



Parvatibai Chowgule College of Arts and Science  
Autonomous

Accredited by NAAC with Grade 'A' (CGPA Score 3.41 on a 4 Point Scale in 3rd cycle)  
Best affiliated College-Goa University Silver Jubilee Year Award

## **GREEN INITIATIVES**

**2020-2021**



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## GREEN INITIATIVES / ENVIRONMENT PROTECTION INITIATIVES -2020-2021

BY

### STUDENTS OF SEC COURSE ON WASTE MANAGEMENT TECHNIQUES

Guiding teachers: Dr. Nandini Vaz Fernandes, Ms. MadhuBalekai, Ms. Tessa Vaz & Ms. Gautami Manakikar

**E-POSTERS:** The SEC students designed E-posters in order to create awareness on the various Waste Management techniques. The students used posters to explain about the adverse effects caused on the environment and human health by the waste generated. They also created awareness on the different sources of waste and how one can segregate and dispose the waste safely without harming the environment. They emphasized on the hazardous effect of E-waste on the environment and suggested methods of disposing the E-waste generated. The main aim of this activity was to reignite the awareness regarding the ill aspects of improper waste management.

NAME OF STUDENT	PHOTOGRAPHS
Stena Rebello	
Tahoorra Shaikh	

RadhaShirsat

**DEPARTMENT OF ZOOLOGY**  
**E-WASTE MANAGEMENT**  
 SEC PAPER ON WASTE MANAGEMENT TECHNIQUES 2020-2021  
 RADHA SHIRSAT-SYBSc-SU190089

Electronic pollution in the form of pollution caused by the discarded electronic E-waste is an emerging global environmental problem. It is a growing concern because of the hazardous nature of the waste. It is a growing concern because of the hazardous nature of the waste. It is a growing concern because of the hazardous nature of the waste.

**Electronic waste also called e-waste is discarded after the end of its useful life. It is a growing concern because of the hazardous nature of the waste. It is a growing concern because of the hazardous nature of the waste.**

**How can e-waste be managed in a sustainable manner?**  
 E-waste is made up of various electronic devices, computer components, mobile phones, and other electronic devices. These devices contain hazardous materials like lead, mercury, cadmium, and other toxic substances. These materials can be harmful to the environment and human health if they are not properly disposed of.

**Why is there a need to manage e-waste?**  
 E-waste is a growing problem because of the increasing use of electronic devices. It is a growing concern because of the hazardous nature of the waste. It is a growing concern because of the hazardous nature of the waste.

**How can we help in managing e-waste?**  
 E-waste management should be done in a sustainable manner. It should be done in a sustainable manner. It should be done in a sustainable manner.

**Conclusion**  
 E-waste management is a growing concern because of the increasing use of electronic devices. It is a growing concern because of the hazardous nature of the waste. It is a growing concern because of the hazardous nature of the waste.

Shruti Kale

**DEPARTMENT OF ZOOLOGY**  
**SHRUTI KALE-SU190003-SYBSC**  
**RESIDENTIAL WASTE MANAGEMENT**

WASTE MANAGEMENT IS DEFINED AS THE APPLICATION OF TECHNIQUES TO ENSURE AN ORDERLY EXECUTION OF VARIOUS FUNCTIONS OF SEGREGATION, COLLECTION AND DISPOSAL OF WASTE. IT MEANS ANY REFUSE GENERATED ON THE PREMISES AS A RESULT OF RESIDENTIAL ACTIVITIES. RESIDENTIAL WASTES INCLUDE GARBAGE, TRASH AND REFUSE, DERIVED FROM HOUSEHOLDS THAT NEEDS PROPER SEGREGATION, COLLECTION AND DISPOSAL.

**SEGREGATION**  
 KEEP SEPARATE CONTAINERS FOR DRY AND WET WASTES IN THE KITCHEN. KEEP TWO BAGS FOR DRY WASTE COLLECTION PAPER AND PLASTIC. FOR THE BEST OF THE HOUSEHOLD WASTE. KEEP PLASTIC FROM THE KITCHEN CLEAN AND DRY AND DROP INTO THE DRY WASTE BIN.

**COLLECTION**  
 DOOR TO DOOR: HOUSEHOLDS ARE GIVEN A SET OF TWO DISPOSABLE BINS TO COLLECT DRY AND WET WASTE. THIS WASTE IS COLLECTED DAILY BY THE MUNICIPALITY.  
 COMMUNITY BINS: THE COMMUNITY MUST BE MOTIVATED TO DEPOSIT THEIR DRY RECYCLABLE WASTE INTO THESE BINS. MUST BE EMPLOYED TO GUIDE RESIDENCES FROM LITTER BODIES AND BINS.

**DISPOSAL**  
 SANITARY LANDFILL: GARBAGE IS LAYERED OUT IN THIN LAYERS COVERED WITH CLAY OR PLASTIC FOAM. SEVERAL WELLS ARE DRILLED TO MONITOR IF ANY LEAKAGE IS CONTAMINATING GROUND WATER.  
 INCINERATION: SOLID ORGANIC WASTE ARE SUBJECTED TO COMBUSTION TO CONVERT THEM INTO RESIDUE.  
 PYROLYSIS: CHEMICALLY DECOMPOSES ORGANIC MATERIALS BY HEAT IN THE ABSENCE OF OXYGEN.  
 COMPOSTING: BIOLOGICAL PROCESS IN WHICH MICROORGANISMS CONVERT ORGANIC WASTE INTO HUMUS.

**REFERENCES:**  
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Renvill Luis

**MANAGEMENT OF MEDICAL WASTE**  
 Smt. Parvatibai Chowgule college of Arts and Science  
 Dept Of Zoology [ SEC Waste Management ] Renvill A. Luis  
 -SU190091 (S.Y.Bsc)

Biomedical waste or hospital waste contains infectious (or potentially infectious) materials. Examples of medical waste include potentially contaminated used or unused discarded needles, scalpels, lancets and other devices capable of harming the skin.

Biomedical waste is generated from biological and medical sources and activities, such as the diagnosis, prevention, or treatment of diseases. Medical facilities generate waste hazardous chemicals and radioactive materials.

Poor medical waste management causes environmental pollution, unpleasant smell, growth and multiplication of insects, rodents, and worms, and may lead to transmission of diseases like typhoid, cholera, and hepatitis.

**CONCLUSION:** Considering its impact on the environment, biomedical waste management requires immediate academic assessment to increase the awareness during training courses.

**Treatment Methods**

- Incineration
- Autoclaving
- Microwaving
- Chemical
- Biological

**Medical Waste Facts**

- 5.9 Million Tons Per Year
- 85% is Non-Hazardous
- 16 Billion Injections Per Year
- 2 Million Needles Per Day
- 800,000 Needle Sticks Per Year, per NIOSH

**REFERENCE:** 1) Medical Waste. (2017, November 07). Retrieved December 03, 2020, from <https://www.epa.gov/tox/medical-waste>

2) World of Biomedical Waste in The Environment. (2020). Retrieved October 20, 2020, from <https://www.researchgate.net/publication/354444444>

AnushaRaut

**SOLID WASTE MANAGEMENT**  
DEPARTMENT OF ZOOLOGY

NAME: ANUSHA RAUT  
ROLLNO: SU190064  
CLASS: SYBSc

**INTRODUCTION**

Solid waste management is the process of collecting and treating solid wastes. Solid wastes are generated from municipal, industrial, and agricultural activities. The waste can be collected by door-to-door collection method, community bins are placed in the locality. After collection, the solid waste is transported via trucks and then it can be treated to reduce the total volume and weight of the materials. This treatment changes the form of the waste and makes it easier to handle. The methods of solid waste management includes sanitary landfills, composting, incineration, pyrolysis.

