
WATER CONSERVATION TECHNIQUES

ROLE OF STAKEHOLDERS-IMPLEMENTATION

1.1 Introduction to water conservation:

Water conservation aims to sustainably manage the natural resource of fresh water, protect the hydrosphere, and meet current and future human demand. Water conservation makes it possible to avoid water scarcity. It covers all the policies, strategies and activities to reach these aims.

Population, household size and growth and affluence all affect how much water is used. Better water conservation and management has economic benefits and helps protect the environment. The more water you use, the more you pay for water and sewer service on a municipal water and sewer system. Excessive water use can overload both individual septic systems and municipal sewer systems, thereby resulting in untreated sewage contamination of fresh water supplies. Water conservation can extend the useful life of both community and individual household sewer systems. Excessive withdrawals of ground water can lead to salt water intrusion, a subtle environmental impact with long-lasting effects.

These areas are usually associated with large population centers or agriculture, where water use is high. Agriculture is our most essential industry, but it is also our largest consumer of fresh water. Water conservation and management will become bigger issues for agriculture and metropolitan areas as they compete for limited fresh water resources in the future. Water Conservation & Management (WCM) is a collaborated publishing project under VOLKSON PRESS and Zibeline International.

Although the earth is rich in water, only one percent is liquid fresh water, the form we require for our highest priority needs. The demands on this liquid fresh water are growing, and many scientists feel that a future shortage of fresh water will be eminent. Water conservation and management emphasizes water quality protection, a growing area of employment and environmental concern. Water conservation and management encompasses the policies, strategies and activities made to manage water as a sustainable resource, to protect the water environment, and to meet current and future human demand.

1.2 Aims:

The Aims of water conservation efforts include:

- With less than 1% of the world's water being freshwater, one aim is ensuring the availability of water for future generations where the withdrawal of freshwater from an ecosystem does not exceed its natural replacement rate.
- Energy conservation as water pumping, delivery, and wastewater treatment facilities consume a significant amount of energy. In some regions of the world, over 15% of the total electricity consumption is devoted to water management.
- Habitat conservation where minimizing human water usage helps to preserve freshwater habitats for local wildlife and migrating waterfowl, but also water quality.



1.1 Water Conservation Tank Chikkamagaluru

1.3 Methods of conserving water:

- Every drop of water counts, so make sure you are not wasting clean drinking water and you are not leaving any running tap
- Remember to use only the amount you actually need and not wasting the water unnecessarily. It has been found beneficial to form a group of water-conscious people at school, college or society level and encourage your friends and neighbours to be part of this group. Promote water conservation in community newsletters and on bulletin boards. Encourage your friends, neighbours and co-workers to also contribute.
- Plant more and more trees to increase transpiration.
- Encourage rainwater harvesting at the community level as well as municipal level.
- Make sure that your home is leak-free and there are no leaking taps or tanks storing water. Many homes have leaking pipes that go unnoticed. Call a plumber as soon as you notice any leakage.
- Do not leave the tap running while you are brushing your teeth or soaping your face.
- When washing the car, use water from a bucket and not a hosepipe which helps to reduce about 50% of the water used for washing your car.
- While watering your lawns do not waste water and use only the amount that is required.
- Do not throw away water that has been used for washing vegetables and use it to water plants or to clean the floors, etc.



Fig 1.2: Visited the Water Conservation Tank Place

1.4 Types and Techniques

- **Irrigation Scheduling** Irrigation system managers use irrigation schedules to determine the appropriate frequency and duration of watering. Water management takes into account the method of irrigation, as well as the amount, timing, and frequency of water application. Farmers regularly monitor weather forecasts, soil moisture, and plant conditions to adjust their irrigation schedules accordingly and prevent both under-watering and over-watering of their crops. This proactive approach helps optimise water use, ensuring that crops receive the right amount of water at the right time for optimal growth while avoiding water waste and potential negative impacts on plant health and productivity.
- **Rainwater Harvesting** Rainwater harvesting is augmenting natural rainwater filtration into underground formations with artificial methods. Percolation naturally recharges groundwater resources. However, due to indiscriminate development and rapid urbanization, the exposed surface for soil has decreased, resulting in a decrease in rainwater.
- **Grey Water recycling** ‘Greywater’ also known as Greywater or Sullage refers to all wastewater generated in buildings from streams without fecal contamination – i.e., all streams except for the wastewater from toilets. Greywater recycling, then, refers to the treatment of wastewater from appliances such as showers, baths and sinks, to be re-used and fed back into a property for non-potable purposes such as flushing toilets and irrigation.
- **Drip irrigation** Drip irrigation delivers water directly to the base of plants using a system of tubes and emitters. This method minimizes water wastage by providing a controlled and targeted supply, reducing evaporation and runoff. It is particularly effective in areas with limited water resources.
- **Cover Cropping** Planting cover crops during fallow periods helps improve soil structure and water retention. These cover crops protect the soil from erosion, enhance organic matter content, and reduce evaporation. Improved soil health contributes to better water infiltration and retention, benefiting overall water conservation efforts.
- **Dry Farming** Dry farming is a method of growing crops without relying on regular irrigation or abundant rainfall. Instead, farmers use techniques that make the most of the limited water available in arid or semi-arid regions. This involves selecting drought-resistant crops, using soil conservation practices, and relying on natural rainfall to sustain the crops.

