



Government of TamilNadu

Department of Horticulture and Plantation Crops

## **Urban Horticulture Development Scheme**

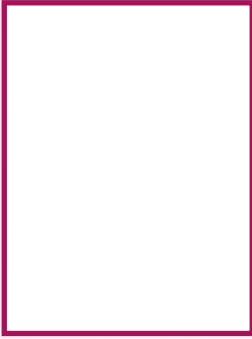


# *Do it yourself*

**Operational Manual**

Department of of Horticulture and Plantation Crops - Chennai, TamilNadu

**Seeds inside Do it yourself Kit**



**Brinjal**



**Tomato**



**Chilli**



**Bhendi**



**Cluster bean**



**Bush lab-lab**



**Radish**



**Amaranthus**



**Coriander**

# Urban Horticulture Development Scheme

## Introduction

### Why we need Plants

Imagine a world without plants. We would be left with only concrete jungles and deserts. Plants, trees, shrubs and flowers provide greenery which is a feast to the eyes. Plants are the most versatile organic material on earth. Naturally plants decompose as they die and fertilize the soil to keep the soil rich in nutrients. Without plants soil erosion occurs by weathering, and hence the ability to grow food for humans will be at stake. Plants provide humans with necessary food like vegetables and fruits. They also provide food for most of the animals and many fishes that we eat. They also provide many of the materials we use today such as wood for shelter, medicines, sugar, starches, oils, waxes, fibers, paper, rubber, gums, and resins. Apart from the direct benefits from the plants, they provide some important indirect benefits to the living things of the world. Above all plants provide oxygen because of which we are all here in this beautiful World of plants.

### Indirect benefits of plants

- Play a major role to protect the environment.
- Responsible for providing oxygen.
- Improve the air quality by absorbing Co<sub>2</sub>, So<sub>2</sub> and other pollutants.
- Attracting the dust particles from the polluted air.
- Urban trees reduce the ambient sound.
- Protect the soil from erosion.
- Improve the soil fertility.
- Acts as a screen against the wind.
- Shelter for wild life.
- Create a cool and non polluted atmosphere around the residential areas.
- Becomes fertilizer after its life cycle.

### Nutrition Garden

Vegetables occupy an important place in our daily diet. For vegetarians in particular, vegetables are the only source to increase not only the nutritive value of food stuff but also the palatability. For a balanced

diet, an adult should have an intake of 85gm of fruits and 300gm of vegetables per day as per the dietary recommendation of the nutrition specialists. But the present level of production of vegetables in our country can permit a per capita consumption of only 120gm of vegetables per day. Besides this, different factor like escalation in the price of agricultural inputs such as fertilizers and pesticides and middle men's profit during the change over from wholesale to retail market have pushed up the cost of vegetable so high that a middle class family finds it extremely difficult to purchase the day to day requirement of vegetables.

Considering the above facts, producing our own vegetable requirement in our backyards using the available fresh water as well as the kitchen waste water has become the need of the hour. This will not only facilitate the prevention of unused water in stagnated condition which will be hazardous to our health through environmental pollution, but can be useful for successful production of our own requirement of vegetables through our physical effort which forms a regular exercise to our body. Psychiatrist recommends that working in garden refreshes the body and mind by relieving harsh stresses. Gardens become the integral part of the family life benefitted by the supply of toxic free fresh fruits and vegetables.

City life acts as a magnet which draws the rural population to urban areas where little or no land is available for kitchen gardens at the backyard. In urban areas, due to escalating population, most of the available land is being concretised for construction purpose. Therefore the need for other alternative, for increasing the vegetable production in the cities is to be thought of. Considering the importance of the facts mentioned above the Government of Tamil Nadu has enacted this scheme so as to enable the city dwellers to grow vegetables in the available space in the open terraces in residential flats and individual houses.

## **Roof Top Gardening**

The art of creating the greenery and maintaining

the greenery on the roof top is known as “**Roof Gardening**”. This is also known as Terrace gardening. The existing roof top can be effectively utilized for growing fruit plants, vegetables, spices, homestead medicinal plants, flower plants and ornamental plants. Other than the decorative benefits, roof plantings may also provide food. The practice of cultivating food on the roof top of building is sometimes referred to as roof top farming.

### **Aims of roof gardening**

- Year round supply of fresh fruits and vegetables.
- Reduces expenditure on purchase of fruits and vegetables.
- Effective utilization of space available at the roof top.
- Supply of toxic free fruits and vegetables.
- To grow our own favourite vegetables.
- Rare and unavailable vegetables can be grown in roof garden.

