

**Organic Terrace Gardening Training:
Growing Your Own Food**



Hasiru Dala

Contents

1. [Importance of Organic Gardening.](#)
2. [Benefits of growing our own food.](#)
3. [Three mythical constraints for gardening.](#)
4. [Natural Parameters: The Seven Elements](#)
 - a. [Seed](#)
 - b. [Soil](#)
 - c. [Sun](#)
 - d. [The season](#)
 - e. [The Air](#)
 - f. [Water](#)
 - g. [The Placement](#)
5. [Garden know how](#)
 - a. [Mulching](#)
 - b. [Pruning](#)
 - c. [Bolting](#)
 - d. [Chitting](#)
 - e. [Companion Planting](#)
 - f. [Crop Rotation](#)
6. [Hand on session](#)
 - a. [Preparing potting soil.](#)
 - b. [Preparation of seedling](#)
 - c. [Transplantation](#)
 - d. [Watering seedling](#)
 - e. [Techniques of watering plants.](#)
 - f. [Filling soil in different containers.](#)
7. [Plant Disease Management](#)
 - a. [Viral infections](#)
 - b. [Bacterial diseases](#)
 - c. [Fungal diseases](#)
8. [Pest Management.](#)
 - a. [Leaf Miners](#)

- b. [White Flies](#)
 - c. [Aphids](#)
 - d. [Mealybugs](#)
 - e. [Spider Mites](#)
 - f. [Caterpillars](#)
 - g. [Cutworms](#)
9. [Organic Pest Control Methods.](#)
- a. [Creating repellents](#)
 - b. [Using Neem Oil](#)
 - c. [Encouraging beneficial Insects](#)
10. [Pests – The good side of the Garden](#)
- a. [Bees](#)
 - b. [Wasps](#)
 - c. [Lady Bugs](#)
 - d. [Aphid Parasite](#)
 - e. [Green Lacewing](#)
 - f. [Praying Mantis](#)
 - g. [Soldier Fly](#)
 - h. [Mealybug Destroyer](#)
11. [Planting Charts](#)
- a. [Spinach](#)
 - b. [Tomato](#)
 - c. [Bottle Gourd](#)
 - d. [Corn](#)
 - e. [Pudina](#)
 - f. [Radish](#)
 - g. [Spring Onions](#)
 - h. [Sweet Potatoes](#)

1.Importance of Organic Gardening.

What is Organic Terrace Gardening?

(OTG) is the concept of growing our own food in our city dwellings be it in our own yards/ home gardens, or on terraces, balconies or even spaces as small as window sills.

Organic Gardening is important as its about moving away from unsustainable technologies and lifestyles, and adopting more of eco-friendly and sustainable methods of living This also encourages people on waste segregation, home composting, organic foods and using natural seeds instead of genetically modified foods.

2.Benefits of growing our own food.

By growing our own food we achieve the following:

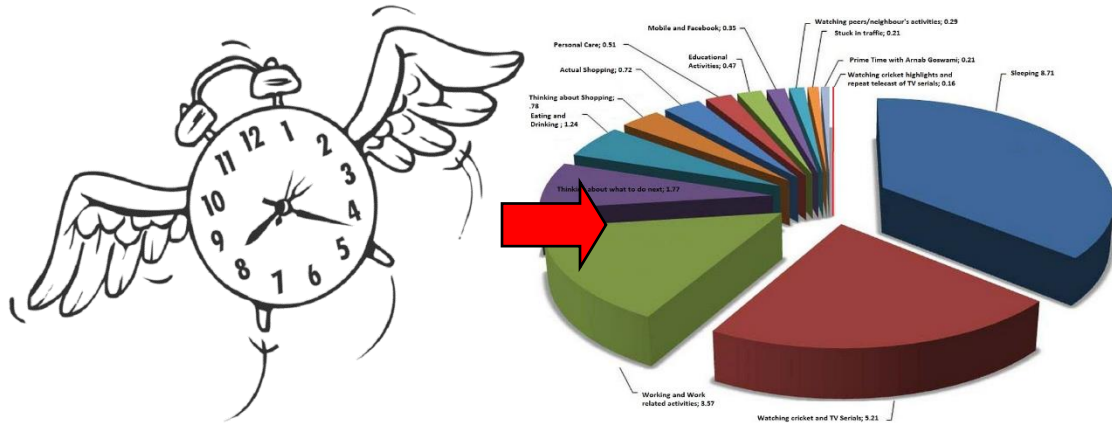
- a. Sustainability
- b. We know what goes into growing it.
- c. It is fresh.
- d. Brings a connection with nature and food we eat.
- e. Healthy and tasty.
- f. Encourages us to do waste segregation & home composting.

3.Three mythical constraints for gardening.

I have no space at home:



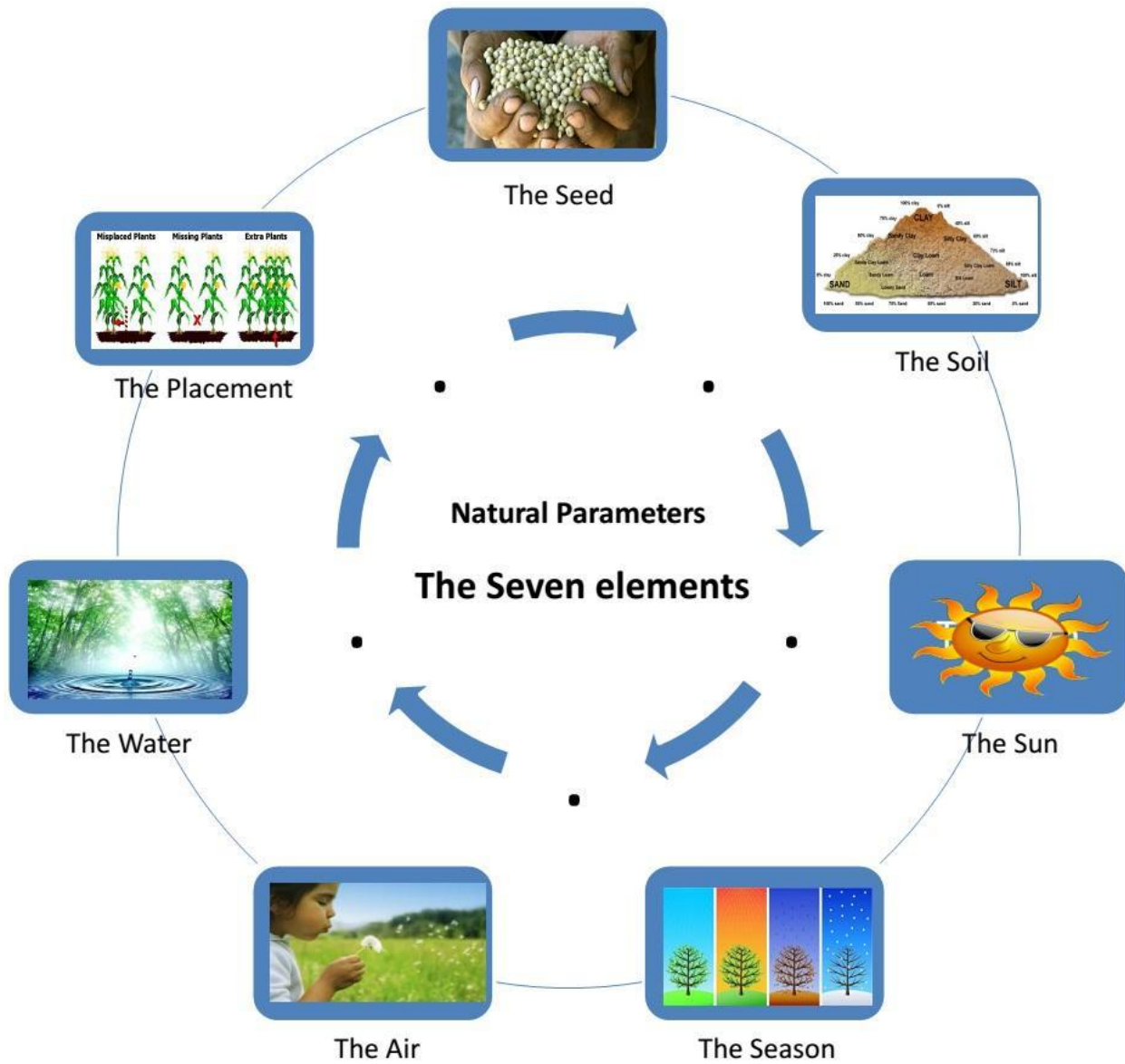
I have no time:



It is not my cup of tea:



4. Natural Parameters: The Seven Elements



a. Seed

Where should I source the seeds from?