- **Aeroponics and Hydroponics** Aeroponics and hydroponics are soilless cultivation techniques that use nutrient-rich water solutions to grow plants. These methods can significantly reduce water consumption compared to traditional soil-based farming. They provide precise control over water delivery, ensuring that plants receive the exact amount needed for optimal growth.
- **Organic Farming** Organic farming is a way of growing crops and raising animals without using synthetic chemicals like pesticides or fertilizers. Instead, it relies on natural processes and resources to maintain soil fertility, control pests, and promote healthy growth. Organic farmers use methods such as crop rotation, composting, and the use of organic materials to enhance soil quality.



Fig 1.3: Water storage tank

1.5 Challenges to Water Conservation in Farming:

Water conservation during farming is an essential ecological practice that needs to be efficiently managed. Water conservation faces several challenges. These challenges include the relationship between water resources and grain-production arrangement, agricultural water use efficiency, and farmland water conservancy investment. However, there are certain challenges that a farmer might face while conserving water while farming.

- **Climate change**

Climate change can be understood as unpredictable weather patterns caused by global warming. This in turn also impacts rainfall, which severely impacts the amount of water

required for agriculture. Farmers may witness droughts in cases of less rainfall, and excessive rainfall may also hamper overall agricultural growth. To maintain productivity, farmers need to adjust to these shifting conditions.

- **Depleting ground water**

Groundwater is depleting in many regions due to excessive extraction for irrigation. This inefficient use of groundwater impacts the fertility of soil as well. To solve this problem, sustainable groundwater management techniques are crucial.

- **Water pollution**

During farming processes, excessive use of fertilizer and pesticides flows through the water bodies near the farm, contaminating the water supply with dangerous chemicals. This is known as water pollution. This also impacts the quality of groundwater and surface water. The harmful effects of water pollution caused by pesticides and fertilizers can be reduced by using appropriate water conservation methods.

- **High Water Demand**

Agriculture is one of the largest consumers of freshwater globally, often accounting for a significant portion of total water use in many regions.

- **Traditional Irrigation Practices**

Many farmers still use inefficient irrigation methods such as flood irrigation, which can lead to substantial water wastage.

- **Lack of Infrastructure**

In some regions, there may be insufficient infrastructure for water storage, distribution, and efficient irrigation systems, hindering water conservation efforts.

- **Climate Variability**

Increasingly erratic weather patterns due to climate change can lead to unpredictable rainfall, droughts, or floods, affecting water availability and complicating water management.

1. Economic Constraints: Adopting water-efficient technologies and practices often requires initial investments that some farmers may find prohibitive, especially in developing regions.

- 2. Policy and Governance:** Inconsistent or inadequate water management policies and regulations can contribute to inefficient water use and allocation in agriculture.
- 3. Education and Awareness:** Lack of awareness among farmers about the importance of water conservation and the benefits of adopting efficient practices can impede widespread adoption.
- 4. Water Quality Concerns:** Pollution from agricultural runoff, pesticides, and fertilizers can degrade water quality, making it unsuitable for reuse or further agricultural use.
- 5. Agricultural Water Use:** Agriculture is a major consumer of water. Improving irrigation efficiency and promoting sustainable farming practices are essential but challenging due to the scale and diversity of agricultural systems.
- 6. Water Infrastructure:** Aging and inadequate water infrastructure in many areas can lead to significant water losses through leaks and inefficiencies.
- 7. Lack of Awareness and Education:** Many people are not aware of the importance of water conservation or lack the knowledge of practical ways to conserve water in their daily lives.
- 8. Technological and Financial Barriers:** Implementing advanced water-saving technologies and infrastructure upgrades requires significant investment and technological expertise, which may not be readily available in all regions.
- 9. Behavioural Change:** Encouraging individuals and communities to adopt water saving practices often requires overcoming ingrained habits and perceptions about water use.
- 10. Infrastructure:** Aging or inadequate water supply infrastructure can lead to leaks and inefficiencies, reducing the effectiveness of conservation efforts.
- 11. Economic Incentives:** In some cases, the financial benefits of water conservation measures may not be immediately apparent or compelling enough to motivate widespread adoption.
- 12. Policy and Regulation:** Inconsistent or insufficient regulations and enforcement can hinder efforts to manage water resources sustainably and promote conservation.

1.6 Benefits of Water Conservation Methods in Farming:

Water conservation in farming plays a pivotal role in sustainable resource management, safeguarding the longevity of water supplies for future generations. By adopting efficient water use strategies, farmers can save money by cutting down on irrigation and energy costs. This not only benefits individual farmers but also contributes to the overall economic sustainability of agricultural practices. Moreover, the implementation of water conservation measures enhances the climate resilience of agricultural systems.

• Environmental Protection

In addition to economic and climate-related advantages, water conservation contributes significantly to environmental protection. Practices such as reducing water runoff and minimizing soil erosion help safeguard water ecosystems from contamination, thereby preserving biodiversity and overall ecosystem health. The positive environmental impact extends beyond the immediate agricultural surroundings, fostering a more resilient and balanced natural environment.

• Improvement in Crop Yield

Effective water management also directly influences crop yields. Properly implemented water conservation measures enhance crop productivity, ensuring consistent and high-quality yields. This not only benefits farmers by securing their livelihoods but also plays a crucial role in global food security. By optimizing water use, agriculture can meet the growing demand for food sustainably, balancing the need for increased production with resource efficiency.

• Preservation of Freshwater Resources

Conserving water helps ensure there's enough freshwater available for current and future generations. As population grows and demand increases, preserving existing water sources becomes critical.

• Improved Water Quality

When water is used more efficiently, there is less runoff and soil erosion, which can help improve water quality in rivers, lakes, and other bodies of water. Reduced usage also lowers the amount of wastewater and pollutants entering the environment.