**METHODS OF SOLID WASTE MANAGEMENT**

Sanitary landfill  
It is the most common method of solid waste management. The landfills are designed in such a way that the bottom of the landfill is covered with an impervious liner, which is made up of several layers of thick plastic and sand. This liner protects the ground water from being contaminated because of leaching. When the landfill is full, it is covered with the layers of soil and clay to prevent seepage of water.




Fig: sanitary landfill  
Author: kot-coll  
Source [https://live.staticflickr.com/7195/7000513786\\_4e183bcf79.jpg](https://live.staticflickr.com/7195/7000513786_4e183bcf79.jpg)  
License: CC-BY-NC-SA2.0

Incineration  
In this method the solid waste are burnt at high temperature. It is burned inside a properly designed furnace under very controlled conditions. The volume of the combustible waste is reduced considerably by burning waste. In the case of off-site pits, it is an most appropriate method to minimize scavenging.

**CONCLUSION**

Waste management is an important element of environmental protection. The improper disposal of solid waste can create unhygienic conditions which can lead to pollution and various disease. Using recovered material generates less solid waste. The sanitary landfill method is most preferred waste management method.

**SOURCES OF SOLID WASTE**

Residential waste is main Source of solid waste. Others include Industrial, Commercial, construction and demolition areas.

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VineetNerurkar

**DEPT OF ZOOLOGY (SEC-WASTE MANAGEMENT)**  
**MANAGEMENT OF MEDICAL WASTE**  
Vineet nerurkar -SU 190298 SYBSC




Medical waste is a subset of wastes generated at health care facilities, such as hospitals, physicians' offices, dental practices, blood banks, and veterinary hospitals/clinics, as well as medical research facilities and laboratories.

**conclusion**

There is lack of sufficient knowledge among dental students regarding management of biomedical waste and recycling or reusing of dental materials. Considering its impact on the environment, biomedical waste management requires immediate academic assessment to increase the awareness during training courses.


**Alternative Treatment and Disposal Technologies for Medical Waste**

Thermal treatment, such as microwave technologies; Steam sterilization, such as autoclaving; Electropyrolysis; and Chemical mechanical systems, among others.

REFERENCE: Medical Waste (2017, November 07), Retrieved December 03 2020, from <https://www.epa.gov/rcra/medical-waste>  
J Int Soc Pres Dent. 2016 Sep-Oct; 6(5): <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5101000/>

AkarshaFaldessai

**COMPOSTING**



**COMPOSTING**

Composting is a method for treating solid waste in which organic material is broken down by microorganisms in the presence of oxygen to a point where it can be safely stored, handled and applied to the environment.

**TYPES OF COMPOSTING:**

- Composting basins
- Onsite composting
- Vermicomposting
- Aerated window composting
- Aerated static pile composting
- In-vessel composting

**Advantages:**

- Enriches soil, helping retain moisture and suppress plant diseases and pests.
- Reduces the need for chemical fertilizers.
- Encourages the production of beneficial bacteria and fungi that break down organic matter to create humus.

**Disadvantages:**

- Drawbacks of composting by – preparation and equipment, the lengthy treatment period, targeting final use of compost product, and environmental issues such as odors and dust. Some investment in equipment and site preparation is required or recommended.

Compostation, R. S. (2015, July 23). The importance of composting. Retrieved from [https://www.researchgate.net/publication/275444444\\_The\\_importance\\_of\\_composting](https://www.researchgate.net/publication/275444444_The_importance_of_composting)

Bhagyashree Mahajan

## SEWAGE WASTE MANAGEMENT

Bhagyashree Mahajan , roll no. SU190341, SYBSc Zoology - Waste Management

### What is sewage?

Sewage is the term used for wastewater that often contains faeces, urine and laundry waste. It is characterized by volume, rate of flow, physical condition, chemical and toxic constituents and its bacteriological status.

### Problems of sewage waste.

1. Untreated sewage water can contaminate the environment and cause diseases such as diarrhoea. It also enters into various water bodies causing them to be polluted. Hence sewage treatment is essential.
2. Sewage disposal is a major problem in developing countries as many people don't have access to sanitary conditions and clean water.

### What is sewage treatment?

Sewage treatment is the process of removing contaminants from municipal wastewater, containing mainly household sewage and industrial wastewater.

### Sewage Treatment

- Primary treatment basically involves physical removal of particles from sewage through filtration and sedimentation.
- Secondary or biological treatment removes dissolved and suspended biological matter. It is performed by indigenous, waterborne microorganisms in managed habitat. Treated sewage is then released into local waterways.

Lizanne Cardozo

→ Have your household sewer line inspected and replaced if necessary


→ Use strainers in sinks to catch food scraps and empty them into trash for disposal

→ Don't put fats, oils or grease down the drain

*Sewage is the waste-water that contains faeces, urine and laundry waste. As a result aquatic organisms are unable to survive. Typhoid fever and cholera are some examples of diseases carried by sewage. To prevent sewage; use fleshes with low capacity, fix leakages in sewer pipes. Alternative methods of sewage disposal are septic tanks, biogas plants.*


### PREVENTING POLLUTION DUE TO SEWAGE

**"STOP THE POLLUTION QUICK DON'T MAKE THE WATER SICK"**



"Polluted Malad Creek at Lohandwala, Mumbai" (Ravi Khemka) License: CC BY 2.0. <https://creativecommons.org/licenses/by/2.0/>

**"THINK OUTSIDE THE SINK!"**



"Tannery sewage" (Majrudrankin) License: CC BY-NC 2.0. <https://creativecommons.org/licenses/by-nc/2.0/>

Mayuri Verlekar

Parvatibai Chowgule College of Arts and Science

Name: Mayuri Verlekar  
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Department: Zoology

### MEDICAL WASTE

#### INTRODUCTION

Medical waste is the waste that contains potentially infectious material. This waste includes waste that is generated by healthcare workers like hospitals, laboratories or medical research facilities.

#### Effects of medical waste

- Soil, air and water contamination
- It can lead to the spread diseases like HIV, Tuberculosis, hepatitis.
- The radioactive elements can seep in the ground water through the landfill and can lead to serious diseases.

• 5.9 Million tones of medical waste is generated per year.

• 16 Billion injections are disposed annually.


#### HOW CAN MEDICAL BE TREATED?

Treatment methods include:


- Incineration
- Autoclaving
- Microwaving
- Chemical treatment
- Biological treatment



Source: <https://www.gettyimages.com/gi/1249612496>



Source: <https://www.gettyimages.com/gi/1249612496>



Source: <https://www.gettyimages.com/gi/1249612496>

#### DISCUSSION

How can we handle medical waste?

