

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION

D.Y. PATIL POLYTECHNIC



MICRO PROJECT

Academic year: 2024-25

TITLE OF PROJECT : SOIL POLLUTION

Subject : Environmental Education & Sustainability Subject code: 314301

Course : Computer Engineering

Course code: CO4K



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION

Certificate

This is to certify that Mr. **Lokare Dnyaneshwari Devidas** Roll No.**31** of Fourth Semester diploma in **Computer Engineering** of Institute, **D.Y. Patil Polytechnic** (Instt.Code: 0996) has completed the Micro-Project in course **ENVIRONMENTAL EDUCATION & SUSTAINABILITY (314301)** for the academic year 2024-2025 as prescribed in the MSBTE curriculum of K Scheme.

Place: Ambi

Enrollment No:**23212350299**

Date:

Exam Seat No: **240706**

Subject Teacher

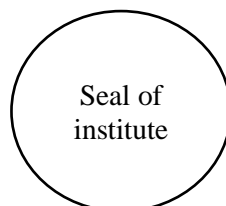
(Prof.S.S Bandal)

Head of the Department

(Prof.S.Shiwankar)

Principal

(Prof. S.V. Awachar)





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Certificate

This is to certify that Mr. **Borhade Soham Navnath** Roll No.**32** of Fourth Semester diploma in **Computer Engineering** of Institute, **D.Y. Patil Polytechnic** (Instt.Code: 0996) has completed the Micro-Project in course **ENVIRONMENTAL EDUCATION & SUSTAINABILITY (314301)** for the academic year 2024-2025 as prescribed in the MSBTE curriculum of K Scheme.

Place: Ambi

Enrollment No:**23212350300**

Date:

Exam Seat No:**240707**

Subject Teacher

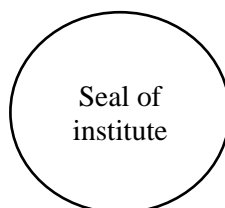
(Prof.S.S. Bandal)

Head of the Department

(Prof.S.Shiwankar)

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This is to certify that Mr. **Tidke Sachin Ramesh** Roll No.**33** of Fourth Semester diploma in **Computer Engineering** of Institute, **D.Y. Patil Polytechnic** (Instt.Code: 0996) has completed the Micro-Project in course **ENVIRONMENTAL EDUCATION & SUSTAINABILITY (314301)** for the academic year 2024-2025 as prescribed in the MSBTE curriculum of K Scheme.

Place: Ambi

Enrollment No:**23212350301**

Date:

Exam Seat No:**240708**

Subject Teacher

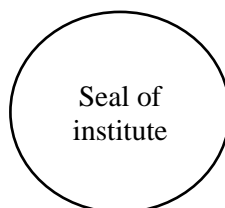
(Prof.S.S.Bandal)

Head of the Department

(Prof.S.Shiwankar)

Principal

(Prof. S.V. Awachar)



ACKNOWLEDGEMENT

It is a matter of great pleasure by getting the opportunity of highlighting. A fraction of knowledge, I acquired during our technical education through this project. This would not have been possible without the guidance and help of many people. This is the only page where we have opportunity of expressing our emotions and gratitude from the core of our heart to them. This project not have been success without enlightened ideas, timely suggestions and interest of our most respected guide "Prof. S.S.Bandal " without his best guidance this would have been an impossible task to complete.

I would like to thank "Prof.S.Shiwankar" Head of our department for providing necessary facility using the period of working on this project work. I would also like to thank our Principal "Prof. S. V. Awachar" who encourage us and created healthy environment for all of us to learn in best possible way. Finally I would pay my respect and love to my parents and all other family members as we as friends for their love and encouragement throughout my career.

Student Names

1. Dnyaneshwari D. Lokare
- 2.Soham N. Borhade
3. Sachin R. Tidke

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Abstract

Soil pollution is a critical environmental issue that threatens food security, ecosystem health, and sustainable development. In the context of Environmental Education and Sustainability, understanding the causes, impacts, and solutions to soil contamination is essential for fostering responsible environmental behavior.

This micro project examines how industrial waste, agricultural chemicals, and improper waste disposal contribute to soil degradation.

It also highlights the role of education in raising awareness and promoting sustainable practices such as organic farming, waste management, and soil remediation techniques.

By integrating environmental education into daily life, this project aims to inspire collective action towards preserving soil health and achieving long-term sustainability goals.

Introduction

It is a serious environmental concern since it harbours many health hazards. For example, exposure to soil containing high concentrations of benzene increases the risk of contracting leukaemia. An image detailing the discolouration of soil due to soil pollution is provided below.