1.7 Importance of Water Conservation Methods in Farming:

The Importance of Water Conservation Methods in Farming is provided below:

- Conserving water in farming practices ensures the sustainability of agriculture by preserving water resources for future generations. It helps maintain a balance between the water needs of crops and the availability of water in the environment.
- Water conservation promotes efficient use of resources. By optimizing irrigation methods and reducing water wastage, farmers can maximize the productivity of their land and minimize the environmental impact associated with excessive water use.
- Efficient water management reduces the cost of water acquisition and irrigation for farmers. By using water wisely, farmers can enhance their economic viability, increase crop yields, and reduce expenses associated with excessive water consumption.
- Water conservation in farming helps preserve natural water ecosystems. Over extraction of water for agriculture can lead to the depletion of rivers, lakes, and aquifers, negatively impacting aquatic ecosystems and biodiversity.

Outcomes:

- Water conservation is a big thing and involves using water sources judiciously, but every little bit helps, every drop that you save counts so don't think that what you do doesn't matter.
- A whole lot of people doing a little bit adds up to a big total. We must all make some little changes in our lifestyles that will change the course of our water. It takes just a small amount of motivation and willingness to bring about a change which brings in some great results and a huge amount of satisfaction.
- Water conservation needs to be a way of life, not just something we think about once in a while. If we all do our part in conserving water, we can make a huge difference.

Objectives:

The objective of a successful water management strategy is to ensure the availability of sufficient water of adequate quality to cover all water needs, including drinking, sanitation, agriculture, and ancillary food production, energy generation, inland water transport, etc.

Water conservation aims to sustainably manage the natural resource of fresh water, protect the hydrosphere, and meet current and future human demand. Water conservation makes it possible to avoid water scarcity. It covers all the policies, strategies and activities to reach these aims. Population, household size and growth and affluence all affect how much water is used.

Climate change and other factors have increased pressure on natural water resources. This is especially the case in manufacturing and agricultural irrigation. Many countries have successfully implemented policies to conserve water conservation. There are several key activities to conserve water. One is beneficial reduction in water loss, use and waste of resources. Another is avoiding any damage to water quality. A third is improving water management practices that reduce the use or enhance the beneficial use of water.

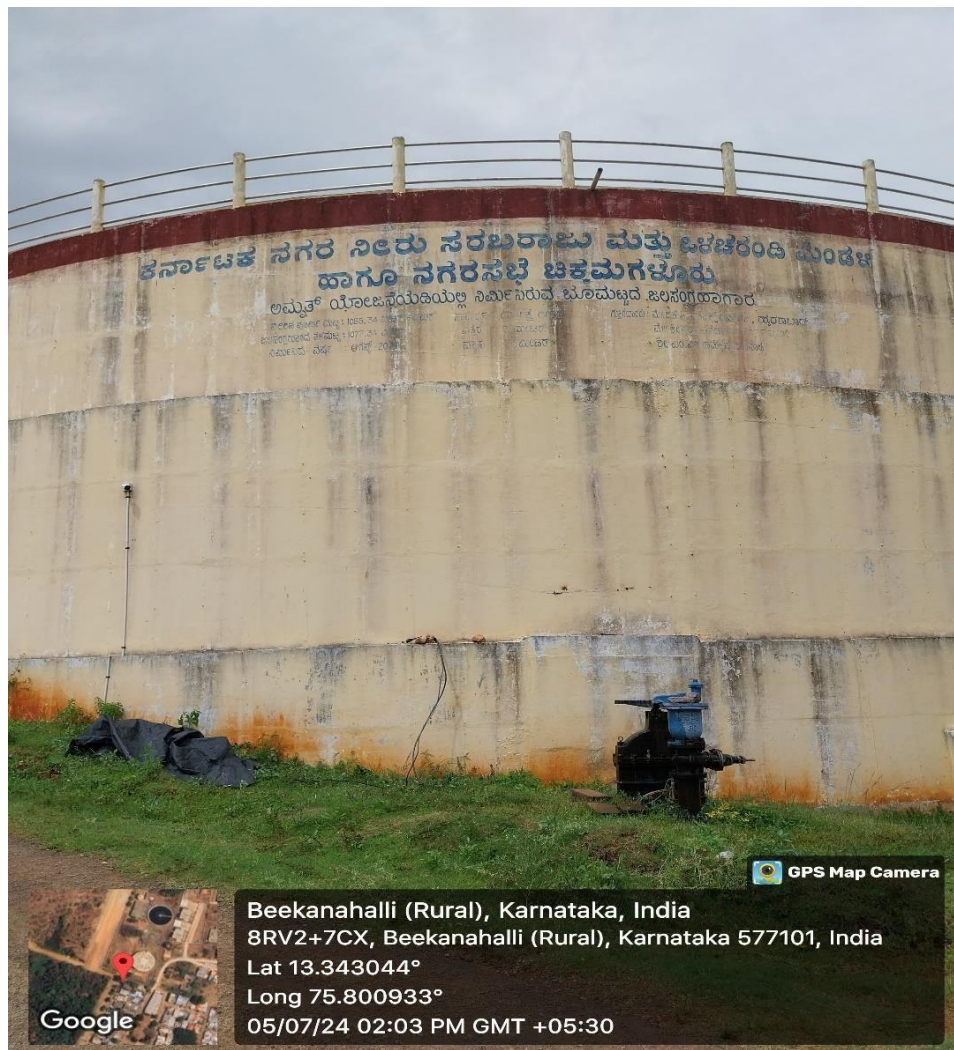


Fig 1.4: Water Conservation Tank

ROLE OF STAKEHOLDERS IN WATER CONSERVATION:

Government Agencies:

- Develop and enforce water conservation policies, regulations, and laws.
- Provide funding and resources for water-saving initiatives and projects.
- Educate the public about water conservation importance through awareness campaigns.
- Encourage water-efficient practices in government buildings and operations.
- Support research and development of new water-saving technologies.
- Collaborate with other stakeholders to develop water conservation plans and strategies.

