



**Indo-Global
Social Service Society**
Celebrating the Spirit of Humanity

URBAN FARMING

A Module on Resilient Urban Farming Practices in Urban Settlements



Credits

Author:

Proshin Ghosh

Editing and Creative Input:

Adrian Dacruz

Graphic Design:

Debasish, Maria We Draw Conversation

Creative Director & Illustration:

Indrajit, We Are Young Foundation

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Indo Global Social Service Society (IGSSS)
28, Lodhi Road, Institutional Area,
New Delhi - 110003 India

Email - info@igsss.net

Tele - 011-45705000

Website - www.igsss.org

Facebook - www.facebook.com/igsss

Twitter - www.twitter.com/@igsss



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Catagories of waste



Make a list of your household wastes and categorize the wastes as mentioned below:

Organic Waste

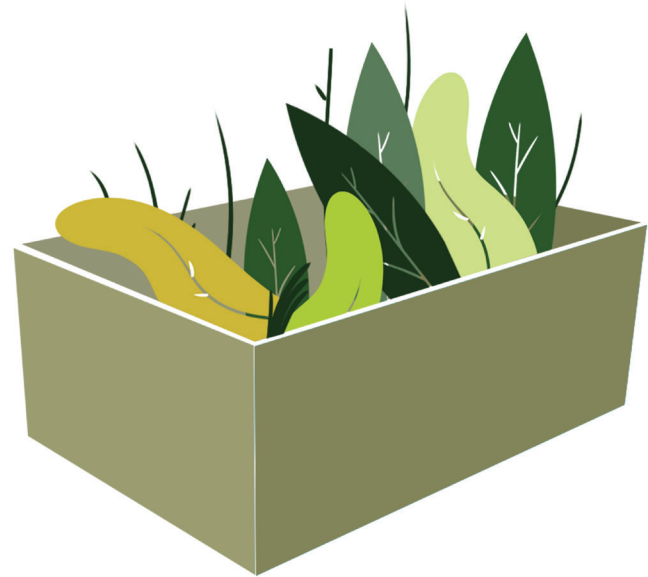
Recycle Waste

Sanitary Waste

Chapter 1

What is resilient urban farming?

A community driven, innovative, climate resilient model comprised of seasonal vegetable cultivation through kitchen waste management in basti houses and premises by urban poor community. This model is highly effective for consumption and alternative income in basti urban poor community and amelioration in the quality of basti ecology



Outcomes of Urban Farming



Daily household vegetables



Income &/ or Savings



Cleanliness of house & basti



Quality in basti ecology

Why urban farming model is suitable in basti ?



Access to vegetables for daily household consumption



Scope of alternative income for the women



Judicious use of household space in basti premises



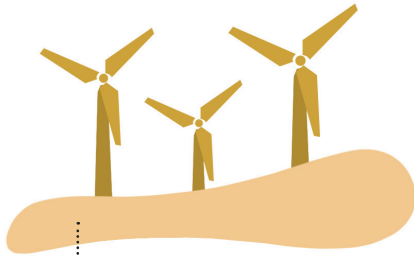
Mitigate adverse impact of climate change in basti



Kitchen waste management in basti houses



Source of vegetable for consumption

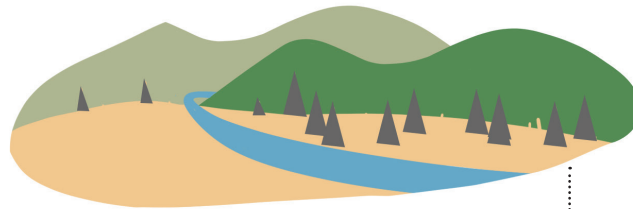


Addressing climate change emergency

Purpose



Alternative income



Land resource management

Chapter 2

Categories Of Resilient Urban Farming

Farming in Household premises
(Space saving models)





**Farming in community land
(Land restoration model)**

Farming in Household Premises

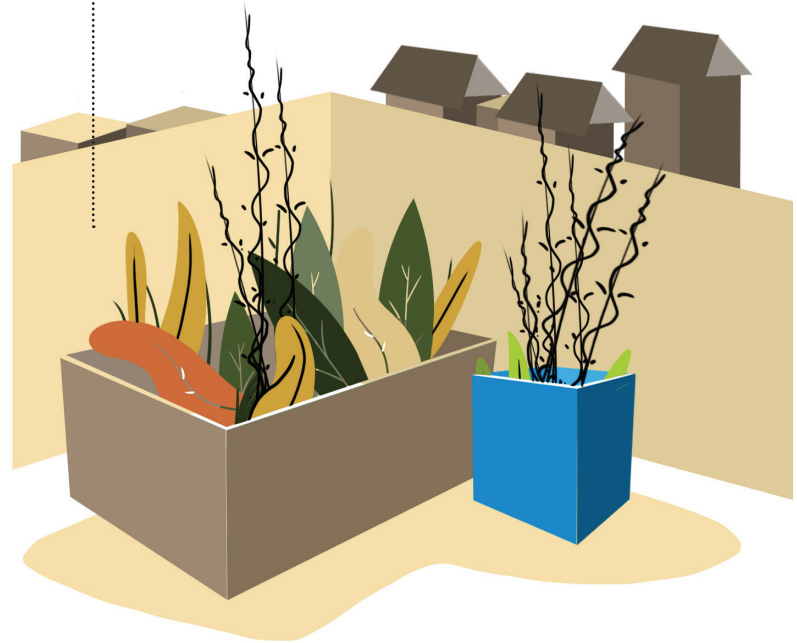
(Space saving model)

