook while covered.
- Close the door of a jiko when the charcoal is well lit to ensure the charcoal does not burn out too fast.

5 HEALTHY SNACKING DURING COVID 19 PANDEMIC

5.1 When snacking cannot be avoided, select healthy snacks and consume in moderation to avoid excessive eating that leads to overweight and obesity

Being at home for too long can lead to excessive snacking, which could lead to overweight and obesity. All snacks should be healthy and consumed in small portions

Examples of healthy snacks

1. Fresh whole fruits
2. Dried fruits (some fruit sun drying procedures in section 2)
3. Milk (fresh or fermented)
4. Milk shakes (no added sugar)
5. Fresh fruit juices- made from fresh fruits with no added sugar
6. Fruit smoothies (no added sugar)
7. Nuts (e.g. groundnuts, cashew nuts)
8. Seeds (e.g. sesame, pumpkin)
9. Popcorn from maize, sorghum and amaranth seed (not sugar coated)

Enriched homemade snacks

- These enriched common snacks can be part of healthy diets when consumed in moderation.
- The recipes can be made under any family context (rural or urban).
- The recipes are generic thus households can replace ingredients with foods within the same food group depending on preference.

NB:

- Substitute egg and milk in case of allergies in all the pancakes recipes below.
- You are encouraged to use fruits to sweeten snacks instead of sugar. For example, recipes below have used mashed ripe banana to sweeten
- Note that lemon juice is added to ripe banana mash to avoid discoloration. Only mash ripe banana when lemon juice is ready for mixing.
- Limit the amount of cooking oil used to prepare snacks and avoid deep frying

IRISH POTATO, CARROT AND CORIANDER PAN CAKES

Ingredients

Wheat flour, 1 cup	Boiled and mashed irish potato, 1/3 cup
Finely grated carrots, 2 tablespoons (Tbsp)	Baking powder, 1 teaspoons (tsp)
Egg, 1	Water or milk, two thirds (2/3) cup
Finely chopped coriander, 2 tsp	Lemon rind, 1 tsp
Mashed ripe banana (to sweeten), ½ cup	Lemon juice, 4 Tbsp
Oil, 30ml	

Procedure

1. Sieve flour and baking powder.
2. Add Irish potato, coriander, carrots and lemon rind into the flour and mix well.
3. Beat the egg, mashed banana and lemon juice in a bowl and add to the mixture in step 2.
4. Add water/milk and mix thoroughly into a flowing paste.
5. Add a little oil in the heated pan, pour the mixture and spread to desirable size. Pan fry till cooked on both sides. **Note:** *You do not have to add oil to consecutive pancakes as the purpose of the little oil is to avoid sticking to pan.*
6. Cook until the paste is finished.
7. Serve with tea or milk.

SWEET POTATO CARROT PANCAKE

Ingredients

Wheat flour, 1 cup	Grated Carrots, ¼ cup
Sweet potato mash, 1/3 cup	Grated Dhania/hoho (optional), 2 Tbsp
Mashed ripe banana (to sweeten), ½ cup	Cooking oil, 30ml
Baking powder, ¼ tsp	Lemon rind, 1 tsp
Eggs, 2	Lemon Juice, 4 Tbsp
Milk/water, two thirds (2/3) a cup	

Procedure

1. Wash sweet potato well, cook till tender then mash to soft smooth consistency
2. Mix the grated carrots in the mash.
3. Add all the dry ingredients (flours, baking powder, dhania, lemon rind) into a bowl and mix.
4. Beat the eggs, lemon juice and ripe banana mash and add to the sweet potato, carrot mix.
5. Add the flour mixture to the sweet potato carrot mixture.
6. Mix all the ingredients thoroughly, add water/milk and mix into a flowing paste.
7. Heat the pan with little oil.
8. Pour the mixture slowly and spread.
9. Fry each side till cooked.
10. Serve with beverage.

CASSAVA DROP SCONES

Ingredients

Wheat flour, 2 cups	Eggs, 2
Cassava flour, two third (2/3) cup	Water, ½ cup
Sugar, 5 Tsp	Cooking oil, 100ml
Baking powder, ¾ tsp	

Procedure

1. Mix the flours, baking powder and sugar together.
2. Add a well beaten eggs and water to the flour mix.
3. Mix into a thick consistency.
4. Drop a little of the mixture at a time into little hot oil and shallow fry till cooked on both sides.
5. Cook until the whole paste is finished.