- Know the healthcare waste rules regulated by DOT, EPA, OSHA and DEA.
- Avoid putting non-hazardous waste in with rest to prevent overreading.
- Separate waste based on sharps, pharmaceutical, chemical, pathological and non-hazardous.
- Use the medical waste disposal color code.

#### CONCLUSION

Incineration of biomedical waste is one of the techno-economical viable scheme. Individual awareness and participation is waste management is very important. Safe and effective management is not only a legal necessity but also a social responsibility.

Reference: Unknowns.(2020). What Is Medical Waste? Definition, Types, Examples & More. Retrieved from MedPro Disposal: <https://www.medprodisposal.com/medical-waste-disposal/what-is-medical-waste-definition-type-examples-and-more/>

Manoj S. (2019) Impact Of Biomedical Waste On Human Health. Environmental Claims Journal. 31:1-334.

DhanayaNaik

## E -WASTE MANAGEMENT

**WHAT IS E -WASTE?**

- It refers to all the electronic waste generated which is unwanted, broken or outdated.

**SOURCES:**

- It includes all the electronic gadgets like television, computer, cellular phones, refrigerator, VCRs, lamps, tablets, bulbs and etc.

**FACT:** 20 to 50 million metric tons of e-waste are disposed worldwide every year.

**HAZARDOUS EFFECTS OF E- WASTES**

**HEALTH:**

- Chemical poisoning through inhalation. other effects includes nausea, neurological disorders, congenital malformations, vomiting, cancer.

**ENVIRONMENT:**

- Degrade water and soil quality.
- It result in high algal population in aquatic conditions.
- Change in climate and ozone layer destruction.
- Waste break down to give one of the potent greenhouse gas –methane.

**PREVENTIVE MEASURES:**

- If you have parts and equipment that are still working, try repairing the electronic device before getting a new one.
- Recycle no matter what you have, it's important to always dispose of your e-waste properly.
- Buy environmentally friendly electronics. Look for products labelled Energy Star or certified by the Electronic Product Environmental Assessment Tool.

Gauri Pandit




"Beach litter" by Jason Kern is licensed under CC BY-ND 2.0      "The Problem It's not too late" by Kasper Dreyer is licensed under CC BY 3.0

**80% OF LITTER IN OCEANS COMES FROM LAND BASED ACTIVITIES. MOST OF IT IS SINGLE USED PLASTIC**



STOP OCEAN PLASTIC POLLUTION, WWW.DEPOSITS.COM

**START THE FIGHT AGAINST PLASTIC TODAY, FOR BFTTR**

Yohan Rodrigues



**DEPARTMENT OF ZOOLOGY**  
**SEWAGE MANAGEMENT**  
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**Introduction**

**What is sewage waste ?**

Sewage waste is considered to be the major issue in waste management it is basically considered as wastewater produced by the community it is characterized by volume or rate of flow, physical condition, chemical and toxic constituents, and its bacteriologic status it basically includes waste water from sinks, bathtubs, showers, dishwashers, and clothes washers etc. water from toilets these are then collected through a system of sewer pipes and then taken to the disposal. The system of sewers is called sewerage. sewage treatment is removing contaminants mainly from municipal sewage plus some industrial wastewater. so these e-poster is about how the sewage waste is treated and collected in order to tackle the major waste hazards of the world and this issue is considered to be the major issue.

**method**

A "13 A Possible Sewage Plant in Connecticut or Rhode Island" by CthulhuWho1 (Will Hart) is licensed under CC BY 2.0

**Conclusion**

Why to treat sewage water ?

- Sewage water contains bacteria, viruses etc. Which reduces the dissolved oxygen level in water as a result marine life will be affected.
- Treated water from sewage treatment plant can be made used for domestic uses (for gardening, washing, etc.)
- And as it will reduce overall water contamination

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AakanshaPatil

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DEPARTMENT OF ZOOLOGY  
**WASTE SEGREGATION**



Segregation is the most important step for the waste treatment. Diverse waste materials requires different ways of treatment.

**WHY WE NEED WASTE SEGREGATION ?**  
India is getting buried under mounds of garbage as the country has been generating more than 1.50 lakh metric tonne (MT) of solid waste every day. Worse - approximately 90 per cent (1,35,000 MT per day) of the total amount is collected waste. Nearly 15,000 MT of garbage remain exposed every day, resulting in almost 55 lakh MT of solid waste disposed in open areas each year, which leads to "severe" pollution level. Of the total collected waste, only 20 per cent (27,000 MT per day) is processed and the remaining 80 per cent (1,08,000 MT per day) is dumped in landfill sites. At times the "highly polluting" unprocessed solid waste in the dump sites reaches 3 crore MT. The solid waste in landfill sites and the uncollected trash - of the total 5.4 crore MT of solid waste generated annually - 4.5 crore MT are unprocessed. The Ministry of Environment, Forests and Climate Change (MoEFCC) provided the details of the ever-growing garbage citing a 2016-17 report by the Ministry of Housing and Urban Affairs.

**There are number of important reasons that encourages waste segregation; legal obligations, cost savings and protection of human health and the environment.**

Here are some steps to manage and segregate waste:

1. Keep separate containers for dry and wet waste in the kitchen.
2. Keep two bags for dry waste collection- paper and plastic, for the rest of the household waste.
3. Keep plastic from the kitchen clean and dry and drop into the dry waste bin.

The benefits of waste segregation are a huge part of the process of waste management. Generating waste materials is something that is practically unavoidable in the world of today. Segregating and disposing of waste properly will not only reduce the amount of toxins entering the atmosphere but is a way of saving the planet and lives of people.

**Bibliography**

Ceejel Pinto

**What exactly is sewage?**  
Sewage is the waste water which is produced in a community of people and can be categorized by volume, toxic/chemical components, physical conditions, etc. This sewage is flows in the water bodies contaminating them and leading to land and water pollution.

**Why sewage treatment is necessary?**  
If the sewage is left unchecked and is not treated properly before releasing into the water bodies there can be

**Waste water treatment**  
sewage is treated in three phases; primary, secondary and tertiary treatment. Primary treatment is where the solid substances get settles at the bottom which are collected and the lighter substances such as oils, fats which float on the top are scrapped off. In secondary treatment with the help of the aerobic bacteria the waste is broken down. And the last phase which is the tertiary phase acts like a filter where the nutrients and other particles harmful to the ecosystem are drained

**Consequences**  
groundwater will be polluted. High risk of diseases. Increase of pollution. Wastage of energy.

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SanjanaKanguri

**REDUCE WASTE**

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**WHAT IS WASTE MANAGEMENT ?**  
Waste management includes the activities and action required to manage waste from its inception.