- From Friends or existing terrace garden.
- From Previous planting.
- Seeds from certified organizations like Vanastree.

How do you differentiate the good seed vs bad seed?

- Method 1:
 - Pour the seeds into a container full of water and allow them to sit overnight.
 - The seeds that are still able to germinate will sink to the bottom of the container while the bad seeds will remain floating on top.
- Method 2:
 - Germination test



1. Method 3:

- o Create Nursery in seed trays & select good ones.



What is the difference between Heirloom, Hybrid and GMO

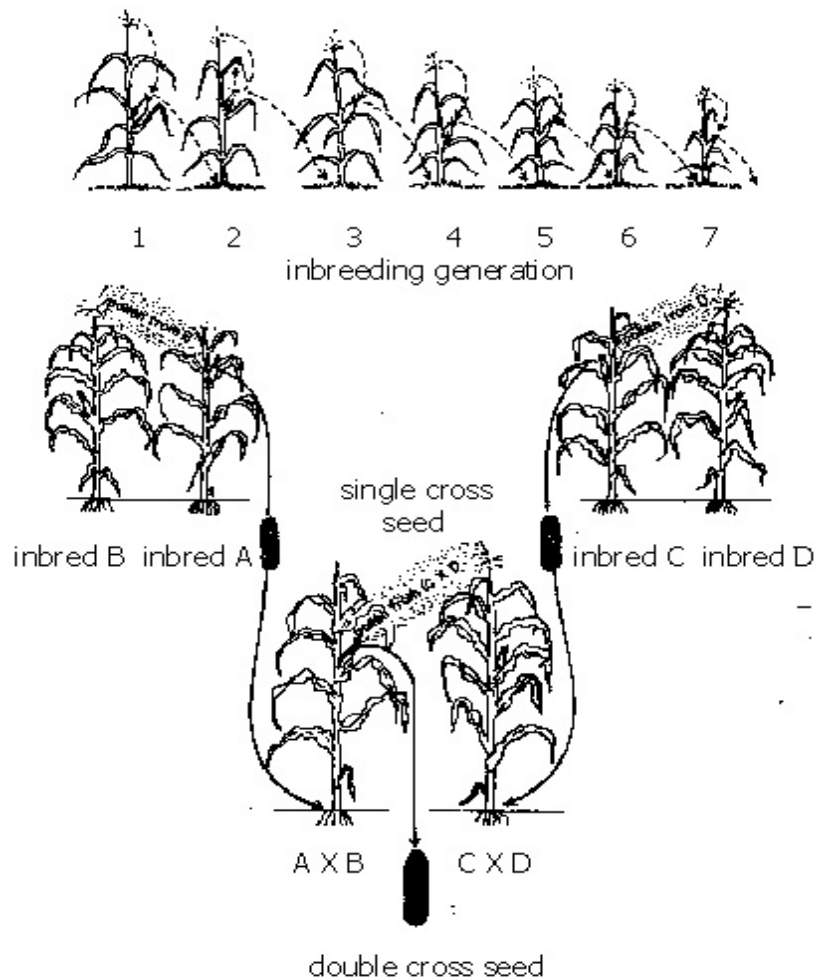
2. **Heirloom seed:**

- o Seed from a plant that has been passed from one generation to another, carefully grown and saved because it is considered valuable.
- o The value could lie in its flavor, productivity, hardiness or adaptability.
- o Many heirlooms have been grown, saved and passed down for more than 100 years.
- o Most heirlooms have been saved and selected because they have the best flavor and production in home and small market gardens.
- o We get the benefit of this long development cycle, as only the best producing, most flavorful, most memorable and most dependable varieties have made the selection throughout the years.
- o Delicate, weak or fickle varieties are no longer with us.



3. Hybrid Seeds:

- o Produced by artificially cross pollinating two genetically different plants of the same species, such as two different tomatoes or two varieties of corn.
- o The cross pollination is done by hand, and a seed that is saved will not grow true to either parent.
- o Thus the farmer or gardener has no choice but to purchase new seed each year.
- o Hybrids are typically bred for commercial use and profit to change the characteristic of the resulting plants, such as higher yield, greater uniformity, more even ripening, improved color and disease resistance.
- o Flavor has only recently begun to be addressed when selecting characteristics for new hybrids.



4. **GMO Seeds:**

- o Have been altered using DNA from completely different species and organisms to give different traits such as resistance to herbicides and acceptance of chemical fertilizers.
- o Some GMO corn, for instance, manufactures its own herbicide in its root structure.
- o Some DNA donors have come from fish, frogs and bacteria.
- o The major crops that are genetically modified are corn, cotton, soybeans and wheat. Sugar beets and alfalfa have recently been deregulated, and potatoes are being studied.
- o Most common garden vegetables are not yet genetically modified simply because the financial return in the market is not present yet.



Heirloom Seeds are the best!

SEEDS EXPLAINED HEIRLOOM, HYBRID, GMO

DEFINITION

- heirloom seed**
seed that is produced through open-pollination by a natural means. An heirloom plant has one parent.
- hybrid seed**
seed that is produced by cross-pollinating two plants in nature or in a lab. A hybrid plant has two parents.
- GMO seed**
seed that has had its DNA altered using techniques of genetic engineering in a lab.

CHARACTERISTICS

- Heirloom plants are typically "true to type". Plants are like the parent of the seed.
- Hybrid plants typically have improved characteristics such as better yield, greater uniformity, improved color, disease resistance, etc
- GMO plants typically have modified or unique traits that the plant wouldn't otherwise possess.

ADVANTAGES

- Greater selection of plants to choose from.
Resistant to pests, disease, extreme weather.
Non-homogenous tastes.
- Very popular, easy to find.
Produce high yield, uniform crops.
Plants may be more disease resistant.
- ??

DISADVANTAGES

- Not as hardy, disease-resistant as hybrid plants.
- Taste is homogenous, no variety in flavor.
Can be costly. Seeds from first-generation plants can't be saved and replanted.
- Not proven to be safe for consumption. Linked with serious health risks including infertility, immune problems, accelerated aging, faulty insulin regulation, and changes in major organs and the gastrointestinal system. Can cross-pollinate with non-GMO plants and crops.

Prepared by Laura Wendling for Dr. J. Renae Norton, www.eatingdisorderpro.com.
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How do I save seeds?

- **Nurture every plant into maturity** (except for diseased or clearly off-type plants); and
- **Save equal amounts of seed from each plant.**
- Don't allow seeds to be wetted by rains or irrigation water after they have begun to dry.

- Don't practice selective seed collecting habits, i.e., collecting more seeds from plants that do well in your garden.
- Avoid injury during harvest or processing due to such causes as rough treatment or overheating during drying, etc.