It is important to understand that all soils contain compounds that are harmful/toxic to human beings and other living organisms. However, the concentration of such substances in unpolluted soil is low enough that they do not pose any threat to the surrounding ecosystem. When the concentration of one or more such toxic substances is high enough to cause damage to living organisms, the soil is said to be contaminated.

- **Soil pollution**



The root cause of soil pollution is often one of the following:

Agriculture (excessive/improper use of pesticides)

Excessive industrial activity

Poor management or inefficient disposal of waste

The challenges faced in soil remediation (decontamination of soil) are closely related to the extent of soil pollution. The greater the contamination, the greater the requirement for resources for remediation.

- **Pollutants that Contaminate Soil**

The different types of pollutants that are found in contaminated soil are listed in this subsection.

Heavy Metals

The presence of heavy metals (such as lead and mercury, in abnormally high concentrations) in soils can cause it to become highly toxic to human beings. Some metals that can be classified as soil pollutants are tabulated below.

- **Industrial Waste**

The discharge of industrial waste into soils can result in soil pollution. Some common soil pollutants that can be sourced from industrial waste are listed below.

Chlorinated industrial solvents

Dioxins are produced from the manufacture of pesticides and the incineration of waste.

Plasticizers/dispersants

Polychlorinated biphenyls (PCBs)

The petroleum industry creates many petroleum hydrocarbon waste products. Some of these wastes, such as benzene and methylbenzene, are known to be carcinogenic in nature.

- **Effects on Human Beings**

Soil contaminants can exist in all three phases (solid, liquid, and gaseous). Therefore, these contaminants can find their way into the human body via several channels such as direct contact with the skin or through the inhalation of contaminated soil dust.

Exposure to high levels of lead can result in permanent damage to the nervous system. Children are particularly vulnerable to lead.

Depression of the CNS (Central Nervous System).

Damage to vital organs such as the kidney and the liver.

Higher risk of developing cancer.

It can be noted that many soil pollutants such as petroleum hydrocarbons and industrial solvents have been linked to congenital disorders in humans. Thus, soil pollution can have several negative effects on human health.

- **Effects on Plants and Animals**



Since soil pollution is often accompanied by a decrease in the availability of nutrients, plant life ceases to thrive in such soils. Soils contaminated with inorganic aluminium can prove toxic to plants. Also, this type of pollution often increases the salinity of the soil, making it inhospitable for the growth of plant life.

Plants that are grown in polluted soil may accumulate high concentrations of soil pollutants through a process known as bioaccumulation. When these plants are consumed by herbivores, all the accumulated pollutants are passed up the food chain. This can result in the loss/extinction of many desirable animal species. Also, these pollutants can eventually make their way to the top of the food chain and manifest as diseases in human beings.

- **Effects on the Ecosystem**

Since the volatile contaminants in the soil can be carried away into the atmosphere by winds or can seep into underground water reserves, soil pollution can be a direct contributor to air and water pollution.

It can also contribute to acid rain (by releasing huge quantities of ammonia into the atmosphere).

Acidic soils are inhospitable to several microorganisms that improve soil texture and help in the decomposition of organic matter. Thus, the negative effects of soil pollution also impact soil quality and texture.

Crop yield is greatly affected by this form of pollution. In China, over 12 million tons of grain (worth approximately 2.6 billion USD) is found to be unfit for human consumption due to contamination with heavy metals (as per studies conducted by the China Dialogue).

Literature Review

Soil pollution has emerged as a significant environmental challenge due to rapid industrialization, urbanization, and unsustainable agricultural practices. Several studies have highlighted how the accumulation of pollutants such as heavy metals, pesticides, plastics, and hydrocarbons degrades soil quality and threatens food security, biodiversity, and human health (Gupta & Sinha, 2019).

According to Sharma and Reddy (2021), soil contamination directly affects plant growth and microbial activity, leading to reduced agricultural productivity and ecological imbalance. The World Health Organization (WHO) also emphasizes that exposure to polluted soil can result in serious health issues, especially in rural communities dependent on agriculture.

In the field of Environmental Education, integrating topics like soil pollution helps raise awareness among students and communities about the need for sustainable soil management. Studies by Patel (2020) show that when learners are exposed to real-world environmental problems, they are more likely to adopt eco-friendly behaviors and practices.

Sustainability-focused research emphasizes the need for restoring soil health through organic farming, composting, and bioremediation techniques. The United Nations' Sustainable Development Goals (SDGs), particularly Goal 15 (Life on Land), stress the importance of protecting soil to ensure a healthy ecosystem.

What is Soil Pollution ?