MILLET CARROT PAN CAKES

Ingredients

Wheat flour, 1 cup	Dhania, 2 Tbsp
Millet flour, 1/3 cup	Lemon juice, 4 Tbsp
Baking powder, ¼ tsp	Lemon rind, 1 tsp
Carrot (grated), ¼ cup	Cooking oil, 30 ml
Eggs, 2	Water/milk, two thirds (2/3) a cup
Mashed ripe banana (to sweeten), ½ cup	

Procedure

1. Wash and grate the carrots.
2. Mix the flours, baking powder, carrot, lemon rind and dhania together.
3. Beat the eggs, lemon juice, banana and milk/water together and add to the mixture.
4. Mix all the ingredients thoroughly into a flowing paste.
5. Heat the pan with little oil.
6. Pour the mixture in bits and spread thinly.
7. Cook to golden brown on both sides.
8. Serve hot or cold.

PAN FRYING SWEET POTATO

Ingredients

Sweet potato (orange fleshed), 1 medium	Salt
Oil, 10ml	Water

Procedure

1. Wash the sweet potato then peel.
2. Cut into thin slices (crisp like).
3. Soak the slices in saline water for 1 minute then drain.
4. Smear little oil on a frying pan (to prevent them from sticking).
5. Pan fry the sweet potato slices for 7-10 minutes stirring them to a prevent sticking.
6. Serve as snack for the family.

SWEET POTATO BREAD OR SCONES

Ingredients

Sweet potato mash, 1 cup	Instant yeast/active dry yeast, 3 teaspoons
Wheat flour, 2 cups	Salt, ¼ teaspoon
Oil, 3 teaspoons	Water, 1 cup
Sugar, 3 tablespoons	

Procedure

1. Peel the sweet potato, wash then boil till soft.
2. Drain and mash to a smooth consistency.
3. Mix the ingredients using either of the following methods;

Method 1.

If using instant dry yeast: Sieve the flour and salt together, mix with the mash and make a hole at the center of the mixture. Put the oil, instant yeast and sugar at the center then add little warm water and start kneading.

Method 2.

If using active dry yeast: Mix sugar, yeast and little water then keep in a warm place for about 10 minutes until it froths. Sieve the flour and salt together, mix with the mash, make a hole at the center of the mixture then put the frothed yeast and oil, add warm water.

4. Do first kneading of the mixture on a slightly floured board using the palm of the hand for about 5 minutes.
5. Put the dough in clean plastic bowl and cover with a damp cloth. Leave it in a warm place for 15 to 20 minutes until it doubles its size.
6. Do second kneading using the procedure above until the dough is smooth and elastic.
7. Shape the dough accordingly and place in greased tins, put in a warm place for 10 to 15 minutes until it doubles its size.
8. Pre heat the oven for 10-15 minutes. Bake at a temperature of 180 to 200°C for 20 - 25 minutes depending on the type of oven.

9. If using jiko, light it until the charcoal is red hot then remove all the charcoal and put on top of the lid covering the baking tin. Place the baking tin on the jiko without charcoal and bake 20 to 25 minutes
10. When ready remove and put on a rack to cool.
11. Eat with beverage of your choice.

BEANS CAKE

Ingredients

Wheat flour, 3 cups	Eggs, 6
Mashed beans, 1 cup	Baking powder, 2 level tablespoons
Sugar, 1 ¼ cups	Grated lemon rind, 3 teaspoons
Margarine, 1 ¼ cups	Lemon juice, 4 tablespoons

Procedure

1. Mix margarine and sugar in a bowl and stir till fluffy and white.
2. Add the mashed beans and mix well.
3. Beat the eggs one at a time into a cup and add to the beans mixture in the bowl and keep stirring.
4. Sieve all the dry ingredients and add to the mixture in the bowl and mix well.
5. Add lemon rind, lemon juice to the mixture and mix well.
6. Grease the baking tin/ pan with margarine and dust with wheat flour.
7. Pour the mixture into the tin/pan and cover it with a cover or pan that is tight fitting when baking on jiko.
8. Put in oven and bake for 45 minutes to 1 hour at a temperature of 170°C or bake on a jiko by lighting it till red hot then remove the charcoal and put on top of the lid covering the baking tin and bake for 45 minutes to 1 hour.
9. Remove from oven or jiko and let it cool.