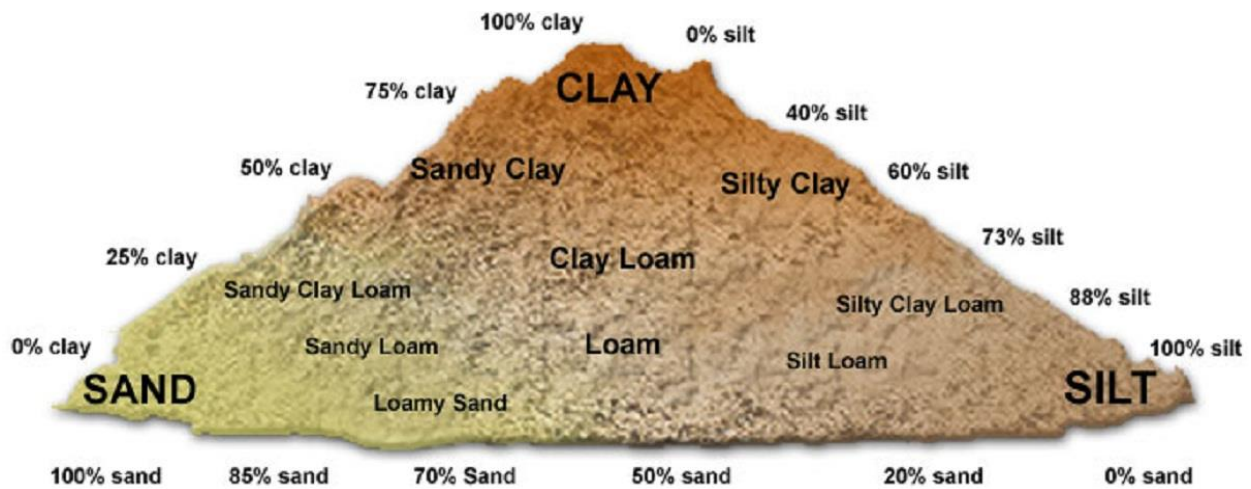
Seed Saving Tips		Grow your favorite plants again, save money, trade seed and preserve plant diversity.
Beans	Let the pods age on the vine until they turn brown. You can also store the entire plant (with roots) upside down in a warm area until pods dry out. Cross-pollination could affect the purity of your bean seeds in the future. Pole beans are more likely to cross.	<p>The table to the left lists several popular annual vegetables and fruits with easy-to-save seeds and a lower potential for cross-pollination in the home garden. They flower and mature seed in the same year. General advice is given to maintain as much seed purity as possible when plants are more prone to cross. Please seek out other references to enhance your knowledge of seed saving.</p> <p>Seed Saving Basics</p> <ul style="list-style-type: none"> ~Save seeds from heirloom or open pollinated (OP) plants only if you want them to stay true. Hybrid seed will not produce the same plant again. ~Choose the healthiest plants and the largest seeds. ~Air dry seeds on a fine screen or paper away from direct sunlight and as quickly as possible to reduce contamination. ~Label seed (drying and storage). ~Use containers that limit moisture. ~Drying may not be necessary if planting soon after collection.
Cantaloupe	Best time to collect seed is when the stem dies and the fruit separates easily. Remove the membranes from the seed by rinsing and gently rubbing with your fingers.	
Cucumber	Harvest seed when cucumbers are fully ripe and yellowed (too ripe for eating).	
Lettuce	Let seed pods dry on the plant. Bag the plant to capture the seeds because they progressively fall off from bottom to top. Do not save seed from plants that bolt too soon. The seed you save may produce plants that go to seed prematurely.	
Peas	Wait until the plant dies and collect the seeds. Peas do not cross-pollinate.	
Peppers	Best time to collect seed is when peppers are full color and beginning to shrivel. Brush off the seeds from the inside stem and let dry. Peppers of the same species could cross. Grow one hot type and one sweet type to prevent cross-pollination.	
Pumpkin	Remove seeds three weeks after harvesting the pumpkin. Varieties within the same species can cross. Rinse off membranes and dry well.	
Squash (Summer)	Harvest seed when the squash has a hard skin and is too ripe to eat. Hold the seeds under water and rinse off the membrane. Avoid cross-pollination-do not plant these species together: Cucurbita Pepo, Cucurbita Moschata, Cucurbita Maxima and Cucurbita Mixta.	
Sunflower	Most sunflowers are hybrids. Save heirloom seeds if you want the flower to stay true. Hang flower heads upside down by a short length of stalk in a cool, dry spot. Once dry, remove the seeds and keep dry until planting.	
Tomato	Save seed when fruit is full color and firm, but still tender to the touch. Remove the protective gel covering the seed. Cross-pollination may occur with wild or currant tomatoes but most popular types will not cross. Ensure space between plants.	
Watermelon	Remove fibers and membranes by rinsing. When dropped in a glass of water, viable seeds will sink to the bottom. Seeds that float may not germinate well.	

How to store my seeds and how long they are viable (Age)?

1. Dry at room temperature on racks or on large sheets of paper for about a week.
2. Separate pods or flower heads by shaking the seeds into large paper bags.
3. Sift out the dried plant bits then pour seeds into recycled paper envelopes.
4. Mark on the packets the type of plant and the date they were harvested
5. Fill a jar with your packets and seal the jar shut.
6. Keep the jar in a cool dark place to keep the seeds dormant.

b. Soil

Three Types of Soil: Sand, Clay & Silt



What is in the soil?

Any soil that you hold has millions of microorganisms. Probably 10 times more than the human population in a table spoon of soil. Soil also has all the nutrients required for the plant to thrive and survive.

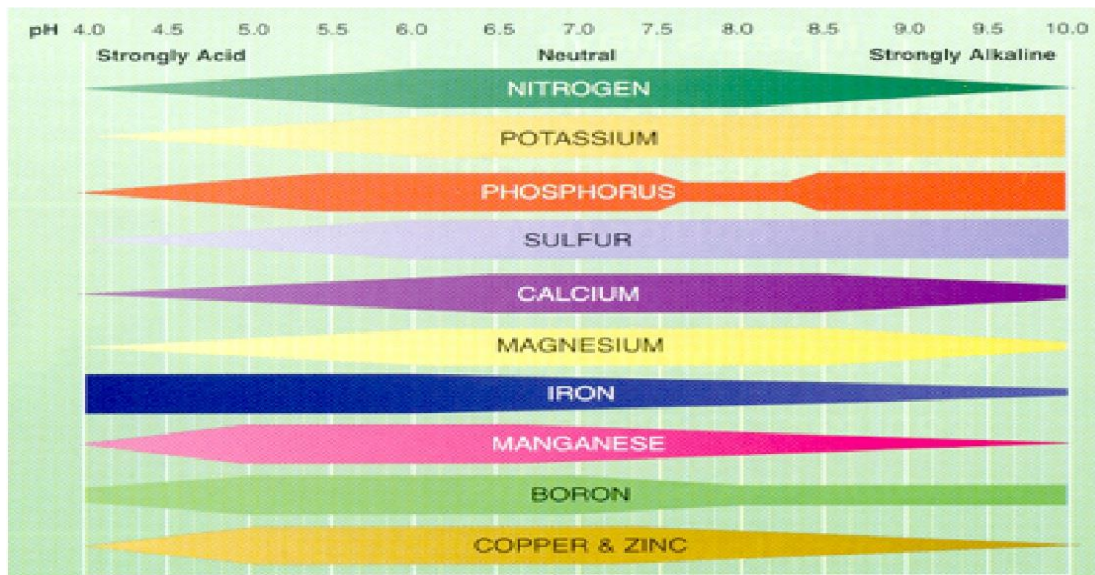
What is soil pH?

Soil pH is a measurement of the acidity or alkalinity of a soil. On the pH scale, 7.0 is neutral. Below 7.0 acid, and above 7.0 is basic or alkaline.

What does the plant needs from the soil?