**REDUCE: THE BEST TO MANAGE WASTE IS NOT PRODUCE IT. REDUCING MEANS USING FEWER RESOURCES IN THE FIRST PLACE BY REDUCING CONSUMPTION AND BUYING LESS.**

**RECYCLE: RECYCLING EXTRACTS VALUABLE MATERIAL FROM ITEMS THAT MIGHT OTHERWISE BE CONSIDERED TRASH AND TURNS THEM INTO PRODUCTS.**

**REDUCE, REUSE, RECYCLE!**

**REUSE: IT TAKES ECONOMICAL AND ENVIRONMENTAL SENSE TO REUSE PRODUCTS AND SOMETIMES CREATIVITY. RATHER THEN THROWING OUT THINGS REUSE THEM IN BETTER WAY.**

One of the bigger reasons to **reduce waste** is to conserve space in our landfills and **reduce** the need to build more landfills which take up valuable space and are a source of air and water pollution. By **reducing our waste**, we are also conserving our resources

REFERENCE: MICHAEL DAVIDSON( AUG, 03, 2018) THE IMPORTANCE OF WASTE MANAGEMENT RETRIVED FROM <https://www.solo.com>  
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TanviAmonkar



FranzilaCrasto



Giselle Fernandes

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 Ways of managing waste.  
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**REDUCE YOUR WASTE**

One can manage waste by reducing the use plastic items such as bottle, plastic bags, etc. and by using reusable bottle, cups, for beverages on-the-go, buy second-hand items, donate used goods and avoid the use of packed item goods.

**Plants Hanging**

One can also manage waste by utilising the waste produced into making something creative out of it. For example in the above picture, a bicleri bottle is used in making hanging vases.

**COMPOST**

One can manage waste by using the biodegradable waste to gain compost which can be very beneficial to the plants as it is a manure to the plants.

**RECYCLE**

One can manage waste by recycling materials like paper, plastic bottles, tetra packs, cans, and all the other plastic goods.

Lavina Gama

**DEPARTMENT OF ZOOLOGY**  
**PREVENTION OF POLLUTION DUE TO MEDICAL WASTE**  
 LAVINA GAMA -SYBSC -SU190235

**Managing the medical waste disposal is one of the major challenges faced by healthcare field. Medical waste is a waste that contains infectious material generated by healthcare facilities. There are different types of medical waste: biomedical, clinical, hazardous, biohazardous.**

**Medical waste is the byproduct of healthcare industries. Some of the examples of the medical waste are: infectious pathogens, chemical, pharmaceutical. Medical waste is disposed by either off-site (truck, mail) or on-site (hospital).**

**Medical waste is treated by incineration, autoclaving, microwaving, chemically and biologically. If the waste is not treated properly it can cause several health hazards to the health care employees and general public. These waste can cause diarrhea, infection, allergies. Medical waste is generated by private physician, retail health clinic, hospitals, veterinary and laboratories.**

**Healthcare waste management can be achieved by proper handling, storing, transporting, treatment and disposal of waste. Raising awareness of the risks pertaining improper disposal of this medical waste amongst people might help to some extent. Support from the government in managing this waste is also needed.**

**Waste generated during treatment, chemicals and infectious waste can cause land and soil pollution. The biomedical waste dumped in low lying areas can contain liquid wastes that can leach into the ground causing ground water pollution.**

Akshay Velguenkar

**SEWAGE WASTE MANAGEMENT [DEPARTMENT OF ZOOLOGY]**  
 Paper- SEC-WASTE MANAGEMENT (2020-2021)

NAME: AKSHAY PRABHU VELGUENKAR  
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**After treatment, the treated industrial wastewater (or effluent) may be reused or released to a sanitary sewer or to a surface water in the environment. • minimize wastewater production or to recycle treated wastewater within the production process**

**SEWAGE WASTE MANAGEMENT**  
 Sewage is water-carried wastes, in either solution or suspension that flow away from a community. It is also known as waste water flows or used water supply of the community.

**Composting**  
 If you're looking for the greenest way of disposing of food waste, composting is the answer. You can pick up a small compost bin to sit in your kitchen to house things like egg shells, coffee grounds, tea bags, potato peels or leftover food on a plate.

**Waste disposal company**  
 A popular way of getting rid of food scraps is to use a garbage disposal located under your kitchen sink. Call a waste disposal company for more information on having one installed.

**Animals**  
 If you live in an area where you can keep farm animals like pigs or goats, you'll have very little food waste. Of course, they can't be fed everything, but animals will eat many items that usually end up in the garbage.

**When used water is eventually discharged back into natural water as it benefits ecosystems, improving streamflow, nourishing plant life and recharging aquifers, as part of the natural water cycle.**

**SEWAGE TREATMENT PLANTS**

**Recycled water is used for irrigation of gardens and agricultural fields or replenishing surface water and groundwater (e.g., groundwater recharge). Recycled water may also be directed toward fulfilling certain needs in residences (e.g. toilet flushing), businesses, and industry, and could even be treated to reach drinking water standards. This last option is called either "direct potable reuse" or "indirect potable" reuse, depending on the approach.**

**REUSE THE PAST, RECYCLE THE PRESENT, SAVE THE FUTURE**

Krutitika Jan

**Department of zoology**  
**'Bio-medical Waste Management'**  
 Name- Krutitika Jan, SEC paper. Waste Management Techniques, Year- 2020-21, Class- S.V. B.Sc., Roll No.- SU190191

**ABSTRACT-** Bio-medical waste pose threat not only to public health but also to the environment. The amount of biomedical waste is increasing due to different factors such as high population density, new generation in the field of outbreak of some diseases such as Covid-19 virus, deteriorating health of people and demand for large number of instruments and diagnostic tools and reliable disposal of waste is of paramount importance to reduce the risk of infection from the waste and its treatment products. In a country like India, Bio-medical Waste Management (BMW) norms regulate the disposal of waste generated. Globally, greater research in this field is required to develop new techniques for treatment and detox when to reduce generation of waste.

**INTRODUCTION**

**What is Bio-medical waste?**  
 BMW is any waste, which is generated during the diagnosis, treatment or transmission of human beings or animals or in research on the use of biological or in health camps.

**In the waste generated detrimental?**  
 This waste is bio-hazardous whereas 25% waste is bio-hazardous and infectious.

**Generators of bio-medical waste-**  
 Hospitals, nursing homes, research centers, bio-labs, medical shops and over-the-counter areas.

**Risk due to bio-medical waste-**  
 If waste is not disposed after proper treatment it can be seen as major source of pollution, some examples are:

1. Source of soil pollution as the virus most disposed areas and incinerators show presence of heavy metals, including changes in the chemistry and biology of soil.
2. Disposal of waste leads to food safety, growth and multiplication of insects, pests and vectors which leads to the spread of cholera, typhoid and etc.
3. Disposal of bio-medical waste releases harmful gases in the atmosphere, affecting the air quality.
4. Leachate from dump leads to water bodies, making it unfit for consumption.

**Bio-medical waste management**

As of now it is very clear that if bio-medical waste generated is not handled and controlled after proper treatment, it is hazardous to the environment of the environment.

So proper handling and disposal of bio-medical waste is important, it is the responsibility of every individual involved in the process from generation to disposal.

**MANAGEMENT OF BIO-MEDICAL WASTE**  
 The only way to prevent the pollution generated by bio-medical waste is managing the waste from the point of generation to the treatment and disposal. The major responsibility of the manager in a medical health services and other hospital and research centers and for diagnostic areas are also a concern for bio-medical waste and this proper disposal should be done by people.