MILLET/ BANANA CAKE

Ingredients

Wheat flour, 3 cups	Lemon or orange rind, 2 tablespoons
Finger millet flour, 2/3 cup	Lemon juice, a third (1/3) a cup
Mashed ripe banana, ½ cup	Essence (optional), 1 tsp
Eggs, 6	Sugar, ¾ cup
Baking powder, 2 tablespoons	Margarine, 1 cup
Water/milk, ½ cup	

Procedure

1. Cream sugar and margarine together into a fluffy paste using a wooden spoon.
2. Beat eggs, ripe banana mash and lemon juice together and add into the sugar margarine paste.
3. Sieve flour, baking powder, spices and salt and mix with lemon rind or flavor essence. Add the flour mixture in bits into the mixture in step two.
4. Add water/milk to makes a thick but flowing paste
5. Pour the mixture into a greased and flour dusted pan and bake in oven or on a charcoal jiko for 45 minutes to 1 hour
6. Remove and let cool.

HOME MADE YOGHURT

Ingredients	Amount
Fresh milk	1 Liter
Active starter culture (can be in form of ready natural yoghurt or commercially acquired starter culture)	50 -100 mls (Ready yoghurt)
Sugar (optional)	50-70gm
Flavor - Preferably natural fruit flavor (optional)	To taste

Procedure

1. Wash your hands with soap under running water.
2. Gather ingredients and clean utensils.
3. For production of good quality yoghurt, you require good quality milk. Boil a small amount of milk in a spoon. If there is clotting, coagulation or precipitation, the milk is not fit for processing or consumption.
4. To remove physical dirt, filter the milk into a clean sufuria.
5. Place some cold water in a bigger sufuria on the fire
6. Put the sufuria containing the milk inside the bigger sufuria. Add sugar to the milk (optional).
7. Constantly stir the milk as you bring the milk to almost boiling point (80 - 85° C) (a point at which milk has started forming cream but has not yet risen). Pasteurize (simmer) at that low temperatures for 15 – 20 minutes. This process will kill harmful bacteria and pasteurizing in the ‘water bath’ prevents the yoghurt from having a burned flavor.
8. Remove the bigger sufuria and its contents from the fire, cover it with a lid and leave it for 30 minutes. This process it called holding.
9. Remove and cool by placing the sufuria with the milk in cold water
10. Cool to 40 – 45°C. This can be checked by placing some milk at the back of your hand. The milk should not burn nor should it be warm, it should be slightly above the body temperature (a comfortable hot). Sieve the milk into a sterilized storage container to remove extra cream.
11. Add active starter culture which can be in form of ready yoghurt or the commercially acquired starter culture. Mix it well and cover the mixture with either foil or a tight lid.
12. Place in fireless cooker (if you have one) or wrap the container with a clean heavy material and store in a clean place and let it stand without disturbance for 8 hours.
13. Remove and break the curd by stirring in one direction.
14. Pack in sterilized container/s. Containers can be sterilized through boiling.
15. Add natural fruit flavor, e.g. pureed mango, passion fruit, watermelons, lemon or any other fruit in season, during consumption to consume the fruits in a fresh form and ensure maximum use of nutrients.

NB: To know the yoghurt is well done the curd will be one mass with no water at the top. Sugar can be added at the start of the pasteurization process thus will be sterilized together

with the milk or it can be added after breaking the curd depending on taste, preference and medical concerns.

NB: Whichever starter culture you choose to use, you should maintain the highest degree of hygiene and use the same starter culture from the same supplier for any given product. This is important because a starter culture has a strong influence on the flavor and textural characteristics, of your product which is important for retaining consumers of your products.

6 SIMPLE TECHNOLOGIES FOR PRODUCING NUTRITIOUS FOODS DURING COVID 19 PANDEMIC

Households can maintain healthy eating during COVID 19 by ensuring constant availability of nutritious foods at household level. This can be achieved through subsistent production of fast maturing nutritious foods using space and water efficient technologies. Own production reduces the need to frequent the market and hence enhances social distancing.

Households can grow fast maturing vegetables such as cowpeas leaves, amaranth, managu, saga, pumpkin leaves, cucumber, okra, courgette, mushroom, tomato, hoho, dhanian, spring onions and fruits such as strawberries.

6.1 EXAMPLES OF SIMPLE SPACE AND WATER EFFICIENT TECHNOLOGIES FOR PRODUCING VEGETABLES AND FRUITS

6.1.1 MICRO GARDENS

- Micro gardens are small production units that can yield a wide range of vegetables, roots and tubers, and herbs in small spaces, such as balconies, patios, rooftops and small open spaces. Some plants can even be produced indoors similar to indoor plants such as flowers.
- They fit the urban context, where limited space and scarcity of water prevail, and they can support household food and nutrition needs during emergencies.
- Micro-gardening makes use of containers such as plastic lined wooden crates, custom-built tables, old car tyres, sacks, plastic containers such as yoghurt cups, water bottles, tins, flowerpots, buckets and even old denim jeans and gumboots.
- It integrates horticulture production techniques with environmentally friendly technologies suited to small spaces, such as rainwater harvesting and household waste management.
- Micro-gardens allow low-income families to meet their needs for vitamins, minerals and plant protein by providing direct access to fresh, nutritious vegetables every day. They can also offer a source of extra income from the sale of small surpluses.
- Micro-garden reduces cost of purchasing foods.