Soil pollution refers to the contamination of soil by harmful substances such as chemicals, pesticides, heavy metals, plastics, and waste materials. It occurs mainly due to human activities like industrial waste dumping, excessive use of fertilizers, and poor waste management.

In the context of Environmental Education and Sustainability, soil pollution is studied to help people understand how important soil is for life. Soil supports plant growth, filters water, and is home to many living organisms. When soil becomes polluted, it affects food production, human health, and the balance of nature.

Environmental Education plays a key role in teaching students and communities how to protect the soil. It helps raise awareness about the causes and dangers of soil pollution and promotes responsible actions like recycling, composting, and using organic farming methods.

Causes of Soil Pollution

1. Industrial Waste Disposal :-

Factories often dump chemicals, metals, and toxic waste directly onto land or into water sources that seep into the soil.

Common pollutants: lead, mercury, arsenic, and petroleum products.

2. Excessive Use of Pesticides and Fertilizers :-

In modern farming, the overuse of chemical fertilizers, herbicides, and insecticides can poison the soil and kill beneficial microorganisms.

These chemicals also enter the food chain and affect human health.

3. Improper Waste Management :-

Dumping household garbage, plastics, and e-waste in open lands leads to the accumulation of non-biodegradable pollutants in the soil.

Waste from landfills also releases harmful substances over time.

4. Oil Spills and Leakages :-

Accidental leaks from oil pipelines, vehicles, or storage tanks contaminate the soil with hydrocarbons, which are very hard to clean.

5. Deforestation and Land Degradation :-

Cutting down trees and clearing vegetation exposes soil to erosion and makes it more vulnerable to pollution.

Soil loses its natural ability to filter and retain nutrients.

6. Mining Activities :-

Mining operations release heavy metals and minerals into nearby soil, disrupting its natural composition and harming plant life.

Solution to Soil Pollution



1. Tree Plantation and Afforestation :-

Planting trees helps prevent soil erosion and improves soil quality.

Forests act as natural filters, absorbing pollutants.

2. Promote Organic and Sustainable Farming :-

Use natural fertilizers like compost and manure instead of chemical-based fertilizers and pesticides.

Crop rotation and companion planting can reduce the need for harmful chemicals.

3. Proper Waste Management :-

Encourage segregation of waste at the source—biodegradable, recyclable, and hazardous.

Promote safe disposal of industrial and e-waste.

Reduce plastic usage and avoid dumping waste into open land.

Conclusion

Soil pollution is a serious environmental issue that affects food production, human health, and the overall balance of ecosystems. Through environmental education, we can raise awareness about the causes and effects of soil contamination and encourage individuals and communities to adopt sustainable practices.

Educating people—especially students—about soil health helps build a sense of responsibility toward nature and inspires action toward reducing pollution. By promoting organic farming, proper waste disposal, recycling, and afforestation, we can protect soil from further degradation.

Sustainability depends on how well we care for our natural resources, and healthy soil is at the heart of a sustainable future. It is our duty to act today, through education and responsible behavior, to ensure a cleaner, greener planet for future generations.

Weekly Progress Report

Sr.No.	Week	Activity Performed	Sign of Guide	Date
1	1st	Discussion and finalization of topic		
2	2nd	Preparation and submission of Abstract		
3	3rd	Literature Review		
4	4th	Collection of Data		
5	5th	Collection of Data		
6	6th	Discussion and outline of Content		
7	7th	Formulation of Content		
8	8th	Editing and proof Reading of Content		
9	9th	Compilation of Report And Presentation		
10	10th	Seminar		
11	11th	Viva voce		
12	12th	Final submission of Micro-Project		

Sign of the student

Sign of the faculty
(Prof. S.S. Bandal)

ANNEXURE II

Evaluation Sheet for the Micro Project

Academic Year: 2024-2025

Name of Faculty: Prof. S. S. Bandal

Course : Computer Engineering

Course code: CO4K

Semester: IV

Subject Name: Environmental Education & Sustainability (314301)

Major learning outcomes achieved by students by doing the project

- **Practical outcome:**

The practical outcome is selective data routing, where a single input is directed to one of four outputs based on control signals.

- **Course outcome:**

Understanding English language for speaking

Outcomes in Affective domain: Function as team member Follow Ethics

Comments/suggestions about team work /leadership/inter-personal communication (if any)

.....3

Roll No	Student Name	Marks out of 6 for performance in group activity	Marks out of 4 for performance in oral/ presentation	Total out of 10
31	Lokare Dnyneshwari Devidas			
32	Borhade Soham Navnath			
33	Tidke Sachin Ramesh			

Signature of Faculty
(Prof. S.S.Bandal)