- **Macro Nutrients:**
 - **Primary Nutrients:** Nitrogen, Phosphorous and Potassium.
 - **Secondary Nutrients:** Calcium, Sulfur, Magnesium.
- **Micro Nutrients:**
 - Boron, Chlorine, Manganese, Iron, Zinc, Copper, Molybdenum, Nickel, Cobalt etc.

What Soil pH is best for plants?



Vegetable Name	pH Recommended
Beans	6.0-7.5
Beetroot	6.0-7.5
Broccoli	6.0-7.0
Cabbage	6.0-7.0
Carrot	5.5-7.0
Cauliflower	5.5-7.5
Celery	5.8-7.0
Cucumber	5.5-7.0
Garlic	5.5-8.0

Vegetable Name	pH Recommended
Kale	6.0-7.5
Lettuce	6.0-7.0
Peas	6.0-7.5
Pepper, sweet	5.5-7.0
Potato	4.8-6.5
Pumpkin	5.5-7.5
Radish	6.0-7.0
Spinach	6.0-7.5
Tomato	5.5-7.5

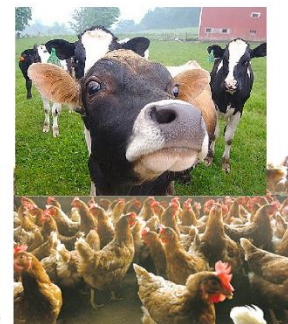
- Any soil as long as it is not too acidic or too alkaline.

- The optimum pH range for most plants is between 5.5 and 7.0,

However many plants have adapted to thrive at pH values outside this range.

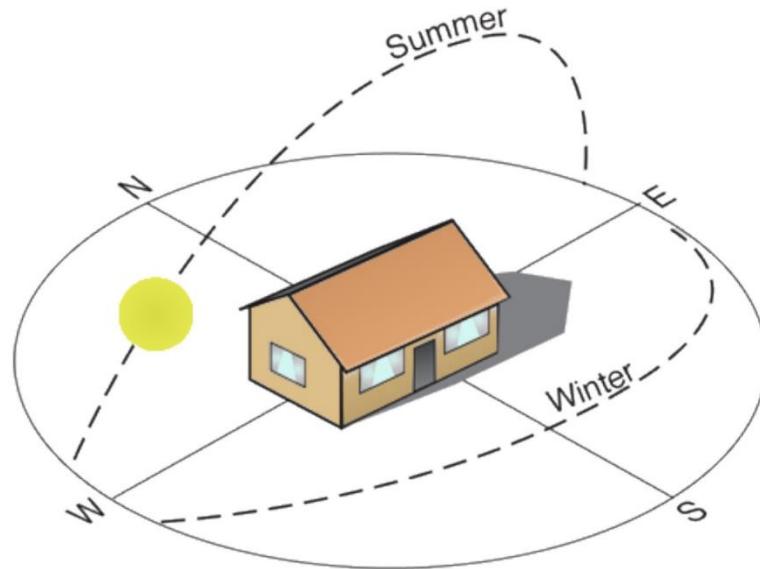
Garden Soil Basics: How to amend my soil? It has to suit what I grow.

- Equal proportions of:
 - Red soil
 - Vermi-Compost
 - Regular Compost
 - Coco-peat.
 - Manure (Cow, Horse, Sheep, Chicken, etc.)
- Add Compost/Manure at regular intervals.
- Optional: Compost Tea, Jeevamrutha, Seaweed liquid and Panchagavya.
- Keep experimenting and changing the ratios.



c. Sun

Understand the path of Sun over your terrace



Different plants have different sunlight requirements.

Some do well in semi shade, some need 4-6 hours of sunlight, some require more and some require less.

Lower Sunlight 3-4 hours a day	Medium Sunlight 4-6 hours a day	High Sunlight 6-8 hours a day
 Swiss Chard	 Beets	 Peppers
 Cos Lettuce	 Carrots	 Tomatoes
 Lettuce	 Potatoes	 Watermelon
 Parsley	 Broccoli	 Okra
 Arugula	 Radishes	 Eggplant
 Asian Greens	 Turnips	 Strawberries

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Sunlight requirement for seedlings

Seeds sown in a seed tray (or anything similar) don't need direct sunlight for the first 1-2 weeks.



Use of Shade Net

If your plants don't do too well under the scorching sun, then you can consider installing a shade net, which cuts off the amount of sunlight hitting the plants.



d. The season

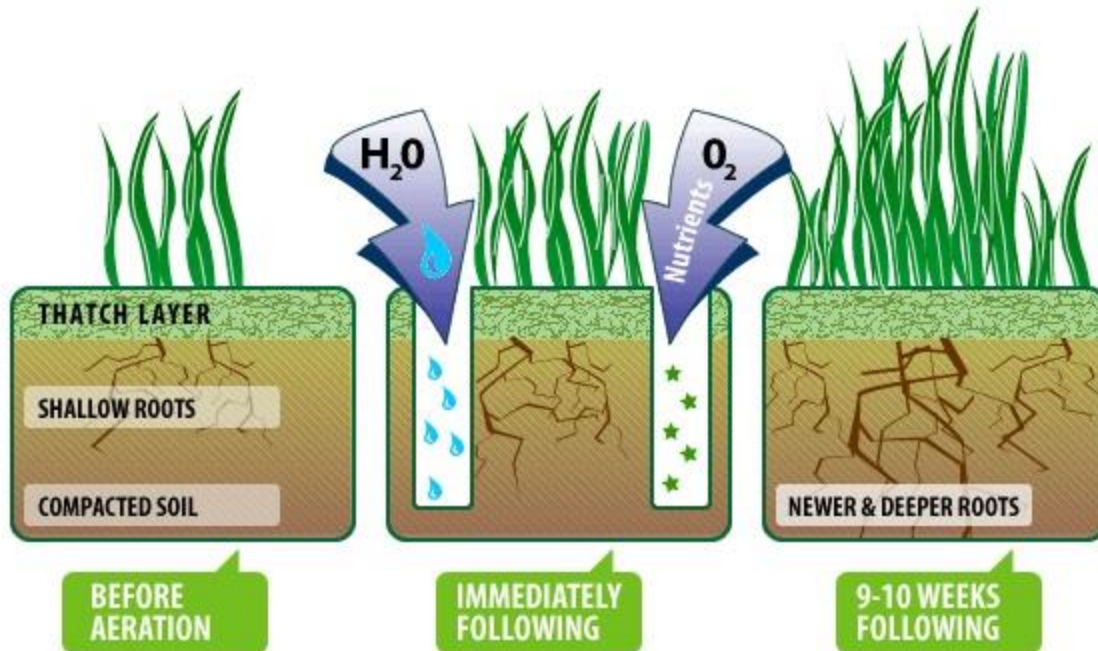
- Your city and your weather
- Cheat the vegetable and create season keeping Sun path in mind