As per other waste management, focus on segregation of waste, the same is applicable to bio-medical waste. Infectious waste first needs to be distributed before any other treatment. Animal and human waste needs different treatment, rather than distribution or recycling. Therefore, segregation plays an important role in waste management.

Another important area that is to minimize the waste generation, to reduce this waste such as reducing, recycling, reusing separate chemical and pharmaceutical waste management can be taken.

**BWM IN INDIA**  
 BMW is taken into a very important role in controlling waste management. India was one of the first countries to implement BMW rules in the year 1986, amended on dated 2001, 2003, 2006, 2016. The quantity of waste produced differs in every country and depends upon health care establishment, its size, nature, annually 8.33 tons of bio-medical waste is generated and one tonne from 6-120 kg per day per bed. The rules state different categories of disposal and treatment according to the category of bio-medical waste. There were six categories in the first phase but were then reduced to eight. The BMW rules of 2016, categorized four color-coded disposal of waste into three different categories. The categories are as follows, other the regular waste such as human anatomical waste, chemical waste, and infectious recyclable biomedical waste, which includes waste, sharps. High-level waste for glass vials and metallic implants.

**LEVELS OF MANAGEMENT OF BIO-MEDICAL WASTE**

**Treatment**  
 The first step is to separate hazardous bio-medical waste, which is followed by segregation based on disposal between specific rules are followed based on type of waste.

**Segregation**  
 Segregation is done based on color-coded bags or containers of separate color. The package is done based on color-coded bags or containers of separate color. The quantity of certain biomedical waste treatment facility shall separate the waste from the treatment.

**Disposal**  
 Different methods are employed based on type of wastes. The processes involved can be thermal, biological or chemical, common treatment use deep-frozen autoclave.

**SIGNIFICANCE AND CONCLUSION**

The management of bio-medical waste is of paramount importance for avoiding infection and environmental pollution due to it. Effective management is not only a legal necessity but also a social responsibility.

The bio-medical waste management practices in a country are guided by bio-medical waste management rules. To have better implementation of rules, all health workers should be given proper training.

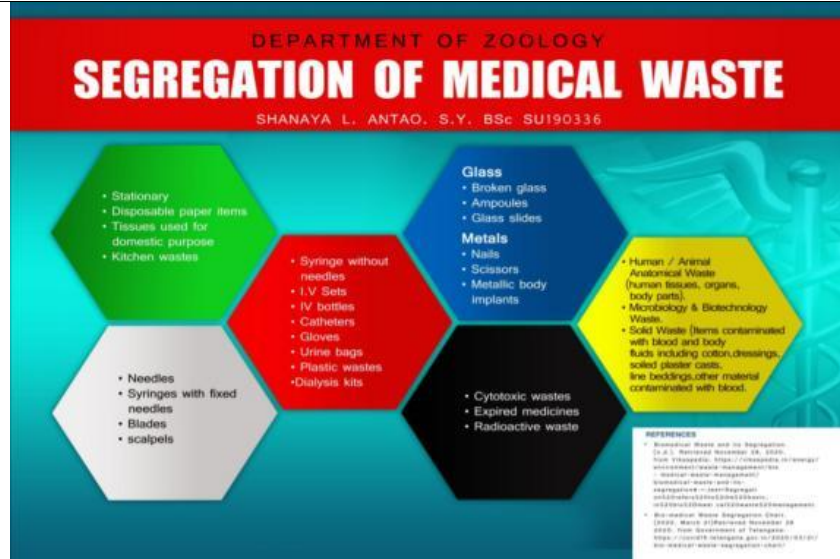
The three main steps: segregation, packaging and treatment should be practiced in a strict manner. This can be followed by proper treatment and disposal methods, such as deep-frozen, incineration.

The current scenario of Covid-19 has worsened the situation regarding the bio-medical waste. Masks can be considered as domestic bio-medical waste which needs to be disposed properly.

**REFERENCES**



ShanayaAntao



**ORGANIC COMPOSTING:** Organic composting mainly reduces the amount of organic waste generated. It cuts down the usage of chemical fertilizers and is used to remediate soils contaminated by hazardous waste. The students were explained the basic concept of organic composting and were given instructions on how to prepare kitchen compost effectively at home. The main aim of this activity was to encourage the students to use and promote organic composting as an ideal way of managing kitchen waste.





**HANDMADE PAPER :** As handmade papers are made from recycled papers, it is an effective method of decreasing the amount of waste generated. The use of recycled paper also reduces the number of trees cut down and promotes sustainable development. Handmade paper can be used to make diverse products such as bags, diaries, envelopes, packaging, office accessories and even cards. The students were given instructions on the process of handmade paper and encouraged to create various products using it. The main aim of this activity was to promote recycling paper and reduce the amount of waste generated.

### PROCEDURE OF MAKING HANDMADE PAPER







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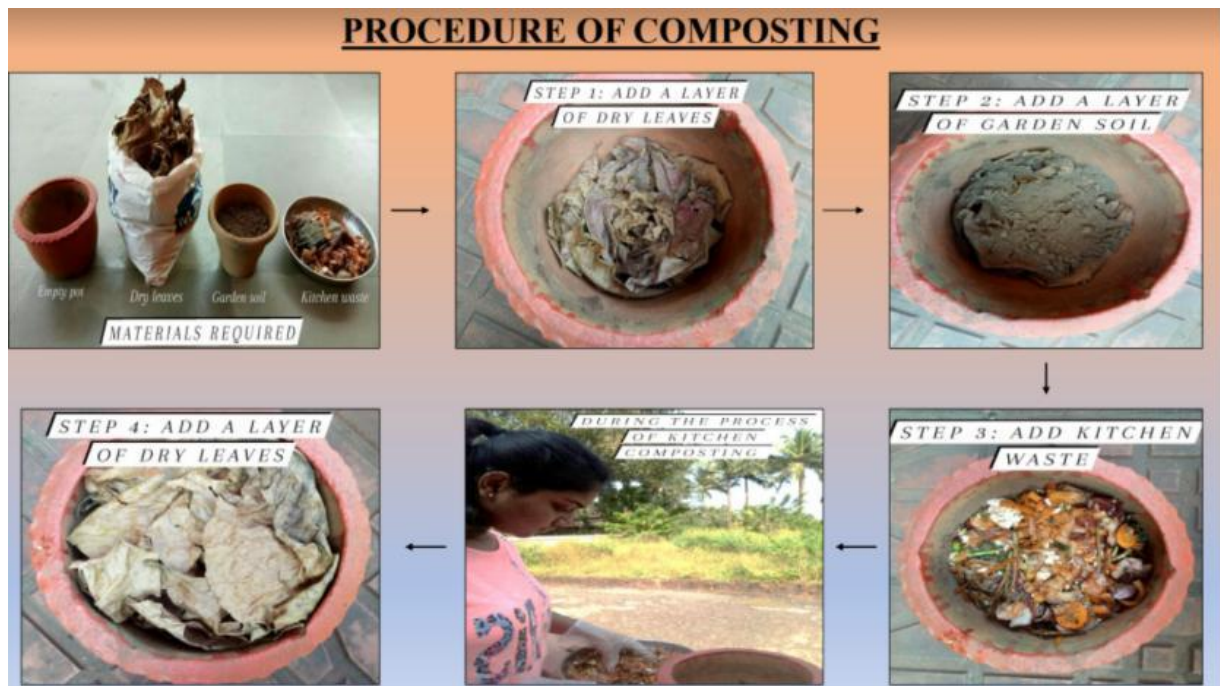
### GREEN INITIATIVES / ENVIRONMENT PROTECTION INITIATIVES -2020-2021