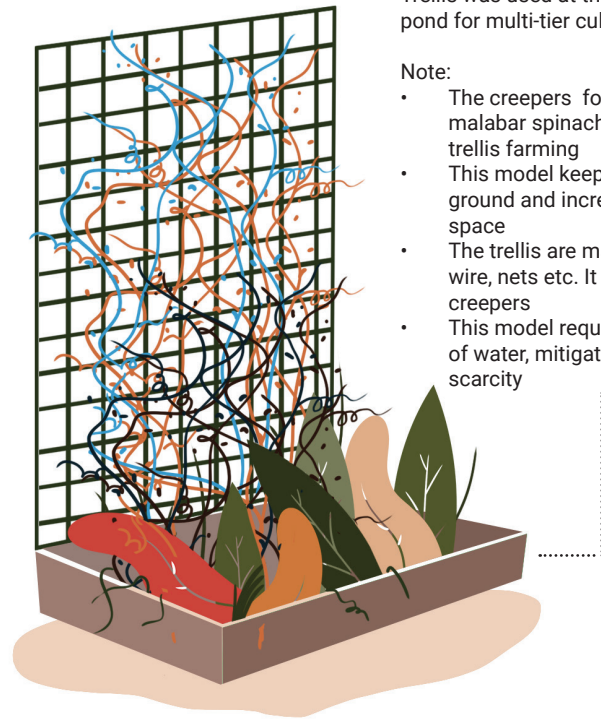
Rooftop Plantation

The rooftop space of the houses are used for this farming

Note:

- The small rooted vegetables, creepers for example gourd, malabar spinach are perfect for rooftop cultivation
- Portable jute sacks are the best choice for seed sowing in rooftop farming
- This model requires low volume of water, mitigates the risk of water scarcity
- Due to portable character this model can be relocated easily during any emergency





Trellis (Chaili)

Trellis was used at the corner of land & pond for multi-tier cultivation

Note:

- The creepers for example gourd, malabar spinach are perfect for trellis farming
- This model keeps plant off the ground and increases usable space
- The trellis are made up of bamboo, wire, nets etc. It provide support to creepers
- This model required low volume of water, mitigate risk of water scarcity

Sack Plantation

In this model jute bags are used for seed sowing & farming.

Note:

- Mixture of organic compost and soil are used for seed sowing.
- This model can relocate easily during emergency
- Requirement of water is low, check wastage of water



Pot plantation

The practice of growing vegetables only in waste pots or similar containers instead of planting them in the ground.

Note:

- This model can be hung hence save space
- Requirement of water is low, check wastage of water
- Mixture of compost & soil is require for seed sowing in the pot
- This model can mitigate risks in emergency due to portable characteristics

