



Module 3

SYLLABUS:

Organic farming and waste management: usefulness of organic farming, wet waste management in neighboring villages, and implementation in the campus.

Organic farming focuses on locally grown products and large-scale use of local products and local wisdom. It excludes the need and demand for external fertilizers for crop production and management. Organic Farming also is known as “Organic Agriculture”.

The organic farming mainly relies upon:

- Crop rotations
- Use of crop residues
- Animal manures
- Bio fertilizers

Advantages of Organic Farming

- It helps to maintain environment health by reducing the level of pollution.
- It reduces human and animal health hazards by reducing the level of residues in the product.
- It helps in keeping agricultural production at a sustainable level.
- It reduces the cost of agricultural production and also improves the soil health.
- It ensures optimum utilization of natural resources for short-term benefit and helps in conserving them for future generation.
- It not only saves energy for both animal and machine, but also reduces risk of crop failure.

Objectives of Organic Farming

- Increase genetic diversity.
- Promote more usage of natural pesticides.



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- Ensure the right soil cultivation at the right time.
- Keep and build good soil structure and fertility.
- Control pests, diseases and weeds

Activity: On JANUARY 5TH 2023 the seeds were seeded in the pot with laterite soil which was mixed with Organic manure.

The following seeds were seeded.

1. Green gram
2. Chilly
3. Long beans
4. Tomato
5. Ladies Finger
6. spinach
7. Brinjal

The plants were bought from Green Mark Nursery Kodikal Mangalore. The owner and the care taker of the Nursery gave the information about the plant, climate and moisture conditions for the plants. Also suggested what manure can be used for the well growth of the plant.

1. Tomato plant:





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The tomato is the edible berry of the plant *Solanum lycopersicum*, commonly known as the tomato plant.

- They are vines that have a weak stem that sprawls and typically needs support. Indeterminate tomato plants are perennials in their native habitat, but are cultivated as annuals. (Determinate, or bush, plants are annuals that stop growing at a certain height and produce a crop all at once.) .
- The size of the tomato varies according to the cultivar, with a range of 1–10 cm (1/2–4 in) in width.
- Tomato plants are vines, initially decumbent, typically growing 180 cm (6 ft) or more above the ground if supported, although erect bush varieties have been bred, generally 100 cm (3 ft. 3 in) tall or shorter. Indeterminate types are "tender" perennials, dying manually in temperate climates (they are originally native to tropical highlands), although they can live up to three years in a greenhouse in some cases .



2. BRINJAL:

This bushy plant is a rich source of flavonoids, alkaloids, and other bioactive compounds Like arginine aspartic acids, etc. It has various common names such as Begun (in Bengali), Baigan (in Hindi), Vartaku (in Sanskrit), Vangi (in Marathi), and Brinjal (in English). It is confirmed that there are about 15-20 varieties of brinjals making them available in a wide variety of colours, shapes, and



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from various countries. Brinjals have many Ayurvedic medicinal properties; hence, they are also known as the Father of modern medicine



3. Long Beans: Long beans are usually green in color and have a slightly different taste and texture compared to other types of beans. They have a slightly sweet and nutty flavor and a firm and crunchy texture when cooked, making them a popular ingredient in many dishes, particularly in stir-fries and curries. Long beans are a good source of vitamins and minerals, particularly vitamin C, vitamin A, potassium, and iron. They are also low in calories and high in dietary fiber, making them a healthy addition to any diet. Long beans are easy to grow, and they can be grown in most types of soil and in a variety of climates. They are usually planted in the spring and summer and harvested in the fall. Long beans can be eaten cooked or raw, and they can be stored in the refrigerator for several days. Cucumber is a widely-cultivated





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4. Chilly:-

Health Benefits of Chilly:

- **Capsaicin** : Chilies have vitamin C and Vitamin A containing beta-carotenoids which are powerful antioxidant. These antioxidants destroy free radical bodies. Usually, these radical bodies may travel in the body and cause huge amounts of damage to cells..
Chilies have antioxidants that can destroy cholesterol which could cause major disease like atherosclerosis and other heart diseases. Other disease like cataract and arthritis like osteoarthritis and rheumatoid arthritis. It also dilates airway of lungs which reduces asthma.
- **Detoxicants** : Chilies acts as detoxifiers as they removes waste products from our body .
- **Pain killer** : Chilies stimulates the release of endorphins that are natural pain killers. It relieves pain caused due to shingles (Herpes Zoster), bursitis, diabetic neuropathy and muscle spasm in shoulders, and extremities. It also helps in relieving arthritic pains in the extremities.
- **Antibiotic** : Chilies brings fresh blood to the site of the infection. The fresh blood fights infection. The white blood cells and leukocytes present in the fresh blood fights viruses.
- **Brain** : Capsaicin stimulates brain to excrete endorphin and gives a sense of pleasure when ingested.





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5. Green Gram:-

Health Benefits of Green Gram:

- a. **Weight loss:-** Green gram is high in protein and fiber. The researcher reported that grams that are high in fiber increase cholecystokinin, a satiety hormone. Other studies show that consumption of green gram increases satiety. Daily consumption of green gram reduces food intake which helps in weight loss.
- b. **Lower blood pressure:-** It is a proven fact that grams are fat regulators. Furthermore, the presence of large amounts of magnesium makes it a very powerful blood pressure regulator. It maintains magnesium levels in the blood. Magnesium eases blood vessels and reduces high blood pressure. This helps to control the blood pressure in the body.
- c. **Helps fight cancer:-** Green gram keeps free radicals under control. These free radicals can be a result of anything like pollution, stress, unhealthy snacks and toxicity in the body. Abnormal cell growth can even lead to cancer. Green gram, which is a natural suppressor of free radicals and is a good option to keep cancer away.
- d. **Improves skin health :-** Green gram adds brightness to the skin. The presence of copper increases its use in various face creams. Using green gram as a scrub is also a good option. It is very easy to make a natural exfoliating face pack using green gram at home. Undoubtedly, it is one of the best natural scrubs you can use to brighten your skin.





6. Ladies finger / Okra Plant

Okra or Okro, *Abelmoschus esculentus*, known in many English-speaking countries as ladies' fingers or ochro, is a flowering plant in the mallow family. It has edible green seed pods. The geographical origin of okra is disputed, with supporters of West African, Ethiopian, Southeast Asian, and South Asian origins. Wikipedia

Scientific name: Abelmoschus esculentus

Order: Malvales

Rank: Species





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WASTE MANAGEMENT

Introduction

Material Recovery Facility (MRF) is located in 2 acres of land in Padavu of Nitte village, Karkala Taluk . It has the capacity of segregation of 10TPD . Its area is 10,000 square feet Equipped with 3 conveyor belts(shop floor, inclined and mezzanine floor) and baler machine, weighbridge, 7ton capacity vehicle. Dry waste from 42 Panchayaths are segregated into 25-30 categories . Around 25 staffs working here in 2 shifts.

Material Recovery Facility is a permanent project and is entrusted to Managala Resource Management (Start up of Ramakrishna Mission, Managlore) for 3 years.

Ever since it began operations on August 1, 2021, the Material Recovery Facility (MRF) Centre of Nitte Gram Panchayat (Karkala Taluk, Udupi district of Karnataka) has provided effective waste management services to 41 Gram Panchayats (GPs) in the Blocks of Karkala, Udupi, Kaup and Hebri that come under the purview of this project.

The project is supervised by the Zilla Panchayat of Udupi. While Saahas Zero Waste Private Limited provides technical guidance for project implementation, the operation of the facility is handled by Mangala Resource Management Private Limited, Mangalore.

Planning

We had to make sure to confirm the date and time, as well as any requirements or restrictions for visitors. Therefore we scheduled our visit at 9:00 AM on 9th February 2024.