### **Benefits of roof gardening**

- Dietary requirements of the family member can be fulfilled.
- An inexpensive way to grow our own fresh vegetables.
- Working in a roof garden will relieve stress and strains.
- Maintaining the greenery through roof garden reduces the pollution.
- Increases the amount of oxygen in air.
- Reduces the indoor temperature by 6 to 8 degree.
- Any varieties of vegetables required can be grown.

## **Urban Horticulture Development Scheme (Do- it yourself kit)**

Growing vegetables at the roof top spaces and common open space available is the major thrust of this programme. The Government of Tamilnadu has announced the Do- it yourself kit programme for the promotion of roof top vegetable garden in Chennai and Coimbatore. Chennai and Coimbatore are thickly populated cities, which needs to be enlightened with growing of roof top, vegetables etc. in their location by technological intervention.

The Department of Horticulture and Plantation Crops will be instrumental to complement the interest of city dwellers by disseminating its technology by providing inputs and technical know-how.

### **Objectives of the Scheme**

- To provide a platform to city dwellers to cultivate their own vegetables.
- Motivating city dwellers to grow vegetables on roof top in their proximity of major urban centres of Chennai and Coimbatore.
- Dissemination of cultivation technology to the urban people of Chennai and Coimbatore.
- Eco-friendly nature to combat the pollution through automobiles and dust.
- Provide nutritional security through poison free vegetables.

### **Highlight of the scheme**

Usage of..

- light weight growing medium.
- light weight containers.
- water proof spread sheet.
- water soluble fertilizer.
- bio pesticides and fungicides

### **Project implementing Agency**

The Urban Horticulture Development Scheme will be implemented by the Department of Horticulture and Plantation Crops.

## Do- it yourself kit

The **Do- it yourself kit** for establishment of roof top vegetable garden in an area of 16 sq.mt have the following components:

| <i>Sl.No.</i> | <i>Components</i>  | <i>Unit</i> |
|---------------|--|-------------|
| 1             | <i>Co-extruded, UV treated and co-extruded LDPE sealed polythene bag shall be of 11" x 11"x11" square base. The height also the same 11" excluding gusseting to create bottom base. (outer white inner black) with compressed coco peat 2kg bricks</i> | 20 Nos      |
| 2             | <i>Vegetable seed kit containing the following items</i>   |             |
|               | <i>a.Brinjal</i>   | 5 gm.       |
|               | <i>b.Tomato</i>  | 5 5m        |
|               | <i>c.Chillies</i>  | 5 gm        |
|               | <i>d.Bhendi</i>  | 20 gm       |
|               | <i>e.Cluster beans</i>   | 20 gm       |
|               | <i>f.Bush beans</i>  | 20 gm       |
|               | <i>g.Raddish</i>   | 20 gm       |
|               | <i>h.Amaranthus</i>  | 100 gm      |
|               | <i>i.Coriander</i>   | 100 gm      |
| 3             | <i>Polythene spreading sheet- white in colour ( 4m x 4m)</i>   | 1 No        |
| 4             | <i>Azadiractin (100 ml packing)</i>  | 1 No        |
| 5             | <i>Azospirillum (200 gm packing )</i>  | 1 No        |
| 6             | <i>Phosphobacteria (200 gm packing )</i>   | 1 No        |
| 7             | <i>Pseudomonas (50 gm packing )</i>  | 1 No        |
| 8             | <i>Trichoderma viridi(50 gm packing )</i>  | 1 No        |
| 9             | <i>Plastic hand sprayer- one litre capacity</i>  | 1 No        |
| 10            | <i>Plastic rose can – 5 litre</i>  | 1 No        |
| 11            | <i>Steel Hand digging fork with Plastic handle (powder coated)</i>   | 1 No        |
| 12            | <i>Hand trowel / Soil scoop - with plastic handle</i>  | 1 No        |
| 13            | <i>Pro tray – fifty holes</i>  | 1 No        |
| 14            | <i>Water soluble fertilizer ( 19:19:19)</i>  | 1 Kg        |
| 15            | <i>Technical booklet</i>   | 1 No        |

### **Subsidy pattern**

- A beneficiary can get 50% subsidy for **Do-it yourself kit**.
- A beneficiary can avail up to maximum of 5 units.