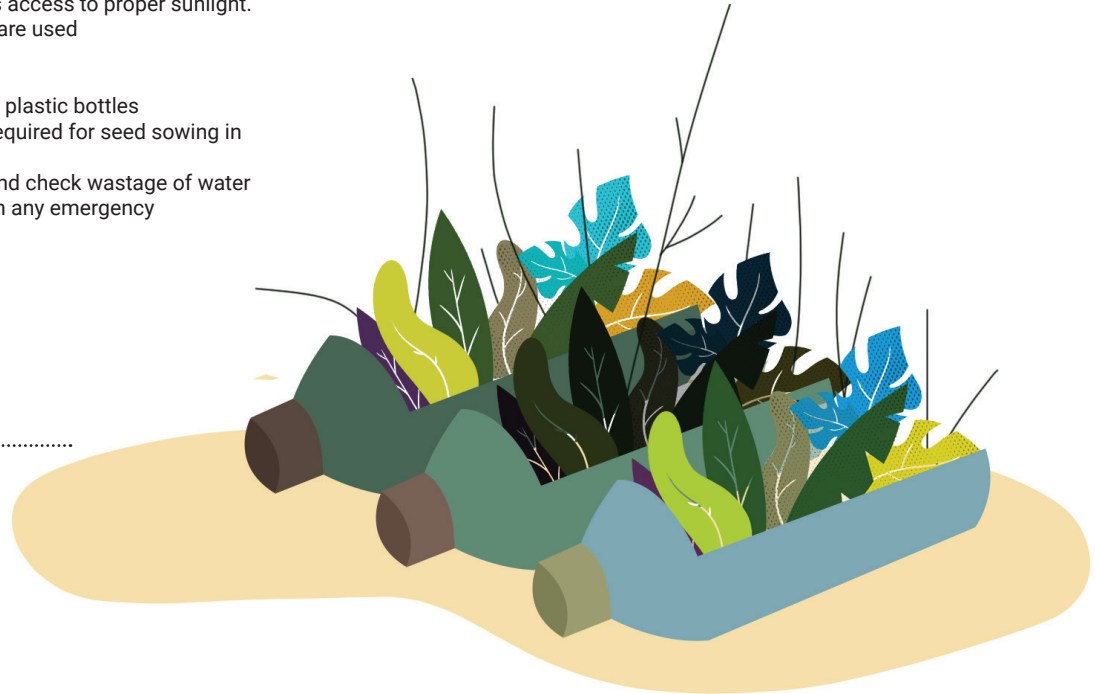


Bottle plantation

Plants are grown inside the bottle with little or no exposure to the outside environment and can be contained indefinitely inside the bottle if it has access to proper sunlight. In this model waste plastic bottles are used

Note:

- This model promotes reuse of plastic bottles
- Mixture of compost & soil is required for seed sowing in bottle plantation
- Requirement of water is low and check wastage of water
- This is portable can relocate in any emergency



Tire plantation

In this model waste tires are used for farming.

Note:

- This model promotes reuse of waste tires
- Mixture of soil & compost requires for seed sowing in the tire
- Requirement of water is low & check wastage of water
- Easy relocation led to mitigate risk in emergency



Farming in community land

(Land Restoration Models)

Inter-cropping

Friendly vegetables are cultivated on same piece of land through inter cropping

Note:

- Utmost yield from same piece of land
- Alternative source of vegetables mitigates risks in emergency

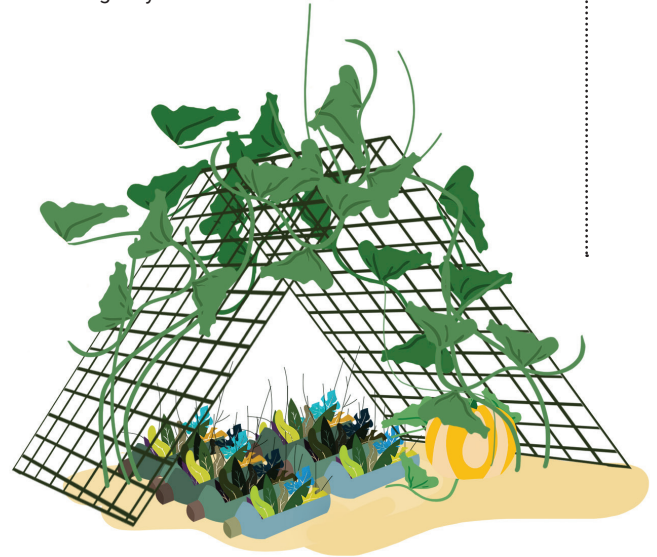


Multi-tier Cropping

Friendly vegetables are cultivated in different tires on same piece of land through trellis

Note:

- Utmost yield from same piece of land
- Alternative source of vegetables mitigates risks in emergency



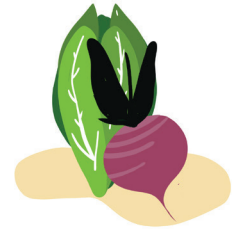
Things to remember

Enemy species

Some vegetables cannot grow together and are called enemy species. We should always be careful not to grow these vegetables together in the inter-cropping or multi-tier system. Some examples of enemy species are given below