Water Utilities:

- Implement water-saving technologies and practices in water treatment and distribution systems.
- Promote water efficiency programs to customers, such as rebates and incentives.
- Monitor and report water usage data to identify areas for improvement.
- Develop water conservation plans and strategies.
- Educate customers about water-saving practices and technologies.

Farmers and Agricultural Industry:

- Implement water-efficient irrigation systems and practices, such as drip irrigation and crop rotation.
- Use drought-resistant crops and soil conservation methods.
- Participate in water conservation programs and initiatives, such as water-saving technologies and practices.
- Implement water harvesting and storage systems.
- Promote water conservation among farming communities.

Businesses and Industry:

- Implement water-saving measures in operations and production processes.
- Invest in water-efficient technologies and practices, such as water recycling and reuse.
- Promote water conservation among employees and customers.
- Develop water conservation plans and strategies.
- Support water conservation initiatives and projects.

Communities and Individuals:

- Adopt water-saving habits and practices in daily life, such as fixing leaks and using water efficient appliances.
- Install water-efficient appliances and fixtures, such as low-flow toilets and showerheads.
- Participate in community water conservation programs and initiatives.
- Educate friends and family about water conservation importance.
- Support water conservation policies and initiatives.

NGOs and Civil Society Organizations:

- Raise awareness about water conservation importance through campaigns and events.
- Promote water-saving practices and technologies.
- Support water conservation projects and initiatives Collaborate with other stakeholders to develop water conservation plans and strategies.
- Advocate for water conservation policies and regulations.

Collaboration and Engagement:

Stakeholders should collaborate and engage with each other to:

- Share knowledge and best practices.
- Develop joint water conservation initiatives.
- Support water conservation policies and programs.

- Educate and raise awareness about water conservation importance.
- Develop water conservation plans and strategies.

By working together, stakeholders can effectively promote water conservation and ensure a sustainable water future.

Implementation of water conservation strategies requires:

1. Collaboration: Stakeholders must work together to share knowledge, resources, and best practices.
2. Education and Awareness: Educating the public about the importance of water conservation and promoting water-saving practices.
3. Policy and Regulation: Implementing and enforcing water conservation policies and regulations.
4. Technological Innovation: Adopting water-saving technologies and practices.
5. Community Engagement: Encouraging community involvement in water conservation efforts.
6. Monitoring and Evaluation: Regularly monitoring and evaluating water conservation efforts to identify areas for improvement.

By working together and implementing these strategies, we can:

- Reduce water waste and scarcity.
- Protect aquatic ecosystems.
- Support economic growth and development.
- Ensure a sustainable water future for generations to come.

CONCLUSION

Water conservation is a critical aspect of ensuring a sustainable future for our planet. The role of stakeholders, including government agencies, water utilities, farmers, businesses, communities, and individuals, is crucial in implementing effective water conservation measures.

Water conservation is a critical imperative for a sustainable future, and its success hinges on the collaborative efforts of diverse stakeholders. Government agencies, water utilities, farmers, businesses, communities, and individuals must work together to implement effective strategies that promote water efficiency, reduce waste, and protect aquatic ecosystems. By leveraging education and awareness, policy and regulation, technological innovation, community engagement, and monitoring and evaluation, we can ensure a water-secure future that supports economic growth, social well-being, and environmental health. Through collective action and a shared commitment to water conservation, we can mitigate the global water crisis and create a more sustainable world for generations to come.

ACTIVITY 1

ORGANIC FARMING, INDIAN AGRICULTURE (PAST, PRESENT AND FUTURE) CONNECTIVITY FOR MARKETING

Introduction:

Organic farming can be defined as an agricultural process that uses biological fertilizers and pest control acquired from animal or plant waste. Organic farming was actually initiated as an answer to the environmental sufferings caused by the use of chemical pesticides and synthetic fertilizers.

Organic agriculture is characterized by two main features, which are the recycling of nutrients and natural means of pest and disease control according to both traditional and modern scientific knowledge. In simpler words, it defines as a farming method of growing and nurturing crops in a natural way. It basically involves the use of green manure, compost, biological pest control, and more.

The major Organic Farming Practices:

Crop Rotation: The crop rotation method refers to changing species of crop year by year in the same field. This method prevents soil erosion, eradicates pest and weed infestation. Crop rotation of one of the most beneficial agriculture practices ensures an increase in crop yield.

Cover Cropping: As you might probably get an idea, these are plants that cover the soil for a certain reason. Unlike other crops, they improve the health of the soil, boost yield and use to feed the cattle. However, cover crops help to prevent soil erosion, regulate moisture, pest management and a rich source of green manure.

Organic farming refers to the management and agriculture production system that natural material, avoiding synthetic substances to maintain the fertility of the soil and environmental damage.

To gain more information and knowledge about organic farming we visited....



Types of Organic Farming:

Organic farming is divided into two types, namely:

- Pure organic farming
- Integrated organic farming
- Pure organic farming: Means avoiding all unnatural chemicals. In this process of farming, all the fertilizers and pesticides are obtained from natural sources such as bone meal or blood meal.
- Integrated organic farming: Includes the integration of pest management and nutrients management to achieve ecological requirements and demands.

Organic Farming and its Benefits:

(Talk by SOMSHEKAR SIR!)