### **Tips for growing vegetables on roof top**

#### **Selection of site:**

Select the site for growing vegetables on roof top or any other place where we get plenty of sunlight. Ensure proper drainage facilities which is very important.

#### **Moisture protection:**

Spread over the 4×4mts polythene sheet on the floor of the selected site to avoid wetting of the floor and to arrest seepage.

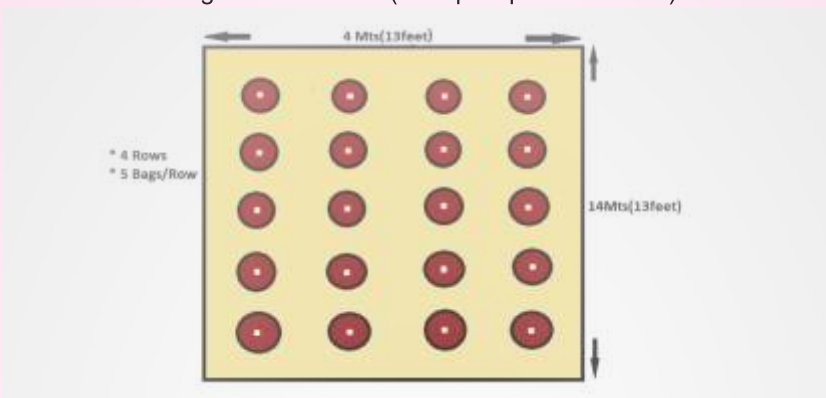
#### **Preparation of grow bags:**

- Take the sealed polythene grow bags with compressed cocopeat brick.
- Cut the mouth of the cover with a help of scissor under the sealed portion and open the cover.
- Add enough fresh water on the cocopeat brick.
- Allow the brick to soak for 5 to 10 minutes
- After adding water the cocopeat volume will expand upto 4 to 5 times
- Make 4 holes at the side walls nearer to the bottom of the bag for draining the excess water.
- Mix the biofertilizer (Azospirillum and Phosphobacteria) and bio fungicides (Pseudomonas and Trichoderma viridi) with the compost. Add 1 Kg of mixed compost to 1 bag of cocopeat medium. (The compost will not be included with Kit. It is available at State Horticulture Farm, Madhavaram and at private Nurseries)
- Ensure that the growing medium is filled 1 inch below from the top of the plastic cover.
- Allow the cocopeat to decompose. It will take 7 to 8 days for decomposition. After decomposition the color will turn black  
Now the grow bags are ready for sowing or planting.



## Arrangement of grow bags

Arrange the grow bags on the polythene sheet in four rows with a spacing of 1 feet between bags on either side. (or as per space available)



## Selection of Vegetables

Technically, any vegetable can be grown in a container, provided the grow bag is large enough to accommodate the roots. Those with shallow roots and with bushy growth habits are more suitable for container gardening. Leafy greens, brinjals, tomatoes, chillies, bush beans, clusterbeans, onions, radishes and bhendies, are all generally well-suited to container culture.

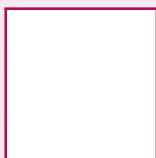
## Type of vegetables

**Transplanted vegetables:** (Protrays) Tomato, brinjal and ,chillies.

**Direct sowing vegetables:** Bhendi, clusterbean, bush lab-lab, greens, radish and coriander

## Bags allocation for vegetables

Total number of bags-20



### Brinjal

3 bags (1 plant/bag)  
Duration 6 months



### Tomato

3 bags (2 Plants/bag)  
Duration 5 months



### Chilli

1 bag (2 Plants/bag)  
Duration 6 months



### **Bhendi**

3 bags(4 plants/bag)  
Duration 4 months



### **Cluster bean**

2 bags(4 Plants/bag)  
Duration 4 months



### **Bush Lab-Lab**

2 bags(4 Plants/bag)  
Duration 4 months



### **Radish**

2 bags(10 plants/bag)  
Duration 45 days



### **Amaranthus**

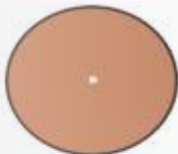
2 bags  
Duration 30 days



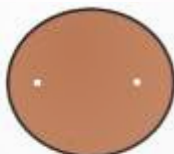
### **Corinader**

2 bag(2 Plants/bag)  
Duration 30 days

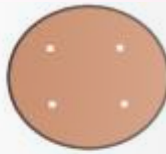
## **Pattern of sowing/planting**



Single plant/bag



Two plants /bag



Four plants/bag

## **Cropping pattern**

Generally for small scale purpose i.e., cultivation in container gardens, we need not depend on any season; but raising of vegetables can be avoided during summer seasons(April & May). Otherwise the seedlings can be sown / grown as per the requirement i.e 90 days before.