Sowing Chart

Sowing Seasons		
Month	North India	South India
JANUARY	Brinjal	Lettuce, Spinach, Gourds, Melons, Radish, Carrot, Onion, Tomato, Okra, Brinjal, Bean
FEBRUARY	Applegourd, Bittergourd, Bottle gourd, Cucumber, French Beans, Okra, Sponge, Gourd, Watermelon, Spinach	Same as January
MARCH	Same as February	Amaranthus, Coriander, Gourds, Beans, Melons, Spinach, Okra
APRIL	Capsicum	Onion, Amaranthus, Coriander, Gourds, Okra, Tomato, Chilli
MAY	Onion, Pepper, Brinjal	Okra, Onion, Chilli
JUNE	All gourds, Brinjal, Cucumber, Cauliflower (Early), Okra, Onion, Sem, Tomato, Pepper	Gourds, Solanaeaceae, Almost all vegetables
JULY	All gourds, Cucumber, Okra, Sem, Tomato	Same as June
AUGUST	Carrot, Cauliflower, Radish, Tomato	Carrot, Cauliflower, Beans, Beet
SEPTEMBER	Cabbage, Carrot, Cauliflower, Peas, Radish, Tomato, Lettuce	Cauliflower, Cucumber, Onion, Peas, Spinach
OCTOBER	Beet, Brinjal, Cabbage, Cauliflower, Lettuce, Peas, Radish, Spinach, Turnip	Brinjal, Cabbage, Capsicum, Cucumber, Beans, Peas, Spinach, Turnip, Watermelon
NOVEMBER	Turnip, Tomato, Radish, Pepper, Peas, Beet	Beet, Eggplant, Cabbage, Carrot, Beans, Lettuce, Melon, Okra, Turnip
DECEMBER	Tomato	Lettuce, Pumpkin, Watermelon, Muskmelon, Ash gourd, Ridge gourd, Bitter gourd, Bottle gourd, Cucumber, Chilly, Cabbage,

e. The Air

- The better your soil breathes, the more it benefits your plant's growth
- Dense, compacted, heavy soils tend to negatively impact oxygen flow and directly affects the growth and yield.
- Your soil needs to breath to allow oxygen and vital nutrients to efficiently reach your plants roots.
 - Plant and root growth
 - Microorganism population and activity
 - Water and Nutrient absorption
 - Helps to avoid the development of toxins
 - Prevents potential development of diseases



f. Water

- Do not over water and do not under water.



- o On an average, watering every alternate day is good enough.
- o Monitor your plants and you will notice when they look dried up or not.
- o If you over water:
 - The water that drains out, will take away the nutrients.
 - And of course you are wasting water too!
 - New & Old Leaves fall at the same time.
 - Flowers become moldy.



Warnings of overwatering:

- > New & old leaves fall at the same time.
- > Flowers become moldy.

- Have good Drainage to allow excess water to pass through.



- Use techniques to retain moisture.



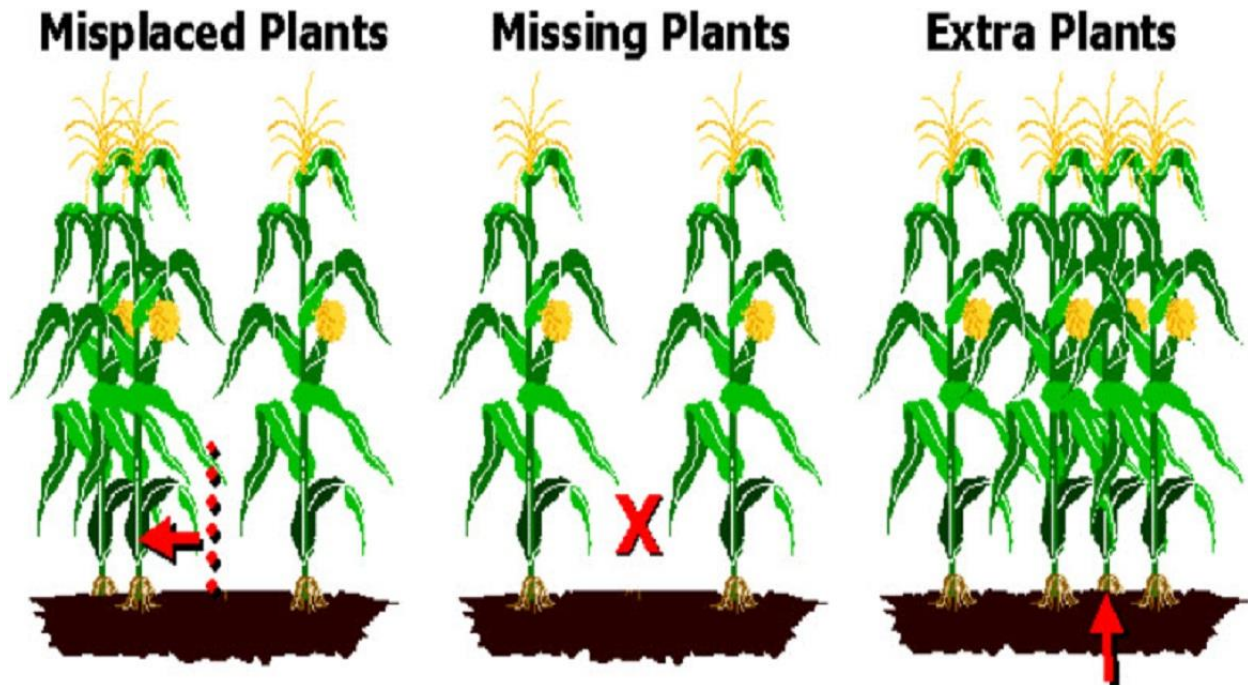
- Drip irrigation system may be considered for big gardens.



g. The Placement

Types of non-uniform spacing

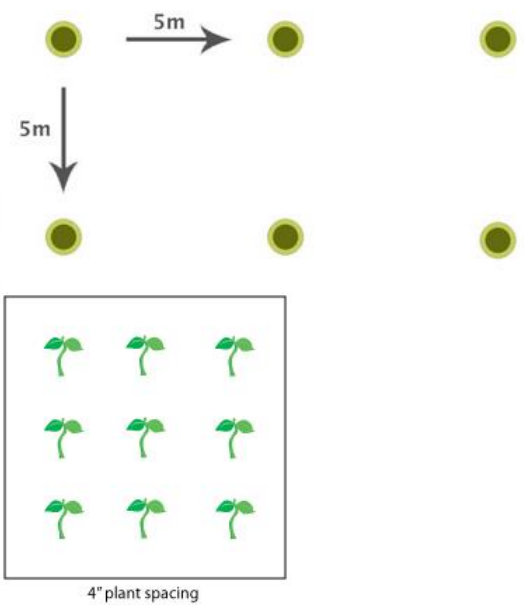
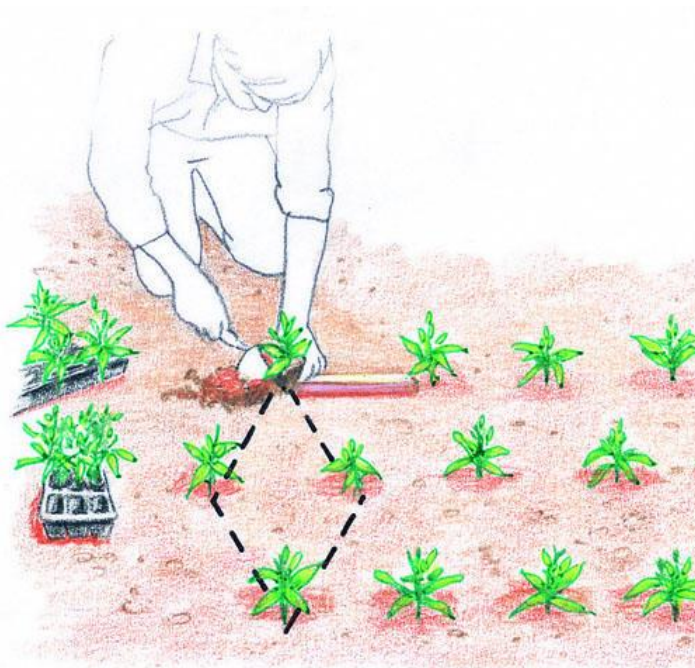
- Misplaced plants
- Missing plants
- Extra Plants.








What Vegetables can be grown in clusters and why?











What should be spacing between each plant?

- The spacing of crops is determined by the ultimate height and spread of the crop.
- There is the space between the seeds or plants along the row and then the space between rows.
- Space is needed for weeding along and between rows, to create good air circulation and to allow each crop to grow to its determined size.
- Some crops in may be harvested when they are young – smaller sweeter carrots and beetroot for example, baby salad leaves – rather than fully mature size, so spacing could be closer.