BY

#### STUDENTS OF SEC COURSE ON WASTE MANAGEMENT TECHNIQUES

Guiding teachers: Dr. Nandini Vaz Fernandes, Ms. MadhuBalekai, Ms. Tessa Vaz & Ms. Gautami Manakikar

**ORGANICCOMPOSTING:** Organic composting mainly reduces the amount of organic waste generated. It cuts down the usage of chemical fertilizers and is used to remediate soils contaminated by hazardous waste. The students were explained the basic concept of organic composting and were given instructions on how to prepare kitchen compost effectively at home. The main aim of this activity was to encourage the students to use and promote organic composting as an ideal way of managing kitchen waste.





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<b>REPORT OF MANGROVE DAY CELEBRATION</b>	
<b>Title:</b>	Mangrove day Celebration
<b>Date and year:</b>	26 <sup>th</sup> July 2021
<b>Resource person</b>	Department Of Zoology
<b>Organising Committee</b>	Department of Zoology And Mangrove Society of India
<b>No. of Participants</b>	15
<b>Objective</b>	To spread awareness on the importance of mangrove diversity.
<b>Summary of the proceedings</b>	<p>Department of Zoology organised competitions for the students on the occasion of World Mangrove Day on 26<sup>th</sup> July, 2021 in association with Mangrove Society of India. Slogan writing, Elocution competition and photography competition were organized for students of BSC Zoology.</p> <p>Winners of the competitions:</p> <ol style="list-style-type: none"><li><b>Slogan Competition:</b> The theme of the competitions was "Conservation of Mangrove ecosystem". Best slogan: Ms. Shanaya Phal Desai – SYBSc Zoology</li><li><b>Elocution competition:</b> <b>Topic:</b> 1. Threats to mangrove ecosystem. 2. Importance of Mangrove. 3. Issues and challenges of mangrove conservation. Best elocution: Ms. Shanaya Phal Desai – SYBSc Zoology</li><li><b>Photography Competition:</b> Theme "Mangrove Fauna" Best photograph: Ms Antara Poi Raiturker- TYBSc Zoology</li></ol>
<b>Photographs</b>	



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DEPARTMENT OF ZOOLOGY  
 IN ASSOCIATION WITH  
 MANGROVE SOCIETY OF INDIA



**MANGROVE DAY CELEBRATION-2021**

# SLOGAN WRITING COMPETITION

**THEME: CONSERVATION OF MANGROVE ECOSYSTEM**

**GUIDELINES:**

1. Number of entries per participant: 01
2. The slogan must illustrate and emphasize on the theme.
3. The entries must be submitted in A3 size paper.
4. The slogan must be short, creative and original.

LAST DATE OF SUBMISSION: 24<sup>th</sup> JULY 2021  
 SUBMIT THE SLOGAN AS A SOFT COPY TO ZOOLOGY@CHOWGULES.AC.IN



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**MANGROVE DAY CELEBRATION-2021**

# PHOTOGRAPHY COMPETITION



**THEME: MANGROVE FAUNA**

**GUIDELINES:**

1. NUMBER OF ENTRIES PER PARTICIPANT: 01
2. SIZE OF THE PHOTOGRAPH: A4 (PORTRAIT/LANDSCAPE SHOTS ACCEPTED)
3. ADD A SUITABLE CAPTION FOR THE PHOTOGRAPH BASED ON THE THEME.

LAST DATE OF SUBMISSION: 24<sup>th</sup> JULY 2021  
 SUBMIT THE PHOTOGRAPH AS A SOFT COPY TO ZOOLOGY@CHOWGULES.AC.IN



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 MANGROVE SOCIETY OF INDIA



**MANGROVE DAY CELEBRATION-2021**

# ELOCUTION COMPETITION

**TOPICS:**  
 1. THREATS TO MANGROVE ECOSYSTEM  
 2. IMPORTANCE OF MANGROVES  
 3. ISSUES AND CHALLENGES OF MANGROVE CONSERVATION

**GUIDELINES:**

1. Make a video on any one topic from the list mentioned.
2. Video should not exceed 01 minute.
3. The video can be in English/Konkani/Marathi.



LAST DATE OF SUBMISSION: 24<sup>th</sup> JULY 2021  
 SUBMIT THE VIDEO TO ZOOLOGY@CHOWGULES.AC.IN

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### GREEN INITIATIVES / ENVIRONMENT PROTECTION INITIATIVES -2020-2021

