



Ministry of Agriculture, Livestock, Fisheries and Cooperative

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, dhania, spring onions and fruits such as strawberries.

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

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 1: Container micro garden



Figure 2: Bag micro garden



Figure 3: Tyre micro garden



Figure 4: Bottle micro garden

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 5: Three in one garden

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 6: Sack garden

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 7: Moist bed

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 1: Cone garden