We had to go to the MRF directly from our college, we all had college bus facility. 3-3-4 faculties from our college guided us.



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Data Collection

Once we reached the facility we wasted no time and immediately set off to explore the facility and gain more information and knowledge on waste management. We found out that the facility on an average generates 226 tons of waste per day. The facility handles all kinds of waste including household waste, industrial waste, hazardous waste, and organic waste. The majority being household waste.

A material recovery facility (MRF) accepts waste materials, whether source segregated or mixed, and further separates, processes and stores them for later use as raw materials for remanufacturing, reusing and reprocessing. Material Recovery Facility (MRF) is also known as Material Reclamation Facility or Material Recycling Facility. An MRF is a place where waste collected from the doorstep in a segregated manner is further segregated and various components of recyclable waste recovered from it for recycle or resale. The waste material is basically segregated into different streams of waste fractions (paper, plastic, packaging paper, bottles etc.)

which is sold to intermediaries who supply bulk material to the recycling industries. MRFs require medium to large storage spaces depending on their capacity to temporarily store sorted recyclables which can be made available to recyclers in bulk at higher resale value. In mechanized MRFs, the entire process is carried out with sophisticated systems and equipment that enable efficient separation of large quantity of material into different fractions. The main function of the MRF is to maximize the quantity of recyclables processed, while segregating materials that will generate the highest possible revenues from the recycling market. MRF also helps in segregating combustible fraction (RDF), non-recyclables and inert from the dry waste stream.

These fractions may be utilize/reused as –

- 1.) Recyclables – Reuse/ reprocessed
- 2.) Non-recyclables - Road making/ plastic to oil
- 3.) RDF - Waste to Energy/ Cement Industries
- 4.) Inert - C&D plant/ daily cover of SLF



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The facility mainly uses manual sorting as the sorting technique as it is a recycling facility. It also uses mechanical and landfill methods as it's sorting technique. This facility recycles nearly 20% of the waste collected, making it very efficient.

The major wastes recycled are

- Plastic Bottles & Containers
- Food & Beverage Cans
- Paper
- Flattened Cardboard & Paperboard
- Glass Bottles & Containers

Analysis

Need of Material Recovery Facility (MRF) :-

Municipal Solid Waste (MSW) is the trash or garbage that is discarded from various sources i.e., Domestic, Commercial, Institutional, Industrial/ Trade etc. in day to day activities. Waste management hierarchy indicates that the least preferred option of ISWM is disposal of waste in landfills. SWM 2016 rules do not permit disposal of organic matter into sanitary landfills and mandate that only inert rejects (residual waste) from processing facilities, inert street sweepings, etc. can be landfilled. All options of waste minimization should be utilized before appropriate treatment technologies are selected and implemented. With the aim to reduce the amount of waste being finally disposed, and maximizing resource recovery and efficiency, Material Recovery Facilities (MRFs) need to be established within the ULBs. A Material Recovery Facility (MRF) is an infrastructure to receive, sort, process and store recyclable/ non recyclables/ RDF and inert materials, with the aim to maximize the quantity of recyclables processed, while producing materials that will generate the highest possible revenues in the market and maximize the reuse of other segregated fraction in different processes/ industries. It is the responsibility of the ULB to set up material recovery facilities with enough space for sorting of recyclable materials as a follow up of source segregation of waste



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at-least as Dry and Wet waste in their SWM. MRFs serve as intermediate processing step between the collection of recyclable materials from waste generators and the sale of recyclable/ nonrecyclables/ RDF/inert materials to the recycling market and for other processes and industries .

Advantages of MRF :-

Recycling prevents a significant fraction of municipal, institutional and bulk waste from being dumped or disposed in landfills. It results in the availability of scarce resources as well as reducing environmental impacts and the burden of waste management on public authorities. If the necessary market mechanisms are established, recycling can generate revenue, contributing to the cost recovery in the municipal solid waste service provision. It helps the ULB by reducing waste volumes and results in cost savings in the collection, transportation and disposal infrastructure, longer life span for landfills/reduced requirement of land, reduced environmental management efforts and generates livelihood opportunities for informal, local vendors/recyclers in the recycling industry.