turnip and tomato



lettuce with beetroot



pumpkin with broccoli



cabbage with raddish



tomato with potato

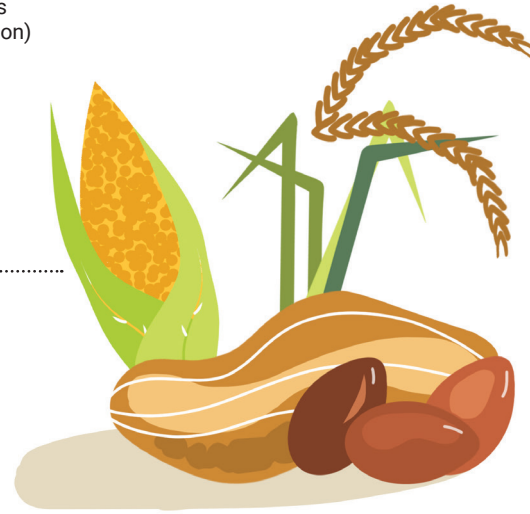


pumpkin with potato

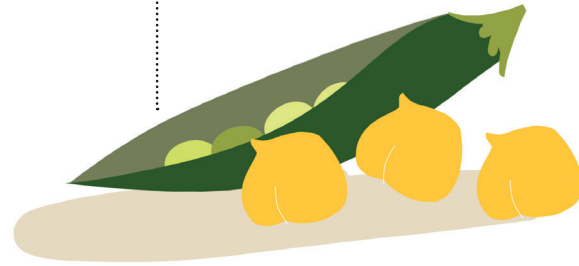
A list of Kharif (suitable for monsoon) and Rabi (suitable for winter) vegetables.

Vegetables List	
KHARIF Crops	RABI Crops
Kheksi	Mutter
Bhindi	Gobi (Phool and Pata)
Katthal	Beans
Bhutta	Mooli
Jimikand	Gaajar
Chukunder	Dhania
Kaddu	Paalak
Lauki	Aloo
Kheera	Bathua
Torai	Kakdi
Haldi	Hara Chana
Baingan	Churchuriya
Adrak	Karela
Chaurai	Barbati
Kundroo	Cholai
Lal Saag	
Pyaz	
Tamata	
Parval	
Methi	

Kharif Vegetables
(suitable for monsoon)



Rabi Vegetable
(suitable for winter)



Chapter 3

Irrigation

- Drip irrigation
- Ridges & furrows
- Trench & land shaping
- Rainwater Harvesting

Irrigation for the model in
community land/ basti
waste land

Irrigation for the model in
Household premises (space
saving model)

Bottle drip irrigation

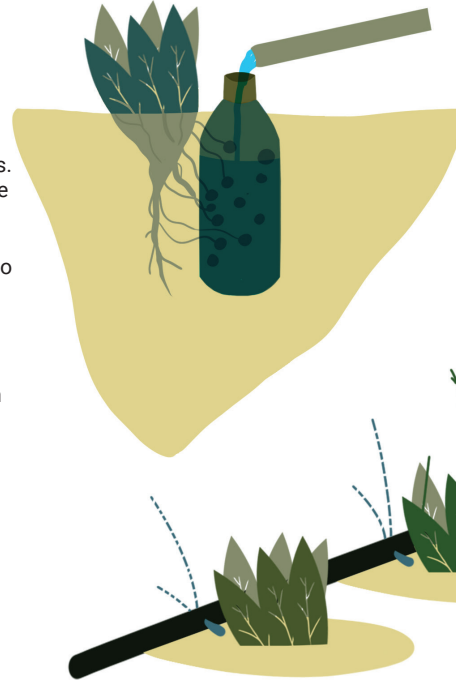


Bottle Drip Irrigation

Bottle drip irrigation is used for farming in the household & basti premises. Waste plastic bottles are perforated and used for watering over the day.

Note :

- Reuse of waste plastic bottles
- Make a small perforation on the edge of the bottle where the side & bottom meets.
- Fill up the bottle fully with water close the cap of the bottle
- Hang the bottle, tying by a rope from the cap and left hanging on top of the plant to water the soil
- Operate the cap to release the water droplets from the bottle as per the requirement
- The soil retains maximum moisture from bottle drip irrigation even in extreme summer



Drip Irrigation

Drip irrigation is used in the farming at basti premises.

Note:

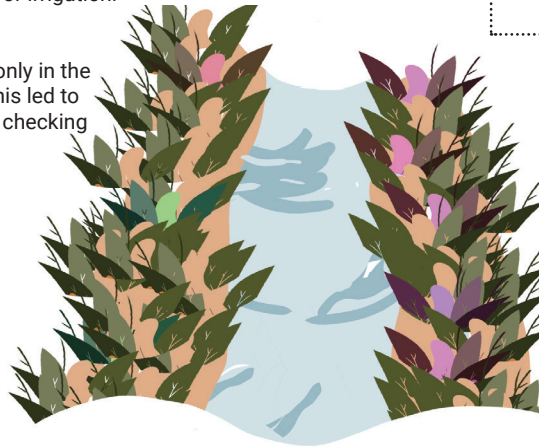
- Drip irrigation has the potential to check wastage of water by allowing the droplets slowly to the roots of plants, either from above the soil surface or buried below the surface.
- This model minimize the surface evaporation through allowing water directly into root zone, hence optimal utilization of water, mitigate risk of water scarcity
- This is a long lasting, cost effective model , requires mechanic for installation

Ridges & Furrows

Earthen ridges and troughs are created by the action of prolonged ploughing which caused soil to build up in regularly spaced ridges along the length of a field.

Earthen furrows are the long, narrow trenches made in the ground by a plough, especially for planting seeds or irrigation.