- Reduced Pollution

Organic farming has environmental benefits that reduce pollution. *"The environmental benefits attributable to reduced chemical inputs, less soil erosion, water conservation, and improved soil organic matter and biodiversity were consistently greater in the organic systems than in the conventional systems".*

Organic farming focuses on enriching the soil natural additives. Because of the healthier soil, organic farming Fig reduces runoff and therefore creates a lower risk of polluting waterways. The absence of harmful pesticide and fertilizer sprays result in a cleaner atmosphere.

- Lower Energy Use

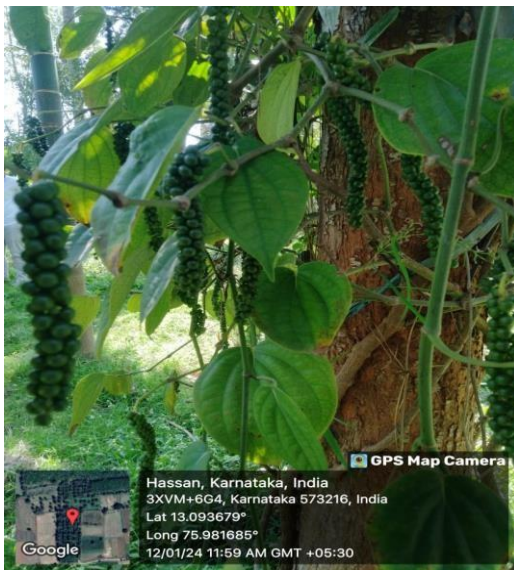
Another environmental benefit of organic farming is the reduction of energy use. Some popular crops such as con require nitrogen rich soil which is a high energy use product if farmed in conventional ways. Conventional farming achieves this by heavily spraying with nitrogen rich fertilizers. Energy calculations begin with the manufacture and transportation of these products In addition, the use of equipment for repeated applications of the less effective fertilizer result in an overall higher energy need than that of organic farming. Organic farming achieves the nitrogen rich soil, instead, by using composted manure and the use of cover crops.

- Economical:

In organic farming, no expensive fertilizers, pesticides, or HYV seeds are required for the plantation of crops. Therefore, there is no extra expense.

- Good return on Investment:

With the usage of cheaper and local inputs, a farmer can make a good return on investments.



- High demand:

There is a huge demand for organic products in India and across the globe, which generates more income through export.

- Nutritional:

As compared to chemical and fertilizer utilized products, organic products are more nutritional, tasty, and good for health.

- Environment-friendly:

The farming of organic products is free of chemicals and fertilizers, so it does not harm the





WASTE MANAGEMENT:

Waste management or **waste disposal** includes the processes and actions required to manage waste from its inception to its final disposal. This includes the collection, transport treatment and disposal of waste, together with monitoring and regulation of the waste management process and waste-related laws, technologies, economic mechanisms.

Waste can be solid, liquid, or gases and each type has different methods of disposal and management. Waste management deals with all types of waste, including industrial, biological, household, municipal, organic, biomedical, radioactive wastes, In some cases, waste can pose a threat to human health.

Health issues can also arise indirectly or directly. Directly through the handling of solid waste, and indirectly through the consumption of water, soil and food. Waste is produced by human activity, for example, the extraction and processing of raw materials, Waste management is intended to reduce adverse effects of waste on human health, the environment, planetary resources and aesthetics.

The aim of waste management is to reduce the dangerous effects of such waste on the environment and human health. A big part of waste management deals with municipal, commercial, and household activity.

Bio gas Waste Management

Biogas is also known as gobar-gas. The gases produced by anaerobic decomposition of organic matter such as manure, municipal waste, plant material, agricultural waste, cow dung sewage, food waste, green waste etc are called biogas. Thus, biogas is not one gas but it is a mixture of gases

Carbon dioxide and methane make up the majority of biogas. It is a source of renewable energy. Biogas is created when organic matter decomposes through anaerobic digestion. In the absence of oxygen, microbes break down the plant or animal waste releasing gases such as carbon dioxide and methane. Renewable energy sources are gaining popularity around the world. Biogas output is gradually increasing as more people set up biogas plants to generate fuel.



Cow dung is the main source for production of biogas as it contains many bacteria naturally which help in anaerobic decomposition of organic matter. This is the reason biogas is called gobar-gas. Cow dung contains methanobacterium which is found in the rumen of the cow's digestive system. Methanobacterium not only produces methane gas but manure as well by decomposition of bio waste.

Composition of Biogas

Composition of biogas may vary according to the substrate used and conditions available in anaerobic decomposition of substrate. It contains methane, carbon dioxide, nitrogen, hydrogen sulfide and oxygen.

Typical composition of biogas with percentage of its constituent gases can be written as follows

Gases	Formula	Percentage present
Methane	CH ₄	50-70
Carbon dioxide	CO ₂	25-50
Nitrogen	N ₂	0-9
Hydrogen	H ₂	0-1
Hydrogen sulfide	H ₂ S	0.1-0.5
Oxygen	O ₂	0-0.5

Apart from these gases we find water vapour also in biogas. The amount of water vapor depends on temperature, moisture present in the substrate mixture.

Production of Biogas:

Bio-digestion produces non-polluting gas that actually reduces greenhouse emissions and hence the greenhouse effect. Because there is no combustion involved in the process, there are no greenhouse gas emissions into the environment, hence, using waste gas as a source of energy is an excellent strategy to counteract global warming, Protection of the environment is, unsurprisingly, a major driver for the increased usage of biogas. Biogas facilities help to reduce greenhouse gas emissions by capturing and utilizing this dangerous gas as a fuel. Biogas production helps to reduce reliance on fossil fuels like oil and coal.