## **Sowing**

### **Direct Sowing**

The vegetable seeds like Bhendi,clusterbean,Bush lab-lab and raddish are directly sown in the growing medium and then pressed by finger.The depth of the seed sowing should be about two and a half times of the seed size and two seeds/hill can be sown as shown in picture 2. Allow the healthy seedling to grow and remove the other one after one week. For greens because of the tiny size of the seeds,1 tablespoon

has to be mixed with 2 parts of sand/compost and broadcasted on the growing medium. Place a news paper flat on the surface and sprinkle the water gently with a rosecane. Remove the newspaper when germination is noticed.

### **Transplanting**

The seedling for crops like brinjal, tomatos and chillies etc., have to be raised in portrays and then transplated in the polybags. These seeds take 30 to 35 days to be eligible for transplantation. In the mean time, greens can be raised in the bags proposed to be planted with brinjal, tomatos and chillies. The greens will come to harvest within a month and after harvesting the greens, we can transplant the seedlings in the growing medium.

### **Protray nursery**

Recently, portrays are employed for raising vegetable seedlings. Protrays are the plug trays of 2-3" depth with a drainage hole. Initially the plugs are filled with cocopeat and one seed is sown in each plug and cover with compost or sand mixed compost. After sowing, the protray should be irrigated immediately. The protray is covered by a polyfilm till the seedlings emerge, and thereafter it is removed and exposed to sunlight up to 12 noon. There after it should move to some shady places. Most of the seedlings are ready for transplanting within one month from the date of sowing.

### **Watering**

Plants in grow bags need a lot of care and attention. It is essential to water the plants judiciously depending upon the season, growing medium, kind of crop, size of the plant and size of the grow bag. Container-grown vegetables on roof top may be irrigated as and when required. Plants need extra water during summer season and hence the plants should preferably be irrigated twice a day. But the growing medium used in our bags are cocopeat, which has high water retention capacity and one time irrigation of a liter of water is enough per bag per day in normal weather and two time irrigation (2lit) is must during hot weather. Too much water flushes valuable nutrients from the bag and encourages the growth of mold and mildew. To determine whether a given plant needs water, insert a wooden craft stick into the planting media; if particles of media cling to the surface of the stick, no water is needed.

### **Manuring**

To encourage root growth and the development of vegetables, fertilize the container grown vegetables once in a week. Maximum growth and yield of crops can be achieved not only through organic manures but also can be improved by the application of inorganic

fertilizers. Sprinkle 1 tablespoon. of water-soluble plant food during vegetative stage and 2 tbsp.during flowering and fruiting stage across the surface of the soil, and irrigate the bag thoroughly. The liquid will dissolve the fertilizer granules and carry the nutrients directly to the roots to give the plant an instant lift.

### **Staking**

Branches heavy with vegetable can easily snap in high wind,so they need staking (i.e) support with small sticks.Plants like tomato, brinjal, bush bean and clusterbean needs staking on 60th day of planting.Leafy vegetables and root vegetables need not require support.

### **Mulching**

Generally wind and sunlight is high in roof top.It will quickly suck the moisture out of the growing medium.Covering the surface of growing medium with organic mulch like dried leaves,straw and coconut husk will help it to retain moisture in summer.

### **Weed Control :**

Hand hoeing and weeding helps in aeration in the root zone and help the plant grow healthy. Weeds should be removed gently and frequently.

### **Pest and disease management**

Based on the growth pattern and climatic factors vegetables are attacked by various pests and diseases.

### **Pest control**

Aphids,mealybugs,thrips and jassids are small sucking insects, injuring the plants especially in early stages of their growth.This will be controlled by spraying with garlic,ginger and chilli extract which can be prepared in the respective households once in a week during the vegetative stage as follows.

### **Preparation of garlic,ginger and chilli extract:**

This is a mixture of three plant extract.18gms of garlic is taken,the outer skin is removed and made into paste.A paste of 9gms of green chillies and 9gms of ginger is made. All the three pastes are dissolved

in 1 lit water. This mixture is stirred well with 2 table spoon khadi soap solution and filtered before spraying.

Fruit borer and stem borers are other serious pests of brinjal,tomato,chilli and bhendi crops. They damage young fruits and make them unfit for consumption. The affected fruits should be plucked and destroyed.