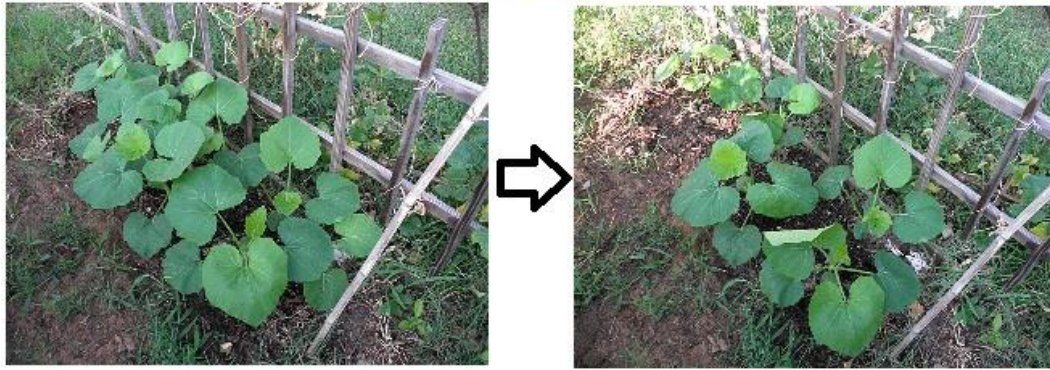


crop size	along row	between row
small upright habit e.g. Onion, garlic 	15cms (half a trowel)	30cms (1 trowel)
small bushy habit e.g. radish and baby carrots, baby leaves 	10 cms (just short of half a trowel or small plant label)	15cms (half a trowel)
medium size bushy habit e.g. Beetroot and parsnips, lettuce, French beans 	15cms (half a trowel)	30cms (1 trowel)
large bushy habit e.g. potatoes, broad beans 	potatoes 30cms (1 trowel) beans 20cms (dibber)	potatoes and beans 45 cms (1 ½ trowels) peas 60 cms (2 trowels)
large trailing habit pumpkin and courgette, climbing beans 	90 - 120cms (3 to 4 trowels) (15cms for beans – half a trowel)	90 – 120cms (4 – 5 trowels)

Square Foot Garden example (4feetx4feet)

 <p>1 Cabbage</p>	 <p>9 Green Beans</p>	 <p>1 Pepper</p>	 <p>16 Onions</p>
 <p>1 Broccoli</p>	 <p>9 Green Beans</p>	 <p>4 Lettuce</p>	 <p>32 Green Onions</p>
 <p>1 Cauliflower</p>	 <p>16 Beets</p>	 <p>4 Lettuce</p>	 <p>16 Carrots</p>
 <p>1 Cherry Tomato</p>	 <p>9 Spinach</p>	 <p>16 Carrots</p>	 <p>32 Radish</p>

What is Thinning?



Can I grow multiple variety of the same vegetable in close proximity?

- Companion Planting.



- Succession Planting



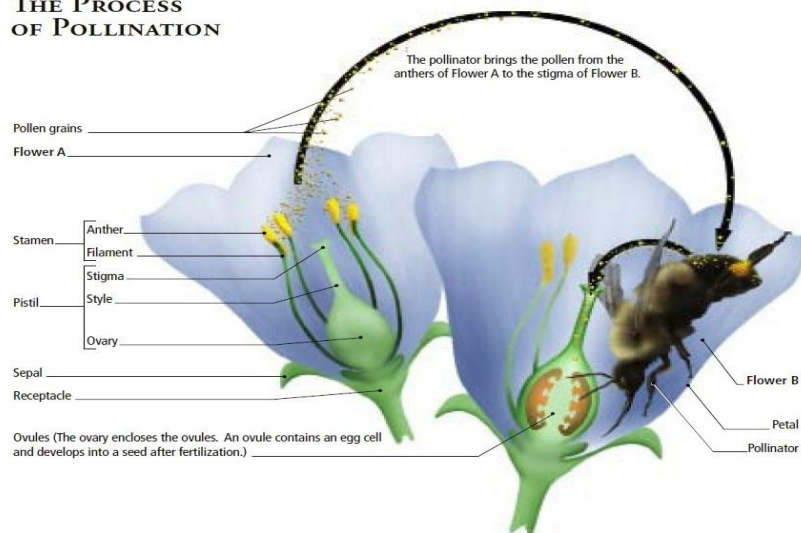
- Diversified Crop variety planting.



What is pollination, hand pollination and cross pollination?

- Pollination.

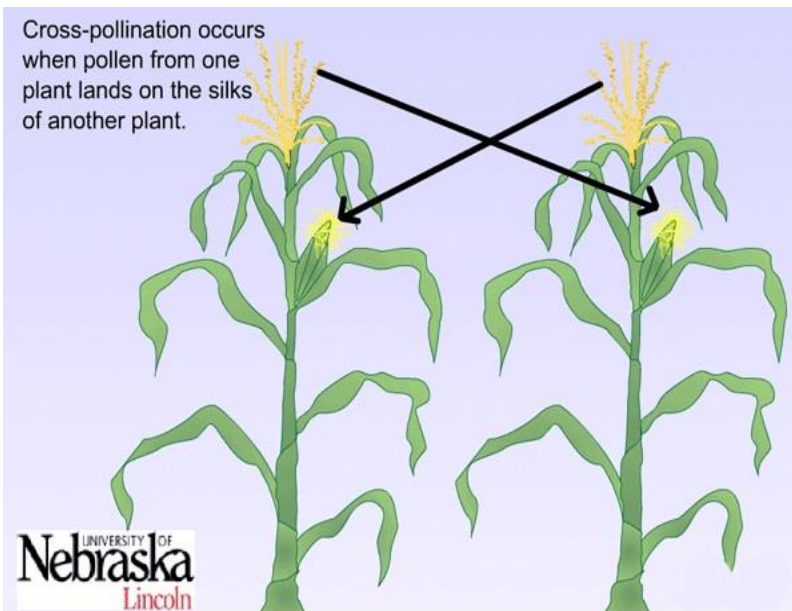
THE PROCESS OF POLLINATION

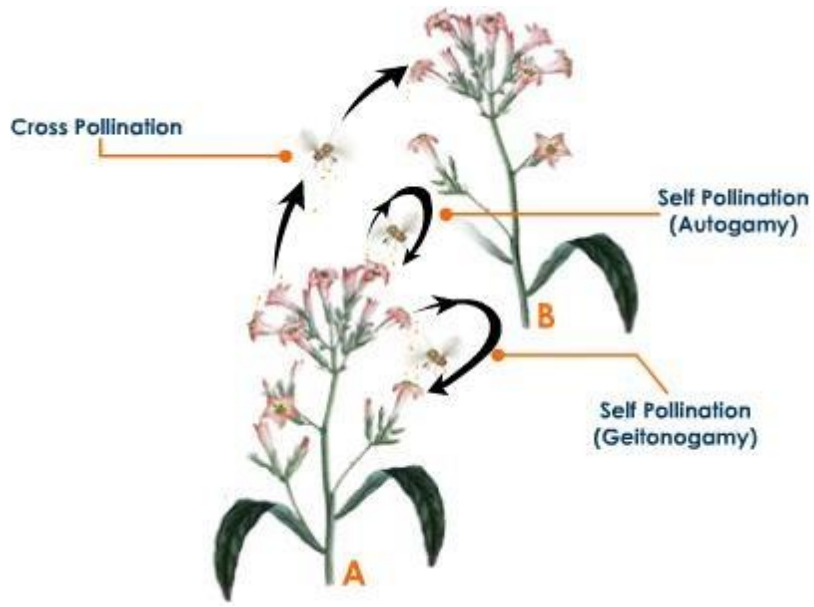


- Hand Pollination.



- Cross Pollination.