BY

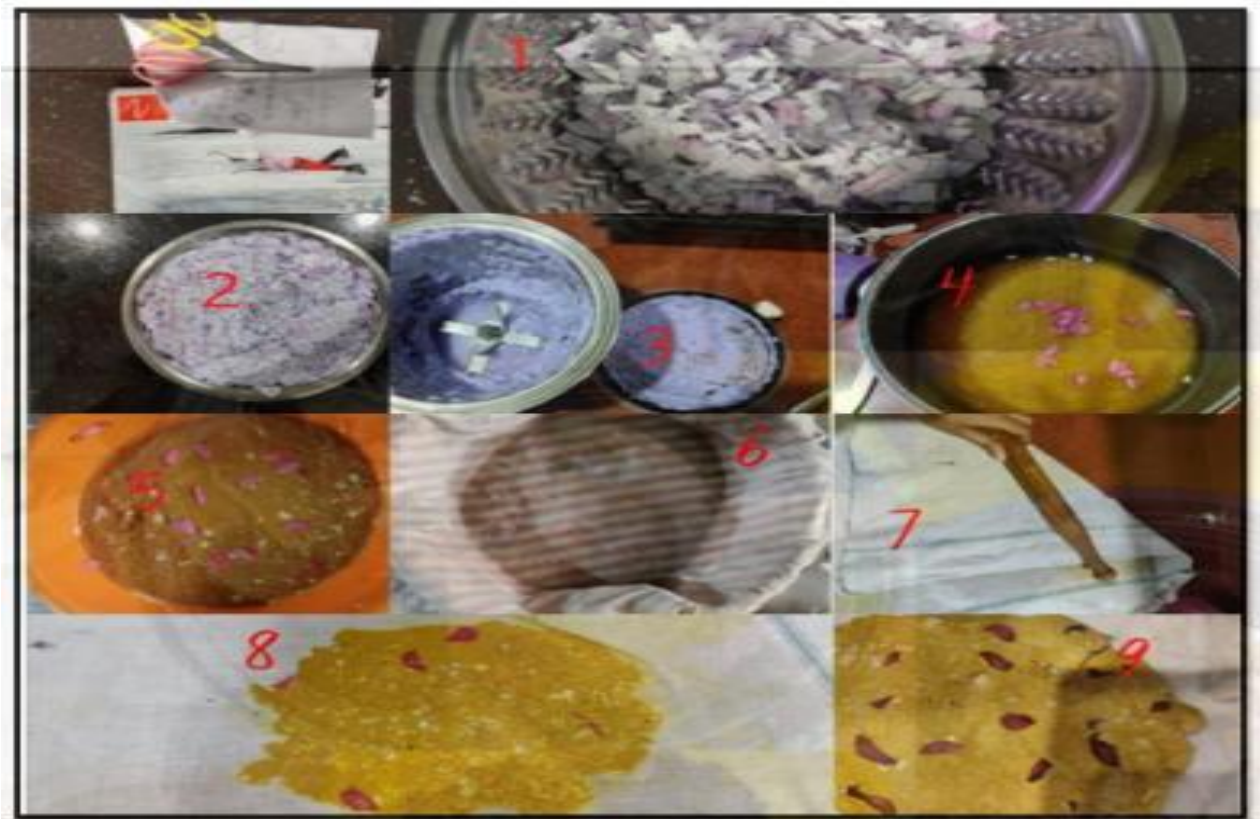
#### STUDENTS OF SEC COURSE ON WASTE MANAGEMENT TECHNIQUES

Guiding teachers: Dr. Nandini Vaz Fernandes, Ms. MadhuBalekai, Ms. Tessa Vaz & Ms. Gautami Manakikar

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### PROCEDURE OF MAKING HANDMADE PAPER





HANDMADE PAPER – BY STUDENTS



## NSS ACTIVITY REPORT

Parvatibai Chowgule College of Arts and Science, Autonomous

- **Title of the Activity:** Sapling plantation on the occasion of World Environment Day
- **Date:** 05<sup>th</sup> June 2021

NSS volunteers clicked a Photo/recorded a Video while planting the sapling and shared it on the social media platform.

Student Volunteers	Male	Female	Total
	15	89	104

Some of the screenshots of the Photo/Video shared on social by by NSS volunteers while planting the sapling





Report made by: **Dr. Mayuri Naik, NSS Programme Officer**



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<b>Title:</b>	<b>Departmental activity</b>	
Date and year:	20/06/2021- 22/06/2021	
Resource person/s:	Department of Zoology	
No. of Participants	31	
Objective:	To sensitise the students on the importance of wildlife, Covid vaccination and wildlife trade.	
Summary of the proceedings	<p>Department of Zoology organised competitions for the students as a part of departmental activity in the month of June from 20-06-2021 to 22-06-2021. Photography, poster and painting competitions were organized, in which 15 students actively participated. The theme of the competitions were ' My backyard wildlife', 'Importance on covid vaccination' and 'wildlife Trade' respectively.</p> <p>Winners of the competitions:            Photography Competition: <b>1<sup>st</sup> place:</b> Mr. Akshay Velguenkar- SYBSc  <b>2<sup>nd</sup> place:</b> Ms. Ferzeen Shaikh- TYBSc  <b>3<sup>rd</sup> place:</b> Ms. Antara Poi Raiturkar-TYBSc            Painting competition: Best painting: Lizanne Cardozo, SY BSc            E-Poster Competition: Winner:Radha Shirsat - SYBSc</p>	
Photographs	<b>Name of the participant</b>	<b>Photograph</b>
	<b>1<sup>st</sup> place: Mr. Akshay Hanumanth Velguenkar</b>	
	<b>2<sup>nd</sup> place: Ms. Ferzeen Shaikh</b>	

**3<sup>rd</sup> place:  
Ms. Antara  
Poi  
Raiturker**



**Painting  
competition:  
Winner  
Lizanne  
Cardozo-  
SYBSc**



**E-poster  
Competition:  
Winner  
Radha  
Shirsat-  
SYBSc**

**COVID VACCINATION**

can keep you from getting the virus

Getting vaccinated also protect people around who are at risk

It will help put an end to the pandemic

Best and safest way to prevent disease

help keep you from getting seriously ill if you get COVID-19

India has been administering Covishield, Covaxin and Sputnik V vaccines to the people. The vaccines are safe and are advised for everyone above 18 years.

**LET'S GET VACCINATED!**

**Walk-in vaccination is now open!**

References: <https://images.app.goo.gl/MKherM4BHMZs85v9>  
<https://images.app.goo.gl/bTadN1SEvuzQ5CTA>  
 Benefits of Getting a COVID-19 Vaccine (2021, June 15) Centers for Disease Control and Prevention. <https://www.cdc.gov/covid19/non/vaccines/vaccine-benefits.html>  
 COVID-19 vaccines (2021, June 21) World Health Organization. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines>  
<https://images.app.goo.gl/e3M99uTKPeNeCzME9>



## **Report of World Environment Day**

NSS unit of Parvatibai Chowgule College of Arts and Science, Autonomous organised Poster making event for NSS volunteers on the occasion of “**World Environment Day**” on 5<sup>th</sup> June 2020. The main theme for the event was “Time for Nature” with sub themes being a) Environmental Awareness, b) Man-Environment relationship and c) Changing Environment and Natural disaster. Total 26 posters were received from 25 NSS volunteers (23 female and 02 male) who participated in this event.

Dr. Nandkumar Sawant was invited as a Resource Person and delivered a talk on **Rejuvenating the coastal landscape** at the international webinar on Time for Nature, Post COVID-19 challenges to environmental challenges, organized by CHEC – INDIA, Jaipur on 5<sup>th</sup> June, 2020 on the eve world environment day.

Dr. Nandkumar Sawant was invited as a Resource Person and delivered a talk on Perspectives of Sustainable Tourism on 9<sup>th</sup> June 2020 organised by Shristi Nature club, PES College, Farmagudi.

Dr. Mayuri M. Naik, NSS Programme Officer conducted a 2 hour online workshop on **Swachhta and Jalshakti** (Under Online Workshop on Swachhta Action Plan, an initiative by Mahatma Gandhi National Council of Rural Education) for NSS volunteers on 23<sup>rd</sup> June 2020. Total 24 NSS volunteers (24 female, 0 male) participated in this online workshop.