Production of biogas has been done since ages. It is a very old method of producing fuel and manure using mainly agricultural waste and cow dung. It is done by the reaction of microorganisms such as methanogens (archaeans) and bacteria. Production of biogas basically is the fermentation of biomass which is done anaerobically in presence of moisture.

It is generally produced at the small scale in rural areas where agriculture is the main profession. An anaerobic digester that treats cow dung and other agricultural waste is called a bio gas plant. It is generally made up of brick and cement.

Typically, it has following parts-

- Mixing tank
- Inlet chambers
- Digester
- Outlet chambers
- Overflow tank

Mixing tank-It is a medium size tank, made up of brick and cement at a her got. In this tank cow dung, agricultural waste and other the mass is collected and mixed with water

Inlet chamber - It is a larger size tank than mixing tank. It is also made up of brick and cement. It connects the mixing tank to the digester.

Digester- It is the largest chamber of biogas plants where the process of anaerobic fermentation takes place. It has a valve on the top from where the produced biogas is released according to the requirement.

Outlet Chamber It is linked to the digester. It collects slurry and manure after fermentation.

Working of biogas plants-Cow dung, dead plants, agricultural waste, food waste etc various forms of biomass are mixed with an equal amount of water in the mixing chamber or tank. This mixture is called slurry. Now this slurry is moved into the digester through the inlet chamber. When the digester is almost half filled with slurry, the introduction of slurry is stopped. Digester is closed and oxygen is prevented from entering the digester to let the fermentation process take place actively, pH level in digester should be neutral or seven while temperature should be 30-35°C for maximum yield. Now the plant is left unused for about 2 months. During these two months anaerobic decomposition of organic matter or fermentation takes place. Eubacteria convert organic material into organic acids, alcohols, acetate, carbon dioxide and hydrogen gas. A chateaus produce methane by using acetate or carbon dioxide and hydrogen gas.

Need of Organic Farming

- ✓ Increase in population make compulsion to stabilize agricultural production, but to, increase it further, in sustainable manner
- ✓ Natural balance needs to be maintained at all cost for existence of life and property.
- ✓ Agrochemical which are produced from fossil fuel and are not renewable and are diminishing in availability.

Outcome:

- ❖ Farmers can reduce their production costs because they do not need to buy expensive chemicals and fertilizers.
- ❖ Healthier farm workers.
- ❖ They improve plant growth and physiological activities of plants.
- ❖ In the long term organic farms save energy and protect the environment.

ACTIVITY 2

WASTE MANAGEMENT- PUBLIC, PRIVATE AND GOVT ORGANIZATION, 5R'S

INTRODUCTION

A waste can be defined as any unwanted and useless material. The waste can be either solid, liquid or gaseous. Liquid water is a mixture of sewage, water from household use, water used in commercial and industrial application etc. Wastewater contains a variety of biological and chemical pollutants which make it unsafe for humans and the environment. The objective of wastewater treatment is to remove or modify these pollutant, so that it can be safely discharge int the environment.



Waste management encompasses a series of processes designed to handle, treat, and dispose of waste in a manner that minimizes its impact on the environment and public health

Waste Generation: Waste is generated from various sources, including households, businesses, industries, and institutions. This waste can be categorized into different types such as municipal solidwaste, industrial waste, hazardous waste, and organic waste.

Waste Collection: Collection involves the gathering of waste from its point of origin, typically through municipal or private waste collection services. Waste may be collected from curbside bins, dumpsters, or specialized containers depending on the type of waste and local regulations.

Transportation: Collected waste is then transported to treatment facilities or disposal sites. Transportation methods vary and may include trucks, trains, barges, or pipelines depending on the distance and type of waste being transported.

Waste Treatment: Waste treatment aims to reduce the volume and toxicity of waste, as well as recover valuable resources. Treatment methods include sorting, shredding, composting, anaerobic digestion, recycling, and incineration. These processes help separate recyclable materials from non-recyclable waste, convert organic waste into compost or energy, and treat hazardous waste to minimize environmental and health risks.

Recycling: Recycling involves the conversion of waste materials into new products or raw materials. Common recyclable materials include paper, glass, plastic, metal, and electronics. Recycling helps conserve natural resources, reduce energy consumption, and decrease the amount of waste sent to landfills or incinerators.

Disposal: Disposal is the final step in waste management and involves the safe and environmentally sound disposal of non-recyclable or residual waste. Landfills are the most common disposal method for solid waste, where waste is compacted and buried in designated landfill sites. Hazardous waste may require specialized treatment and disposal facilities to prevent contamination of soil, water, and air.

Regulation and Compliance: Waste management is subject to regulations and standards at the local, national, and international levels.

TYPES AND TECHNIQUES

Waste management encompasses various types and techniques aimed at efficiently handling different types of waste while minimizing environmental impact and maximizing resource recovery.

- **Source reduction:** Also known as waste prevention or minimization, source reduction involves reducing the amount of waste generated at the source by adopting practices such as product redesign, packaging optimization, and reuse of materials. By minimizing waste generation, source reduction helps conserve resources and reduce environmental pollution.
- **Reuse:** Reuse involves extending the lifespan of products or materials by using them multiple times for the same or different purposes. Common examples of reuse include using refillable containers, repairing or refurbishing products, and donating or selling items for secondhand use. Reuse helps conserve resources and reduce the need for new production.
- **Recycling:** Recycling involves collecting, sorting, processing, and transforming waste materials into new products or raw materials that can be used in manufacturing processes. Common recyclable materials include paper, glass, plastics, metals, and textiles. Recycling helps conserve natural resources, reduce energy consumption, and mitigate environmental pollution.