5. Garden know how

a. Mulching



b. Pruning



c. Bolting



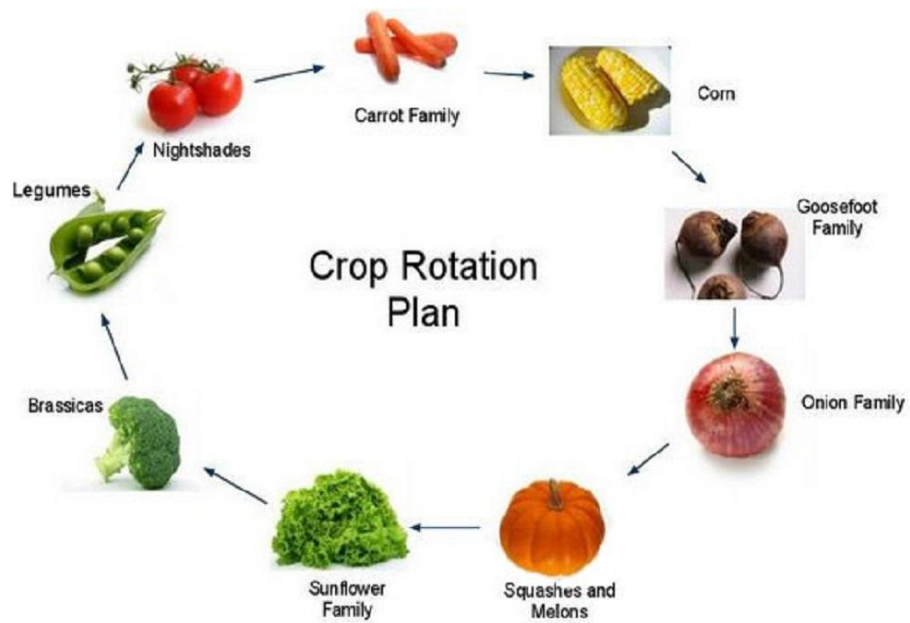
d. Chitting



e. Companion Planting



f. Crop Rotation



6. Hand on session

a. Preparing potting soil.

Covered in section on Soil





b. Preparation of seedling





c. Transplantation





d. Watering seedling



e. Techniques of watering plants.



f. Filling soil in different containers.



7. Plant Disease Management

a. Viral infections

Mosaic Virus

Curl Top Virus

b. Bacterial diseases

Leaf Spot

Root rot, Stem rot and Fruit rot

c. Fungal diseases

Damping off

Leaf curl

Powdery Mildew

Blight (Early & Late)