Note :
This irrigation is convenient only in the farming at basti premises. This led to optimum utilization of water, checking wastages.

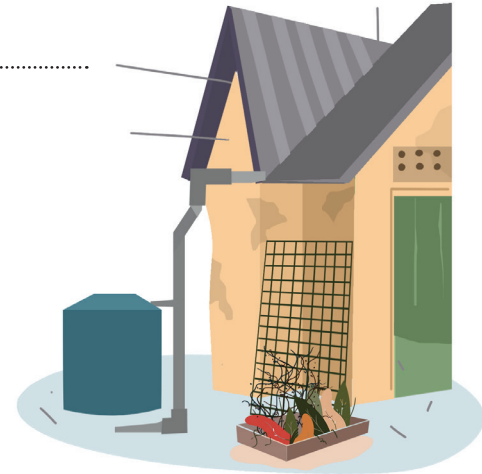


Rooftop Rainwater Harvesting

Storing or harvesting the rain water from the rooftop of the houses in the basti for reuse.

Note:

- The rain water will collect in storage vessel for future irrigation use.
- This irrigation mitigate risks of water scarcity .

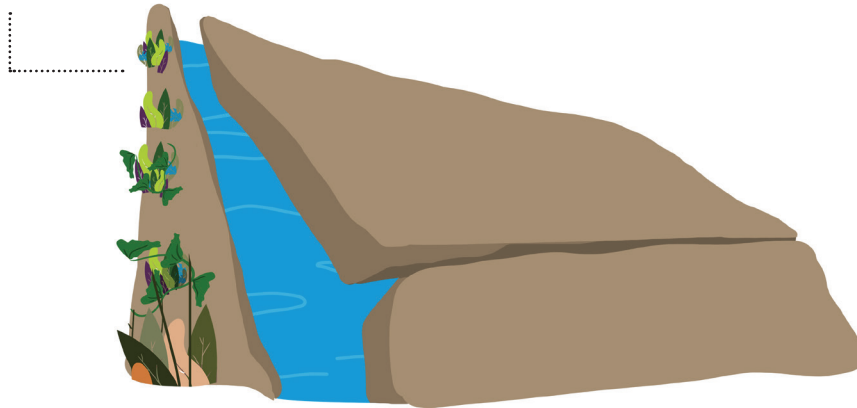


Trench & land shaping

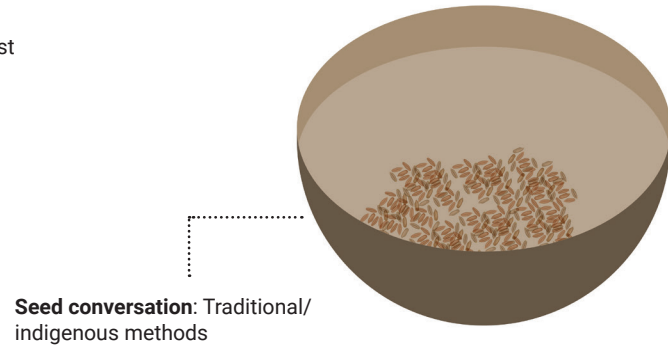
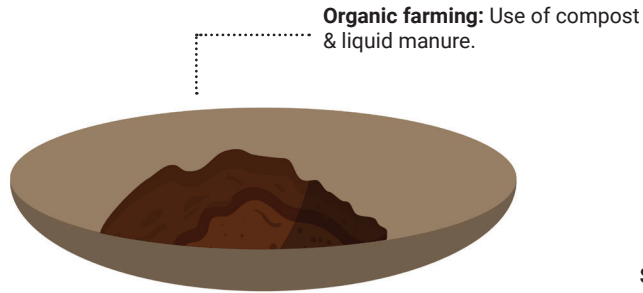
A trench is a type of excavation in the ground that is generally deeper than it is wide, and narrow compared with its length shaping of the farm land, which involves in modifying the surface of the farm land for harvesting of excess rain water as well as making the land surface suitably shaped for adoption of improved cultivation of diversified vegetables in the basti farm land.

Note:

- The trench & land shaping can enhance water or moisture retaining capacity of the soil and reduce soil erosion