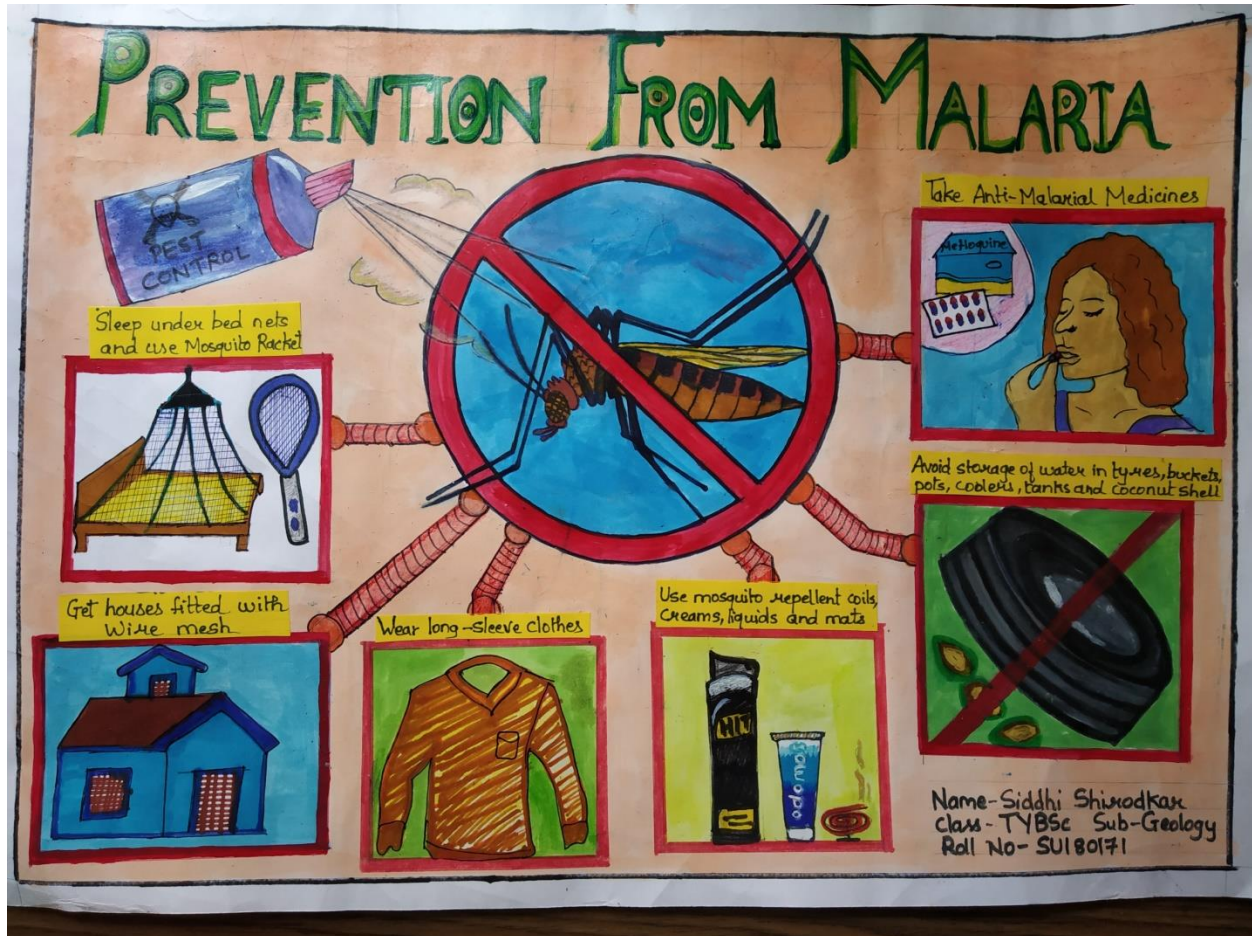
# Report- Posters on Vector borne diseases

Date of submission:09/10/2020

NSS Volunteers participated- 37

Female- 37

Male- NIL



# VECTOR BORNE DISEASE DENGUE



## What is Dengue?

It is an infectious disease transmitted by a female mosquito.



ONE BITE  
THREAT TO  
life

## Symptoms



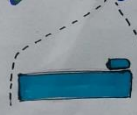
## Simple measures to protect you & your family



Get rid of Stagnant Water



Use of insect repellent



Use of insect nets while sleeping



Seek early medical help.

Spray To  
Kill



yukta DicholKar  
S.Y.B.Sc. Chemistry  
SU190039



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**REPORT OF FACULTY PARTICIPATION**

<b>Title:</b>	'Bird Walk'
<b>Date and year:</b>	05 <sup>th</sup> to 07 <sup>th</sup> February 2021
<b>Organising Committee</b>	Goa Forest Department
<b>No. of Participants</b>	25
<b>Objective</b>	To expose students to various birds found at carambolim and maina Curtorim.
<b>Summary of the proceedings</b>	Dr. Nandini Vaz Fernandes and Mr. Stephen Dias, Department of Zoology coordinated the 'Bird Walk' organised by Goa Forest Department from 05 <sup>th</sup> to 07 <sup>th</sup> February 2021. Bird walks were conducted at two sites viz. Carambolim Lake and Curtorim-Raia Lake (Maina-Curtorim Wetland Complex). Mr. Stephen Dias, Ms. Gautami Manakikar, Ms. Prasanna Naik Gaonkar and Ms. Pratibha Tripathi conducted the birdwalks for the general public on behalf of the forest department.

**Photographs**







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<b><u>REPORT OF FACULTY PARTICIPATION</u></b>	
<b>Title:</b>	Pre-Bird Festival Webinars'
<b>Date and year:</b>	29 <sup>th</sup> to 31 <sup>st</sup> January 2021
<b>Organising Committee</b>	Goa Forest Department
<b>Resource person:</b>	Dr. Nandini Vaz Fernandes Parag Ragnekar Amit raj Golda DaCosta Shalma Mascarenha Pronoy Baidya Jalmesh Karapurkar
<b>No. of Participants</b>	60
<b>Objective</b>	To understand the biodiversity conservation-prospects and challenges
<b>Summary of the proceedings</b>	Dr. Nandini Vaz Fernandes, Associate Professor, Department of Zoology was invited as a resource person by Forest Department, Govt. of Goa, for the 'Pre-Bird Festival Webinars' organised from 29 <sup>th</sup> to 31 <sup>st</sup> January 2021. Her session on "Introduction to Birdwatching" was the opening session of the Pre-bird festival, which was live streamed for general public all over Goa. The Pre-Bird Festival was organised by Forest department as an initiative to create awareness on the importance of bird conservation and to share the knowledge of various birds and their role in the environment and the benefits of birding

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## Photographs



Goa Forest Department

Presents

## Pre-Bird Festival Webinars

29 Jan- 01 Feb 2021



Dr. Nandini Vaz Fernandes  
An Introduction to Birdwatching  
29 Jan-15:30-16:30



Parag Rangnekar  
Bird Diversity of Goa and its  
potential as a bird tourism hotspot  
29 Jan-16:30-17:30



Shalma Mascarenhas  
Endemic Birds of Western Ghats  
in Goa  
30 Jan-15:30-16:30



Amit Raj  
Birds in Reels  
30 Jan-16:30-17:30



Pronoy Baidya  
Birding for a Better Tomorrow  
31 Jan-16:30-17:30



Golda D'Costa  
Wetland Birds of Goa  
01 Feb-15:30-16:30



Jalmesh Karapurkar  
Denizens of the Night: Night  
Birds of Goa  
01 Feb-16:30-17:30

Image: Colleen O'Dell



Goa Forest Department

Presents

## Pre-Bird Festival Webinars

29 January 2021



Dr. Nandini Vaz Fernandes  
An Introduction to Birdwatching  
15:30-16:30



Parag Rangnekar  
Bird Diversity of Goa and its  
potential as a bird tourism hotspot  
16:30-17:30

Live Streaming on



<https://www.facebook.com/100180528770151/live/>

Image: Colleen O'Dell