Composting: Composting is the process of decomposing organic waste materials such as food

- scraps, yard waste, and agricultural residues into nutrient-rich compost through microbial activity. Compost can be used as a soil amendment to improve soil fertility, structure, and moisture retention in agriculture, landscaping, and gardening applications.
- Waste-to-energy (WTE) conversion: Waste-to-energy conversion technologies such as incineration, anaerobic digestion, and thermal gasification are used to convert waste materials into heat, electricity, or biofuels. WTE facilities can help reduce the volume of waste sent to landfills, recover energy from waste streams, and generate renewable energy.

USES AND BENEFITS OF WASTE MANAGEMENT

Waste management plays a crucial role in maintaining environmental sustainability, public health, and resource conservation.

- Environmental protection: Proper waste management helps prevent environmental pollution by minimizing the release of hazardous substances, contaminants, and greenhouse gases into the air, water, and soil.
- Resource conservation: Waste management promotes resource conservation by recovering valuable materials from waste streams through recycling, reuse, and recovery processes.
- Public health: Proper waste management protects public health by minimizing exposure to hazardous substances, pathogens, and pollutants present in waste materials.
- Economic benefits: Waste management generates economic value through job creation, revenue generation, and cost savings associated with resource recovery, recycling, and energy production.
- Community well-being: Well-managed waste systems enhance the quality of life and well-being of communities by improving sanitation, reducing environmental hazards, and enhancing aesthetic appeal.

5 R's AND ITS USAGE

The 5R's represent a hierarchy of waste management strategies aimed at reducing waste generation, conserving resources, and promoting environmental sustainability.

- Refuse: Refusing unnecessary or excessive consumption of goods and materials is the first step in the waste management hierarchy
- Reduce: Reducing consumption and minimizing the use of resources is the next step in waste reduction. This involves making conscious choices to purchase products with minimal packaging, opting for durable and long-lasting items, and avoiding over consumption of goods and services.
- Reuse: Reusing products and materials instead of disposing of them after a single use is an effective way to extend their lifespan and minimize waste. This can include repairing, refurbishing,

or re-purposing items.

- **Recycle:** Recycling involves collecting, sorting, and processing waste materials to produce new products or raw materials. By separating recyclable materials such as paper, glass, plastics, and metals from the waste stream, individuals can divert valuable resources from landfills and conserve energy and natural resources.

A sewage treatment plant is a facility designed to treat wastewater generated from domestic, commercial, and industrial sources before it is discharged back into the environment. The primary goal of sewage treatment is to remove contaminants and pollutants from the wastewater to protect public health and the environment. Here's an overview of the components and processes typically found in a sewage treatment plant:

1. **Preliminary treatment:** The wastewater undergoes preliminary treatment to remove large objects, such as debris, trash, and grit, through processes such as screening and grit removal. This helps protect downstream equipment and prevents blockages in the treatment process.
2. **Primary treatment:** In the primary treatment stage, the wastewater flows into settling tanks, where suspended solids and organic matter settle to the bottom as sludge, while oils and grease float to the surface and are skimmed off. This process, known as sedimentation or clarification, helps reduce the concentration of solids and pollutants in the wastewater.
3. **Secondary treatment:** After primary treatment, the wastewater undergoes biological treatment in secondary treatment tanks. This typically involves the use of biological processes such as activated sludge, trickling filters, or constructed wetlands, where microorganisms break down organic matter and nutrients in the wastewater. Secondary treatment helps further reduce the concentration of pollutants, including organic compounds, nitrogen, and phosphorus.
4. **Tertiary treatment:** Some sewage treatment plants include tertiary treatment processes to further polish the treated wastewater and remove remaining contaminants. Tertiary treatment may involve additional filtration, disinfection, or advanced treatment technologies such as membrane filtration, UV disinfection, or chemical precipitation to improve water quality before discharge.
5. **Sludge treatment and disposal:** The sludge generated during the treatment process is typically treated separately to stabilize and de-water it before disposal. Sludge treatment may involve processes such as anaerobic digestion, aerobic digestion, or mechanical de-watering to reduce its volume and stabilize organic matter. The treated sludge can be reused as fertilizer, incinerated, or disposed of in a landfill, depending on local regulations and environmental considerations.

6. Effluent discharge: The treated wastewater, known as effluent, is discharged into receiving water bodies such as rivers, lakes, or oceans, or reused for non-potable purposes such as irrigation, industrial cooling, or groundwater recharge. Effluent discharge must comply with regulatory standards and permit limits to protect water quality and aquatic ecosystems.

OUTCOME

The outcomes of effective waste management are diverse and encompass various environmental, social, and economic benefits. Here are some of the key outcomes:

- **Environmental protection:** Effective waste management helps protect the environment by minimizing pollution, conserving natural resources, and reducing greenhouse gas emissions. By properly disposing of waste and implementing recycling and resource recovery programs, waste management prevents contamination of air, water, and soil, preserves ecosystems, and mitigates climate change impacts.
- **Resource conservation:** Waste management promotes resource conservation by recovering valuable materials from waste streams through recycling, reuse, and recovery processes. By diverting waste from landfills and incinerators and recycling materials such as paper, glass, plastics, and metals, waste management conserves natural resources, reduces energy consumption, and minimizes the environmental footprint of resource extraction and production.
- **Energy recovery:** Waste-to-energy (WTE) conversion technologies harness the energy content of waste materials to generate heat, electricity, or biofuels. By recovering energy from waste streams, WTE facilities reduce reliance on fossil fuels, offset energy consumption, and contribute to renewable energy production, thereby mitigating greenhouse gas emissions and promoting energy independence and security.
- **Public health and safety:** Effective waste management protects public health and safety by minimizing exposure to hazardous substances, pathogens, and pollutants present in waste materials.
- **Economic benefits:** Waste management generates economic value through job creation, revenue generation, and cost savings associated with resource recovery, recycling, and energy production. By creating opportunities for green jobs, promoting innovation, and reducing waste disposal costs, effective waste management contributes to economic growth, competitiveness, and sustainability.
- **Community well-being:** Well-managed waste systems enhance the quality of life and well-being of communities by improving sanitation, reducing environmental hazards, and enhancing aesthetic appeal. By fostering clean and healthy living environments, waste management promotes

community cohesion, social equity, and quality of life for residents.