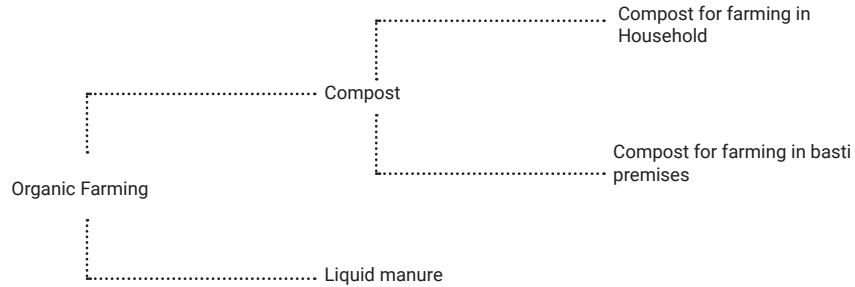


How to make Urban Farming long lasting



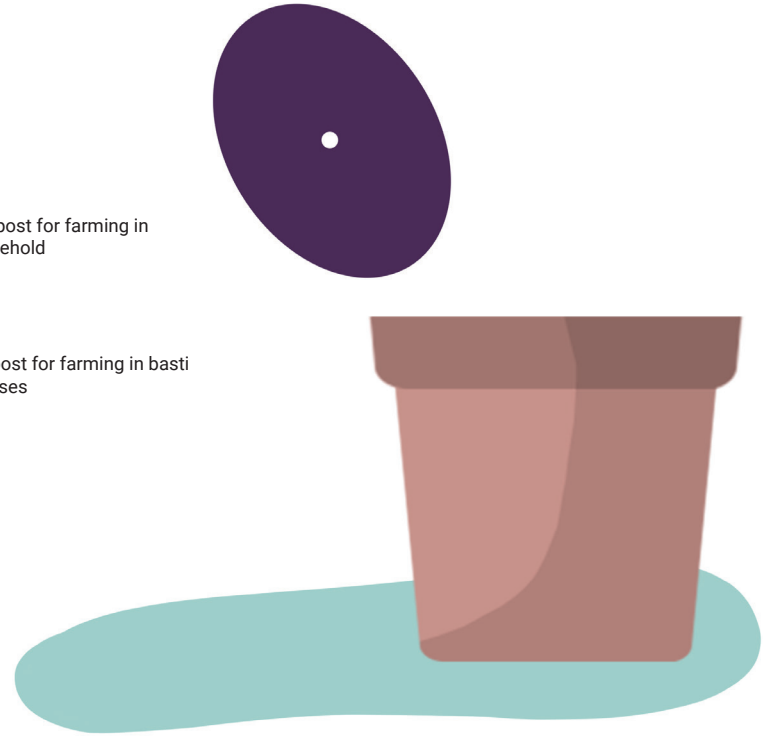
Chapter 4

Compost



In this module, we shall learn about two types of compost

- Household level compost
- Community level compost



Compost for Household Premises



Materials needed:

Below is the list of materials required to prepare compost in household premises

- Earthen pot with a small hole at the bottom, with proper lid
- Kitchen waste
- Dry leaves or straw

Process of composting:

- Keep the pot at a dry safe corner of the house. so that the depositions should avoid from bright sun light & rain.
- Put some dry leaves or straw on the bottom of the pot before putting the kitchen waste in.
- Collect & deposit the kitchen wastes in the earthen pot (medium size). The pot must be covered by the lid to avoid odour (smell).
- Every week, shake the pot to mix the waste material in it. If the waste gets very dry, you can sprinkle some water on it from time to time.
- After 2 weeks, you can put some dry cowdung on top of the deposition this is for quick

- decomposition
- After two months the deposits converted to dark black coloured household compost which is used during early morning or evening at dimmed light on the field three times in a week for two months for best results.

Kitchen Waste to be put in the Compost:

- Vegetable and fruit peels.
- Eggshells and fish scales,
- Tea leaves after use (without sugar)
- Other food waste

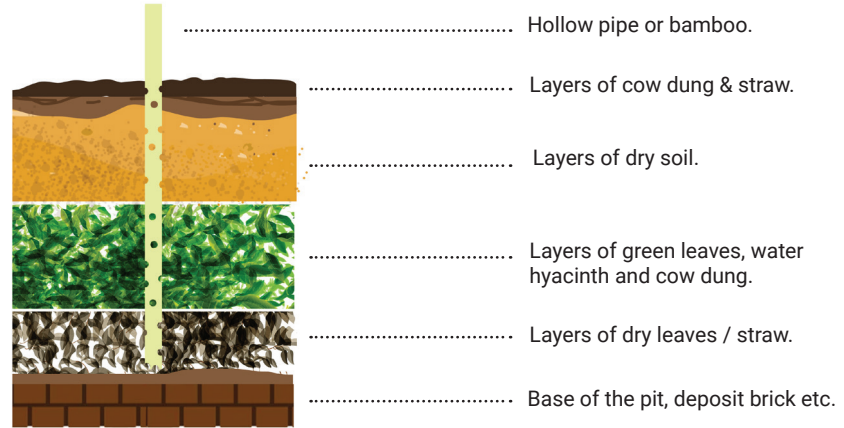
Kitchen waste that should NOT be put in the Compost:

- Oils and fats
- Ashes
- Slaughter waste, dead animals
- Plastic packets
- Vegetable peels with sharp smell, for example, onion, garlic peels etc

Compost for Community Land

Instructions:

- A (length 5 ft X breadth 3 ft X depth 3 ft) pit is dug behind the household kitchen or kitchen garden at a shady and moist upland. The pit should be at least 3 feet away from any surrounding trees.
- On the base of the pit, deposit brick lets & stone cheeps.
- The first layer consists of dry leaves / straw. A thick mixture of water & cow dung & cow urine is splashed over this layer and the mixture should completely cover the lower layer of dry leaves.
- The second layer consists of green leaves, water hyacinth & dry cow dung.
- The third layer consists of dry soil. The layers are enveloped by ash of cow dung & straw (oven ash) & mud depositions from pond



- Ventilation is to be allowed in the deposition by inserting a hollow pipe or bamboo which will help in decomposition. The depositions should avoid from bright sun light & rain.
- After two months the depositions converted to dark black coloured household compost which is used during early morning or evening at dimmed light thrice weekly for two months.

Things needed:

- Bricklets and stone chips
- Dry leaves and straw
- Wet (fresh) Cow Dung and Cow Urine
- Green Leaves
- Water Hyacinth
- Dry Cow dung
- Burnt Ash of cow dung and straw
- Water
- Pot to mix the ingredients
- Hollow pipe or bamboo

**Things to remember:**

- Sprinkle water on the compost pit if the temperature is very hot. Do not check inside the pit, only sprinkle water if the temperature outside is hot
- The compost pit will go down after a while as the material decomposes. Do not top up the pit with more layers over the ash and cement layer.

Guidelines for choosing the spot to dig the compost pit

- Shady Area / No direct sunlight/safe from rain.
- Spot should be in the corner of the basti where the community does not often come by.
- Should be at least 3-5 feet away from any trees.
- The mud where the pit should be dug should not be dry mud, it should be a little wet.
- Rainwater should not gather in that spot, it should be on a little height.
- It should not be at the edge of a lake
- The pit should not be deeper than 5 feet, others sunlight will not reach the lower layers.

Liquid Manure

(Amritpani)

Liquid manure is another type of manure that can be made with organic waste and can be used to improve soil quality and kill the pests. Liquid manure is also known as Amritpani.

Materials Required:

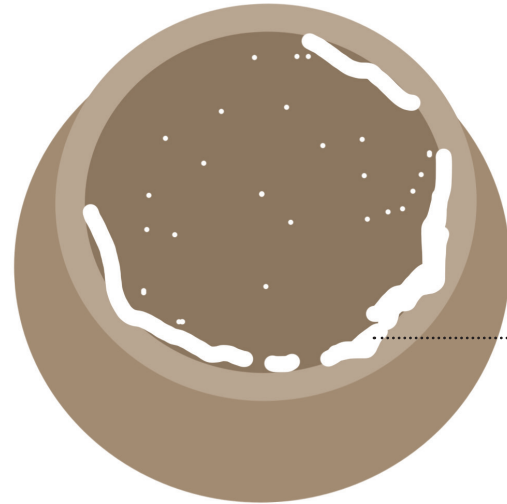
It requires 4 ingredients: Water, Cow Dung, Cow Urine and Jaggery

Process:

- In a clay pot, put water and cow dung in a ratio of 10:1 for example, if there are 10 litres of water, that will have 1 kilo of cow dung.
- Then pour in the same amount of cow urine. If there is 10 litres of water, then put 1 litre of cow urine.
- Then put jaggery at the rate of 1/4th the amount of cow urine i.e 250gm.
- Mix the liquid and keep it covered

Things to Remember:

- Be sure to only use fresh dung and fresh urine that is not more than one day old.
- A white fungal growth is observed after 2 weeks which indicates that the mixture 'Amritpani' is prepared.
- This mixture is used with water in 2:8 ratio thrice in a week for 2 months for healthy & effective growth of plants.



A **white fungal** growth seen after 2 weeks, indicating that the mixture is prepared

Chapter 5

Seed Conservation

General Guidelines

- The best time of day for seed collection, treatment & conservation is before 10 am and after 2pm when there is mild sunlight and when the dew has evaporated
- The seeds must be washed with water and sand separately in order. Avoid treating seeds with any chemicals or detergents. Winnowing is an ancient method by which the chaff is wafted away from the seeds after tossing into the air
- Do not allow the seeds to come into contact with the soil or ground, because such contact with soil will lower the quality of seeds. Use a strainer or a tray so that the seeds can be dried above the ground
- Do not expose the seeds to rain, uniform sun drying is the best one.
- Drying the seeds in the mild sun before 10 AM and after 2 PM is the most ideal way to dry seeds
- Use natural additives such as black piper, Eucalyptus bark, Cinnamon bark, Red chilies, Fenugreek, Neem leaves, Vitex, Turmeric rhizome, Mint leaves, Tobacco leaves etc to conserve seeds for long days.
- Dry airtight earthen pots are used for seed conservation.
- Milk powder is used for absorption of extra moisture from the seeds
- Soak the seeds in water held at a constant temperature of 50 degree Celsius or with a mixture of water & cow urine in 1:1 ratio for about 25 minutes. These are the best methods to treat seeds from pests & microbes
- If you conserve seeds in this manner, then the seeds can last as long as 3 years.