Items needed to set up a micro garden:

1. Planting base: can include sacks, old tyres, recycled containers, wooden planters, pots. Proper drainage is required for any type of planting base.
2. Fertile soil. Alternatively, substrates can be used as a substitute, such as rice hulls, peanut shells, wheat husks, sand, wood shavings, coconut fiber, coarse sand or cotton seed hulls. Substrate culture will require mineral soluble fertilizers, which are often expensive and not readily available. A viable alternative is to make compost.
3. Compost. Compost can be made from kitchen waste. It enables to maintain the soil fertility of micro – gardens at no cost. From the garden to the kitchen and from the kitchen to the garden. There are “ad hoc” composting bins, easy to manage, that can be used at individual household level.
4. Seeds or seedlings. Common foods to grow include leafy greens such as spinach, leafy onions, sukumawiki, lettuce, tomatoes, terere, strawberries, herbs-mint, dhania, broccoli, cauliflower and even potatoes.
5. Water. A micro-garden can be grown on an area of just one square meter. Water requirements are modest, an important consideration especially in cities, where good quality water is often scarce and expensive. In a year, a one square meter micro-garden consumes about 1,000 liters of water, or less than 3 liters per day. To ensure a regular water supply, micro-gardeners can channel rainwater into storage. Rainwater is free and of excellent quality.
6. Pests can be controlled by non-chemical means, including colored sticky traps, insect proof nets and intercropping with aromatic herbs that naturally repel insects, such as basil, parsley, spring onions, chilies and mint.
7. It is important to ensure the crops have access to adequate light but avoid very direct sunlight, wind and interference for maximum yields.



Figure 16: Container micro garden



Figure 17: Bag micro garden



Figure 18: Tyre micro garden



Figure 19: Bottle micro garden

6.1.2 THREE IN ONE GARDEN

- This entails one structure with the top having vegetables, the middle holding a chicken or rabbit house and the floor is a fishpond.
- The vegetables feed the household
- Vegetable remains feed the chicken/ rabbits
- The droppings feed the fish
- Fish and chicken are for food and income generation.



Figure 20: Three in one garden

6.1.3 PROCEDURE OF MAKING A SACK GARDEN (MULTI-STOREY GARDEN)

Requirements

- Plot area (2ft x 2ft)
- Black polythene tube (1000 gauge/bag) 1.5 meters or grain bags
- 2-inch diameter poles (4 pieces)
- 4kg tin (kasuku or paint) - 1 piece
- Ballast (1 wheelbarrow)
- Soil (7 wheelbarrows)
- Manure (7 wheelbarrows)
- Water
- Sharp knife
- Spade
- Assorted vegetable seedlings (local or exotic)
- Sharp stick

Procedure

1. Measure an area of 2ft x 2ft and dig one foot deep if it's to be established on the ground.
2. Remove the lid and bottom and place the hollow tin at the center of the area.
3. Secure the four poles at the corners of the square area.
4. Insert the polythene tube or bag around the four poles.
5. Fill the hollow tin with ballast.
6. Mix the topsoil with manure and fill the space between the tube or the bag and the hollow tin.

7. Gradually fill the soil/manure mixture without interfering with the tin to the height of the tin.
8. Lift the tin without moving it from the center position by gently pulling up the tin
9. Refill the tin with stones and the hollow area between the tin and tube or bag with the soil.
10. Water the soil moderately with each layer
11. Repeat the steps (i.e. filling/lifting of the tin and watering) until the polythene tube/bag is full and the central core of stones is formed.
12. Leave the filled tin at the top of the bag
13. Poor water into the tin through the central core till the soil is well moistened.
14. Leave it overnight to set
15. Make the holes spaces at 15cm x 15cm diagonally (about 9 rows with 16 holes each).
16. Scoop out some little soils at the wholes and plant the seedlings, firm the soil around each seedling.
17. Water at least twice a week.