The plants should be sprayed with Neem oil @ 4 ml/litre of water + khadi soap solution which controls these insects.It also control the leaf eating catterpillars of greens and other vegetables.

Beetles are other common pest of vegetables,they attack gourds,brinjal,tomato and beans. This can be controlled by spraying cow dung extract.

### **Preparation of cow dung extract**

Take 100 grams of cow dung and mix it with 1 litre of water. Filter the extract with a gunny cloth.Add 500 ml of water to the filtrate and again filter it with the same cloth.The filterate will be a very clean solution.Spray the filterate on the plants.

### **Diseases**

Fungal diseases (damping off and wilt) and viral disease affect the plants particularly during the rainy season. Both fungal and bacterial diseases can be controlled by the bio pesticide namely Trichodermaviridi and Pseudomonas which is already mixed in the soil application during planting. Application of 100gms neemcake/bag and spraying of 10% cow's urine are some of the organic methods to control the fungal and bacterial diseases. The virus affected plants show yellow patches. The affected plants should be removed and destroyed.

### **Harvesting**

Vegetables should be harvested at the peak of maturity and used promptly, which will be superior in nutritional content, freshness, flavour and appearance. Leafy vegetables should be picked up frequently when tender. Root vegetables should be pulled out when mature.

Tomato is picked at ripe stage. Brinjal, chilli, clusterbean, bushbean and bhendi are picked after they attain full size but still t

## Yield per season



**Brinjal-**  
3bags  
(1plant/bag)  
1.5kgs/bag  
**Total Yield-4.5kgs**



**Tomato**  
3bags  
(2plants/bag)  
2 kgs/bag,  
**Total yield-6 kgs**



**Chilli-**  
1bag  
(2plants/bag)  
2kgs/bag  
**Total Yield-2kgs**



**Bhendi-**  
3bags  
(4plants/bag)  
5kgs/bag  
**Total Yield-15kgs**



**Clusterbean-**  
2bags  
(4plants/bag)1kgs/b  
**Total Yield-2kgs**



**Bushlab-lab-**  
2bags  
(4plants/bag)  
2kgs/bag  
**Total Yield-4kgs**



**Radish**  
2bags  
(10plants/bag)  
1kg/bag  
**Total Yield-2kgs**



**Amaranthus-**  
2bags  
(3-4bundles/bag)  
**Tot. Yield**  
**6-8 bundles**  
**in 1 month**



**Coriander**  
2bags  
(3bundles/bag)  
**Tot. Yield**  
**6 bundles**  
**in 1 month**

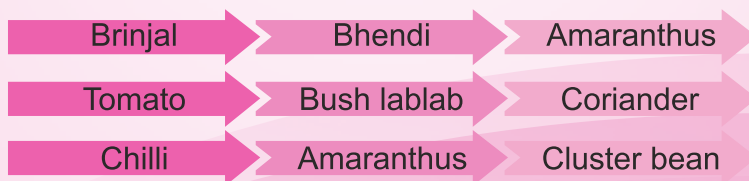
## Post harvest operations

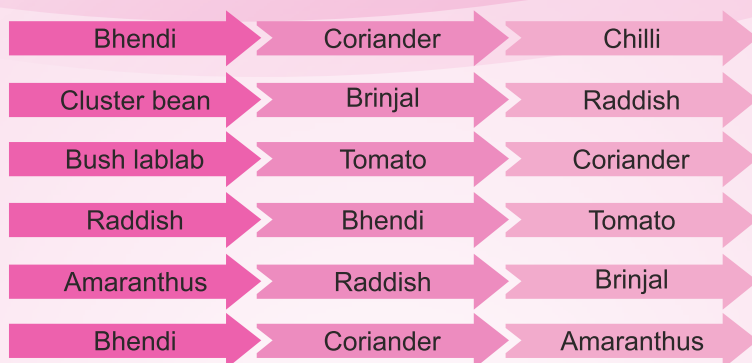
**Digging of soil:** As soon as the season is over i.e., after the final harvesting of vegetables, remove the plant from the polythene cover and dump the growing medium in open place and break the clods.

**Application of organic manures:** After 15 days, add 20kg cocopeat and 10 kg compost and mix thoroughly and refill all the polythene covers.

**Choose alternate crops:** In order to maintain proper recycling of nutrients, crop rotation can be adopted. Hence choose alternate crops for the next season.