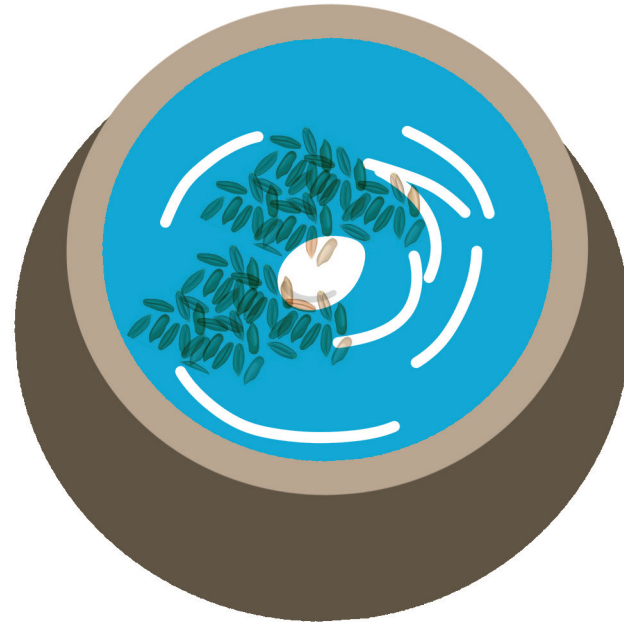
** Seed treatment to be done before 10 am and after 2 pm

Seed Treatment

Process 1:

Seeds need to be washed before being stored for conservation. For this, the bad seeds which have no germ-plasm have to be removed and separated from the good quality seeds which are appropriate for conservation and later use.

- Fill bucket of water with salt at the ratio of 1:10 (which means, if there are 10 litres of water, then 1 kg of salt should be used. If 5 litres of water then 500 grams of salt. This is done to see the saturation and super saturation of water
- Test the saturation levels of the water by placing an egg in the bucket. If the egg floats on the surface of the water, the water is saturated and suitable for use.
- Pour all the seeds into the bucket and wait for couple of minutes.
- The bad seeds will float on the surface. They should be collected and removed from the bucket.
- The good seeds will collect at the bottom of the bucket and should be collected and placed in a tray which should then be dried.



Process 2:

- Soak the seeds in water held at a constant temperature of 50 degree Celsius or with a mixture of water & cow urine in 1:1 ratio for about 25 minutes. These are the best methods to treat seeds from pests & microbes.

Traditional process to conserve seeds in airtight container

- Put the clean dry seeds in a large earthen pot after treatment.
- Light a candle and place it in the middle of the pot in a standing position.
- Seal the earthen pot with a lid and fasten the edges with wet mud so as to make the earthen pot completely airtight.
- The pot remains sealed and season ready to be planted for the next whether it be one year or six months. The seeds should not be used after a period of 3 years.
- The seed conservation strategy which is mentioned above is very useful. Milk powder can also be tied in a pouch and kept in the earthen pot with the seeds for better results.

TIMELINE CHARTS

Household Compost

		Weeks									
STEPS	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Onwards
Filling up of earthen pot with kitchen wastes		No more Household waste to be deposited after									
Mix dry cow dung & splash water when the pot gets filled.											
Keep the pot in dry & dark place, preferably at the corner of house											
Shuffle the waste in the earthen pot, splash water if the mixture gets dry, check the color in 1 weeks intervals											
The depositions converted to dark black colored household compost											
Use the compost at early morning or evening at dimmed light, thrice in a week for two months											

Liquid Manure (Amritpani)

	Weeks			
	1st	2nd	3rd	onwards
STEPS				
Prepare Amritpani mixture				
Close & keep the container in a shady moist place				
white fungal growth is observed				
Use the mixture as mentioned in manual for healthy & effective growth of plants				

Seed Conservation

	Weeks			
	1st	2nd	3rd	onwards
STEPS				
Collection of seeds				
Washing of Seeds				
Seed treatment				
Drying seeds				
Seed storage & preservation for using the seeds to next season				



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With its presence in 25 states and one Union Territory of India, IGSSS has set its thematic focus on promoting sustainable livelihoods, energising the youth as change makers, protecting lives, livelihood and assets from the impact of hazards, advocating for the rights of CityMakers (Urban Poor Residents) and developing a cadre of leaders from the community and civil society organisations. Gender and Youth are underlying themes across all its interventions.



Indo Global Social Service Society (IGSSS)
28, Lodhi Road, Institutional Area,
New Delhi - 110003 India