Objectives of the project:

- To provide centralised waste management services with limited human resource utilization.
- To derive maximum resources from the waste and prevent unscientific waste management while protecting the environment.
- To increase the efficiency of human resources by using simple machines.
- To dispose non-recyclable waste such as multi-layer plastics to cement factories.
- To dispose waste to authorized recycling centres .
- To provide efficient facilities, social security, and promote health and safety of workers.
- To maintain records on waste management.



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Process:

Dry waste collected door to door within the project area is brought to the solid waste management (SWM) centres where it is weighed and packed before loading onto the MRF station's waste collection vehicle every week. The waste thus collected is again weighed in the MRF centre and stored in the storage compartments.

It is then divided into about 25 to 30 sections with the help of a conveyer belt. The sorted waste is then bailed using a bailing machine. Recycled waste is sold to authorized recycling companies. Non-recyclable waste is transported to cement factories for the purpose of co-processing.

Unit capacity:

The MRF unit has a 1000 sq. ft building and is capable of handling 10 tonnes of waste per day. It has separate sections for waste storage, sorting and bailing units, in addition to an office, a security room, a rest room and toilet facility. Other amenities include a conveyor belt, a baling machine, a stacker, a fire safety facility, a generator, a CCTV, a 70-ton capacity way bridge and 7-ton capacity truck.



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Service charges:

A separate bank account for the MRF is being maintained by the Nitte GP into which GPs are required to deposit monthly service charge; the Chairman or Member Secretary are signatories to the account. An invoice is submitted to the Joint Committee and Multiple Gram Panchayats by the MRF Operator with supportive documents before the 5th of every month. The GPs are required to deposit service fees into the Bank Account of this Joint Committee within 7 days of receipt of the invoice.

Role of the GPs:

- To inform households, commercial establishments, and other waste producers about the procedure for waste segregation and collection, at their own cost
 - Wet waste and hazardous waste from households should be done at GP level
 - Segregate waste collected within their jurisdiction, store in dry units, ensure dry waste is odourless and deliver it to the MRF vehicle
 - Waste collected at GP level should be packed in bags
 - A vehicle should be available to transport waste to prevent waste dumping
 - If a GP wishes the MRF to collect bulk waste, the MRF operator should be notified two days in advance
- Timely payment of service fee to MRF operator. If waste collected is less than expected, 50 per cent of service fee needs to be paid



Process and Crushing



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Outcome and Impact:

- Quantity of waste collected has increased from 1-2 tons to 4-5 tons after MRF was setup
- Waste dumping and public littering has reduced enormously
- The project changed to a revenue neutral model after MRF operations began
- Awareness on scientific handling and disposal of different categories of waste has increased among the public
- MRF centre sells waste to authorized recyclers at higher rates
- The bailing system allows for bailing and selling of bulk quantities
- Non-recyclable waste is shipped to the cement companies
- Inclusion of unorganised entrepreneurs into a formal supply chain
- Creating an incentive for supply of good quality carton
- Better living standards and career in waste management for all staff employed through this project

- Safe equitable opportunities for women across all levels supported by policies to avoid any form of discrimination
- Optimal working conditions for workforce through best industrial practices and ensuring fair incentives .
- Creating an improved supply chain for reuse of carton with better price realisation
- Maximise resource recovery from waste .
- Responsible management of waste to ensure diversion from landfill .
- Reducing avoidable contamination through design for recycling.
- Scientific management of waste to reduce greenhouse gases .
- Reduce the negative effect of various operations and transportation of waste.
- Creating traceability to ensure diversion from landfill and open burning of waste.



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Conclusion

The visit to the waste management facility empowers students to become informed and proactive stewards of the environment, equipped with the knowledge and motivation to effect meaningful change in the world around them.

SUBJECT COORDINATOR

HOD