Figure 21: Sack garden

6.1.4 PROCEDURE OF MAKING A MOIST GARDEN

Moist garden: Construction (ground or roof top)

Requirements

- Plot area (1.2 meters wide x any length)
- Black polythene tube (1000 gauge/bag)
- Poles 4 pieces
- String or binding wire
- Stones (big, medium and small)
- Soil
- Manure
- Assorted vegetable seedlings (local or exotic)

- Water
- Watering can
- Sharp panga
- Spade
- Sharp stick

Procedure

1. Prepare and measure area to be planted 1-1.2 meters wide, any length depending on the materials available.
2. Split the polythene tube open from one side.
3. Lay the polythene sheet on the ground and fold the four sides to 60cm high holding it in place with cut pieces of poles and string or binding wire.
4. Place the big stones inside, then medium and small to fill up to 10 cm from the bottom.
5. Mix the soil and manure at a ratio of 1:1 then pour on top of the stones up to 45 cm from the ground.
6. Water the soil and plant the seedlings remembering to incorporate spring onions and dhania to help in pest control.



Figure 22: Moist bed

6.1.5 PROCEDURE OF MAKING CONE GARDEN

Requirements

- Polythene tube 1000 gauge
- Soil
- Manure
- Shape knife
- Pieces of sticks
- Biding wire
- Seedlings
- Water

Procedure

1. Measure the polythene paper one meter two-meter diameter or less depending on the material available.
2. Draw a circle of two-meter diameter and draw a ridge round it.
3. Bind the polythene at the joint with a double fold then insert the polythene paper in the ridge and fill it with soil mixed with manure.
4. Make a ridge 15-30cm (depends on the crop to be grown) inside and insert another layer of paper, fill with soil and do more layers as space allows.
5. Water thoroughly, plant assorted vegetables two alternating rows on each bench.

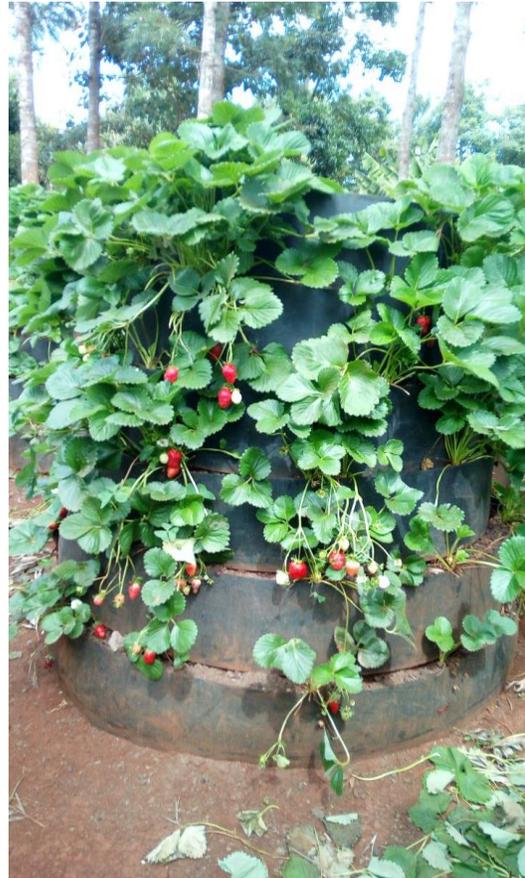


Figure 23: Cone garden

7 ANNEX I: MINISTRY OF HEALTH GUIDELINES ON COVID-19 MANAGEMENT

Considering that the COVID-19 disease has now been classified as a pandemic, we are taking precautionary measures. All Kenyans should observe the following:

1. Regularly and thoroughly wash your hands with soap and water or use alcohol-based hand sanitizer.
2. Maintain a distance of at least 1 meter (5 feet) between yourself and anyone who is coughing or sneezing.
3. Persons with a cough or sneezing should stay home or keep a social distance but avoid mixing with others in a crowd.
4. Maintain good respiratory hygiene by covering your mouth and nose while coughing and sneezing with a handkerchief, tissue, or into flexed elbow.
5. Stay at home if you feel unwell with symptoms like fever, cough and difficulty in breathing.
6. Suspend all public gatherings, meetings, religious crusades games events etc.
7. Suspend all inter – school events
8. Follow ministry of health guidelines on closing and opening of schools and religious services
9. Public transport providers are directed to provide hand sanitizers for their clients and regular cleaning of the vehicles. Matatus should carry the required passengers to maintain social distance, provide sanitizers and their vehicles should be disinfected regularly.
10. Temporary suspension of prison visits for the next 30 days.
11. Kenyans must not abuse social media platforms or indulge in spreading misinformation that can cause fear and panic.
12. Travel restrictions outside the country unless absolutely necessary and no travel to disease epicenter countries.
13. All persons visiting public places such as supermarkets, open air markets, public transport should at all times wear a face mask to reduce the chances of transmission of the virus.
14. Utilize the call line facility number 719 to report on any cases regarding the disease and *719# to receive the correct messages.