- Climate change mitigation: Waste management plays a role in mitigating climate change by reducing greenhouse gas emissions from waste disposal, landfill decomposition, and fossil fuel use. By implementing methane capture technologies, promoting organic waste diversion, and prioritizing energy recovery from waste, waste management helps mitigate climate change impacts, reduce carbon emissions, and build climate resilience.

ACTIVITY 3

SETTING OF INFORMATION IMPARTING CLUB FOR WOMEN LEADING TO CONTRUBUTION IN SOCIAL AND ECONOMIC ISSUES

INTRODUCTION

Pradhan Mantri Mahila Shakti Kendra (PMMSK) scheme has been approved by the Indian government for implementation from 2017-18 to 2019-20, with the goal of empowering rural women through community participation and creating an environment in which they can recognize their full potential.

In order to promote women's safety, security, and empowerment during the 15th Finance Commission's period of 2021-22 to 2025-26, the Government of India has introduced "Mission Shakti," an integrated programme for women's empowerment. In February 2022, The Pradhan Mantri Mahila Shakti Kendra Scheme (PMMSK) was discontinued, and its objectives were effectively merged into the new Umbrella scheme Mission Shakti. The Pradhan Mantri Mahila Shakti Kendra scheme is a flagship scheme of the Government of India. It operates under the Ministry of Women and Child Development. It was launched in 2017. It aims to empower rural women through community participation. It strives to improve their socio-economic status. The scheme is implemented through Panchayati Raj Institutions (PRIs) at village levels. Each Mahila Shakti Kendra caters to approximately 5000 rural populations covering 3-4villages. The Kendra seek to facilitate education, skilling, employment, and entrepreneurship opportunities for women.

The scheme focuses on the following areas

- women's health and nutrition,
- financial inclusion,
- digital literacy,
- agricultural livelihoods,
- entrepreneurship,
- awareness against social evils, etc.

BENEFITS OF THE SCHEME:

Through the PMMSK scheme, the central government intends to establish more than 115 Mahila Shakti Kendra across the country. However, these Kendra will be established in backward rural areas where no such facilities have previously been provided by the government. Some of the benefits of the Pradhan Mantri Mahila Shakti Kendra Scheme areas follows:

- The government will attempt to connect rural women to these Shakti Kendra in order to educate them on how to exercise their community rights.
- Thus, PMMSK provides a platform for rural women to interact with the government and claim their entitlements.
- Where women can increase their empowerment capacity through training and awareness-raising programmes.
- Additionally, Government-recruited volunteers teach rural women about their rights and other subject areas related to health and employment.
- Rural women can learn about a variety of topics at Shakti Kendras, including employability, nutrition education, digital literacy, and skill development.
- The PMMSK scheme helps rural women understand their true place in society.

ACTIVITY CONDUCTED IN THE UNIT



The PMMSK Scheme is a performance-based scheme. The performance of the scheme is measured against the following indicators:

- Number of Mahila Shakti Kendra (MSKs) set up.
- The number of rural women trained in various skills.
- The number of rural women who have accessed government schemes and services.
- The number of rural women who have started their own businesses.
- The number of rural women who have participated in decision-making at the local level.

Provision of training to rural women in various skills, such as:

- entrepreneurship,
- financial literacy, and
- health and hygiene.
- Facilitation of access to government schemes and services for rural women
- Promotion of entrepreneurship among rural women.
- Empowerment of rural women through capacity building and awareness generation.

Current Status of PMMSK Scheme

The Pradhan Mantri Mahila Shakti Kendra Scheme was intended to work at various levels, including national (domain-based knowledge support) and state (State Resource Centre for Women) technical support to respective governments on women's issues. However, it was discontinued in 2022. The functioning of the MSK scheme was examined in February 2022 by the Development Monitoring and Evaluation Office (DMEO), NITI Ayog, and its recommendations were taken into account when creating the new programme under the recently introduced Mission Shakti.

OUTCOME

The Constitution not only guarantees women's equality but also empowers the state to implement measures of positive discrimination in their favour. Thus, the Indian government has put into effect

numerous laws as well as a number of programmes and schemes in an effort to enhance the safety, security, and status of women.

CONCLUSION

The National Service Scheme initiatives focusing on organic farming, waste management, and the Mahila Shakti Yojana have collectively contributed to sustainable development, environmental conservation, and women empowerment. Through organic farming, communities are encouraged to adopt environmentally friendly agricultural practices, reducing reliance on harmful chemicals. Waste management efforts aim to promote recycling, reduce pollution, and create a cleaner environment. The Mahila Shakti Yojana empowers women by providing them with opportunities for skill development, entrepreneurship, and leadership roles, thereby fostering gender equality and social-economic progress. Together, these initiatives represent a holistic approach to community development, promoting self-reliance, environmental sustainability, and gender inclusivity.