## Crop Rotation System per bag for different Season





### Role of Non-government Organizations (NGO) in implementing UHDS

Non-government Organizations play a vital role in successful implementing Government schemes. They compliment and supplement government efforts through their understanding of grass root level problems and easy access to public. On account of this principle, Do-it yourself kit scheme can be successfully implemented handholding with notable non-government organizations viz. Lions Club, Rotaract Club, Exnora etc.

NGOs shall serve as a link between the Horticulture Department and the common public of city residents. They can play a role in formation of clusters, liaise and co-ordinate with AAO's in implementation of Do-it-yourself kit scheme, identification of beneficiaries, giving technical training support along with Horticulture Officers, to monitor the performance of the programme and give feed-back. NGOs shall aid in the propaganda and advertisement of the scheme to the public. The beneficiaries can make use of the wide network of branch offices of these NGOs in their local areas to get details about the UHDS scheme and technical know-how of root top gardening.

The Assistant Agriculture Officers and Horticulture Officers can have close co-ordination with these NGOs to implement the Do-it-yourself Kit scheme by giving the details about the scheme, guidelines, cost of kit, eligibility of beneficiaries, mode of payment, technical guidance in maintaining the roof top garden, source of inputs and clarification of doubts.

Volunteers of NGO's will be given training on various aspects of maintenance of plant species based on their request.

# Health benefits of Vegetables

## Brinjal



- Brinjal is a great food for preventing heart diseases. It helps to maintain cholesterol levels.
- It is high in potassium and helps to lower the high blood pressure.
- Brinjal is also beneficial for reducing enlargement of spleen which mainly occurs due to malaria.

## Tomato



- Tomato contains large amount of lycopene, an antioxidant that is highly effective in scavenging cancer causing free radicals.
- The regular consumption of tomatoes has been proven to decrease the levels of LDL cholesterol and triglycerides in the blood.
- Coumaric acid and chlorogenic acid found in tomato fight against nitrosamines which are produced in the body and are the main carcinogens found in cigarettes.
- Tomatoes keep the digestive system healthy by preventing both constipation and diarrhoea.
- It also prevents jaundice and effectively removes toxins from the body.

## Chilli



- **Improve heart health, Boost circulation and helps protect against strokes.**
- Limits Spreading of Prostate Cancer.
- Lower the cholesterol, and to reduce the amount of fibrin in the blood.

## Bhendi



- It is a supreme vegetable for those feeling weak, exhausted, and suffering from depression.
- It is used for healing ulcers and to keep joints limber.
- It treats lung inflammation, sore throat, and irritable



bowel syndrome.

- It is good for summer heat treatment.
- It is good for constipation.
- It is good in normalizing the blood sugar and cholesterol level.

### Clusterbean (Guar)



- Lowers blood cholesterol levels.
- Guar gum powder is a water-soluble fiber, and is used as a laxative.
- The fiber helps keep the digestive tract healthy and regular.

### Radish



- Radishes are very good for the liver and stomach, and it acts as a powerful detoxifier.
- It helps heal the symptoms of piles very quickly. Its juice also soothes the digestive and excretory system, further relieving the symptoms of piles.
- They have anti-cancer and anti-inflammatory properties.
- Its disinfectant properties protect the kidneys from any infections.

### Greens



- Leafy greens are full of vitamins, minerals, and disease-fighting phytochemicals.
- Leafy greens may help reduce the risk of cataracts and muscular degeneration.
- Leafy greens are an excellent source of foliate, which can reduce the risk of cardiovascular disease and memory loss.

## Contact us

*For registration through online, please contact our website*



[www.tnhorticulture.tn.gov.in](http://www.tnhorticulture.tn.gov.in)

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## Do it yourself kit components



Polythene bag with compressed cocopeat brick - 20 nos



Polythene spreading sheet - 4x4 mtrs



Vegetable Seed Kit



Bio-fertilizers & fungicides



Water soluble fertilizer



Plastic hand sprayer



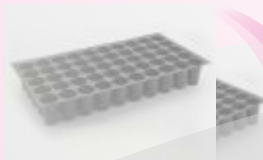
Bio-pesticide



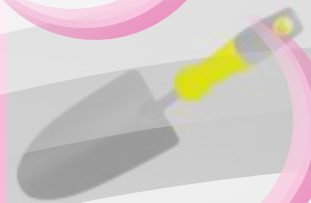
Hand digging fork



Plastic rose can



Protrays



Hand trowel



Operational Manual

# Roof Top Vegetable Garden