8. Pest Management.

a. Leaf Miners



b. White Flies



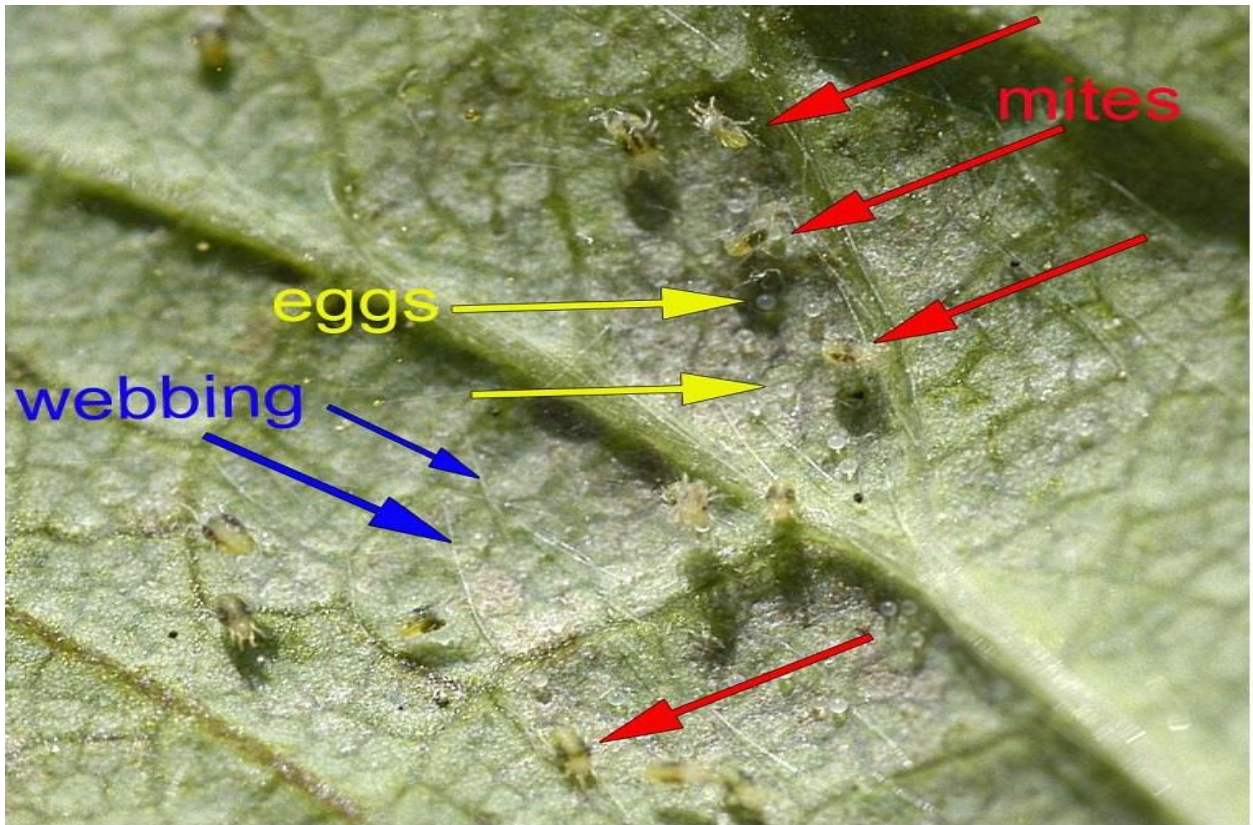
c. Aphids



d. Mealybugs



e. Spider Mites



f. Caterpillars



g. Cutworms



9. Organic Pest Control Methods.

a. Creating repellents

Marigold, Garlic, Herbs, Cucumber peels

b. Using Neem Oil

c. Encouraging beneficial Insects

10. Pests – The good side of the Garden

a. Bees



b. Wasps



c. Lady Bugs



d. Aphid Parasite



e. Green Lacewing



f. **Praying Mantis**



g. **Soldier Fly**



h. Mealybug Destroyer

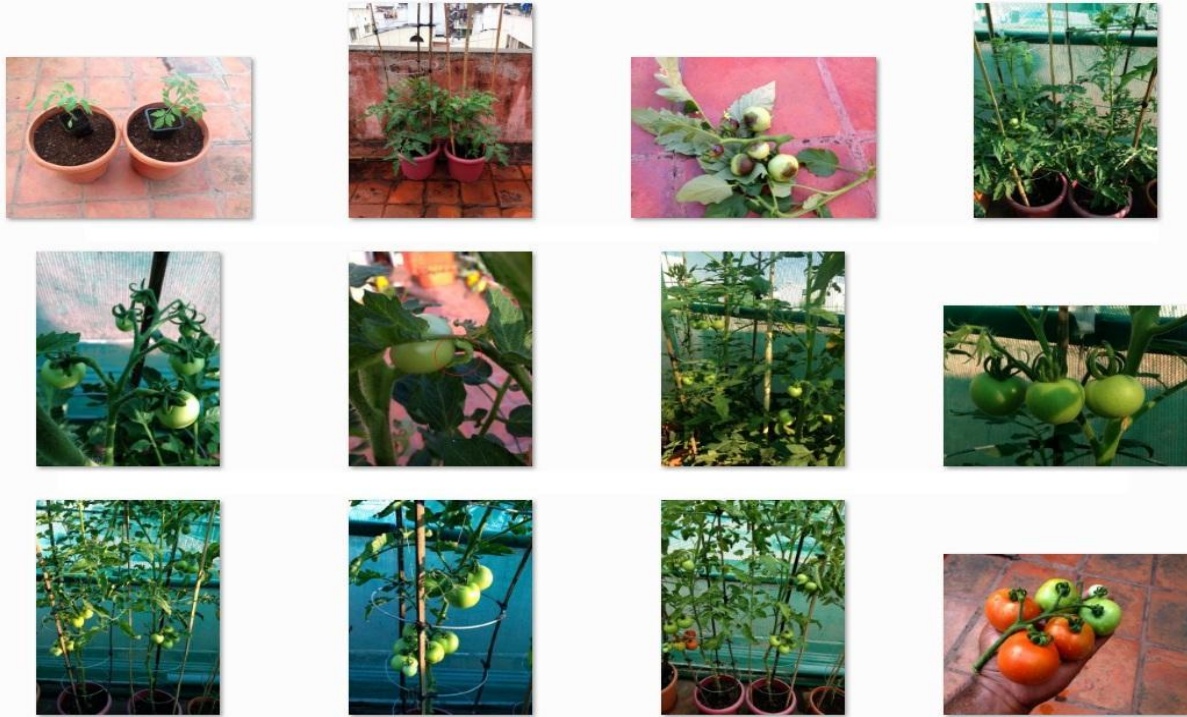


11. Planting Charts

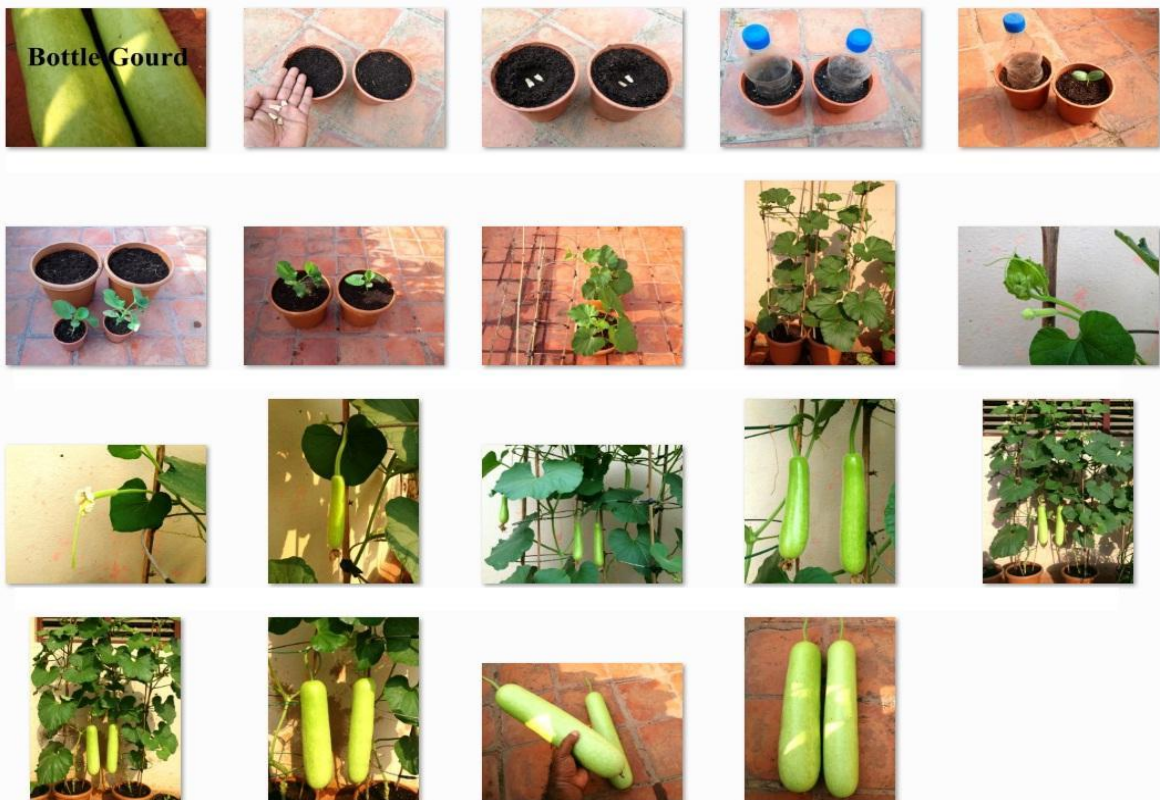
a. Spinach



b. Tomato



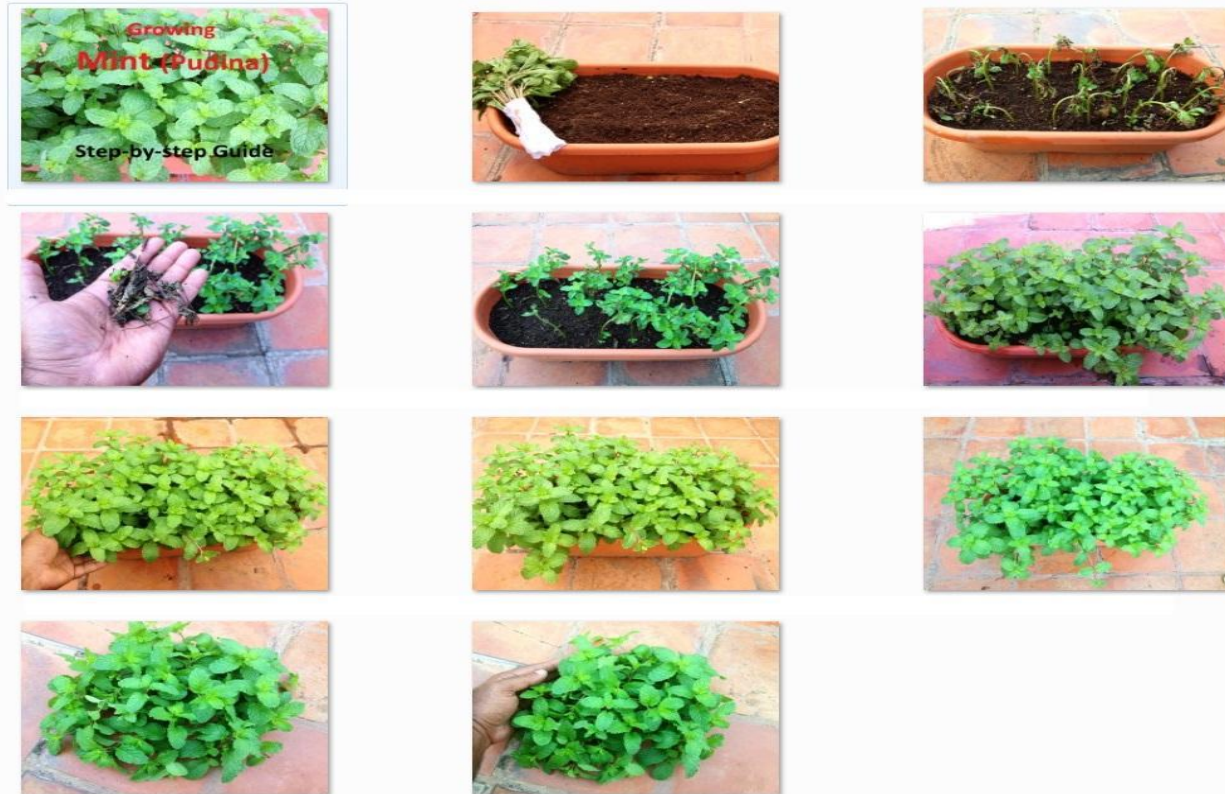
c. Bottle Gourd



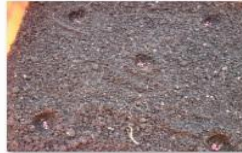
d. Corn



e. Pudina



f. Radish



g. Spring Onions



h. Sweet Potatoes

