

# Module 1

## Environmental Awareness and Conservation of Natural Resources

### Education Module

#### 1-Introduction

This module focuses on basic concepts of environmental awareness and conservation of natural resources. Participants will have the opportunity to learn about the services provided by natural resources and ways to conserve them. They will be able to identify reduce, reuse, recycle, and describe different resource conservation practices according to the type of waste.

**Duration: 5 hours**

#### Objectives:

##### *GENERAL OBJECTIVE*

To develop environmental awareness among participating teachers by informing them about the reasons for the depletion of natural resources and suggesting measures to prevent it, thereby promoting the conservation of natural resources.

##### *SPECIFIC OBJECTIVES*

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Frame work of Module 1				
Duration	Venue	Methodology	Learning Outcome	Assesment
<b>Session 1 The Concepts of Natural Resources</b>				
1 hour	Training hall	Roleplay Group work Sharing ideas Discussion Presentation Activity sheet	Participants will understand about various types of natural resources and associated issues,	reflective diaries, verbal feedback, semi-structured interview form with open-ended questions, process outputs (drawing, audio, visual materials created by the participants)
<b>Session 2: Reasons for the depletion of natural resources</b>				
1 hour	Training Hall	Group discussion Individual work Activity sheet Discussion Inventory development	Participants will be able to identify reasons for the depletion of natural resources and propose measures to prevent it.	reflective diaries, verbal feedback, semi-structured interview form with open-ended questions, process outputs (drawing, audio, visual materials created by the participants)
<b>Session 3: Waste Diversion</b>				
1 hour		Group work Discussion Sharing thoughts Presentation	Participants will be able to identify types of waste and explain the origins of the waste generated.	reflective diaries, verbal feedback, semi-structured interview form with open-ended questions, process

		Activity sheet		outputs (drawing, audio, visual materials created by the participants)
<b>Session 4: Natural Resources Conservation Practices; Reduce, Reuse, and Recycle</b>				
1 hour		Roleplay Group work Discussion Sharing thoughts Presentation Activity sheet	Participants will be able to explain reduce, reuse, recycle and describe different resource conservation practices according to the type of waste in the school.	reflective diaries, verbal feedback, semi-structured interview form with open-ended questions, process outputs (drawing, audio, visual materials created by the participants)
<b>Session 5: Concept of Upcycling</b>				
1 hour		Discussion Group work Sharing thoughts Presentation Activity sheet Art/ poster competition	Participants will be able to understand the concept of upcycling and suggest practices for upcycling.	reflective diaries, verbal feedback, semi-structured interview form with open-ended questions, process outputs (drawing, audio, visual materials created by the participants)

### **Session 1: The Concept of Natural Resources and Environment**

**Duration:** 1 hour

#### **Resources Required**

- Hand out
- Flip chart
- Markers/pens
- Reference material

#### **Methodology**

- Group work
- Discussion
- Sharing thoughts
- Presentations

#### **Learning Outcome:**

The participants understand the concepts of marine life, forests, biodiversity, wildlife, water and pollution.

**Procedure:**

1. Discussion the various concepts of environment and natural resources among the participants for 15 minutes.
2. Divide the participants in groups of 4-5 members.
3. Distribute reading materials on concept-related topics such as soil and its products, water and the resources of aquatic environments, energy resources, ores and metals, societies and resources, global warming.
4. Give each group a topic related to the topic and give them 20 minutes to discuss it among themselves.
5. After 30 minutes, invite group representatives to give a 5 minutes presentation on their assigned topic with question-answer session at the end.
6. Review and reinforce each topic through discussion within the local context.
7. Distribute the reference material of given topic for further reading.

**Questions:**

1. What is environment?
2. What do you understand by natural resources?
3. Could you please explain biodiversity?
4. How water and the resources of aquatic environments is beneficial?
5. How does global warming impact the environment?

## **Natural Resources and Environment**

**Environment**

Animate and inanimate surroundings in which beings live. It includes human beings, animals, plants, objects, water, soil, air and interrelations between them plus aesthetic, natural science and cultural history values. Environment can be defined as a sum total of all the living and non-living elements and their effects that influence human life. While all living or biotic elements are animals, plants, forests, fisheries, and birds, non-living or abiotic elements include water, land, sunlight, rocks, and air. Aquatic ecosystems are critical components of the global environment. In addition to being essential contributors to biodiversity and ecological productivity, they also provide a variety of services for human populations, including water for drinking and irrigation, recreational opportunities, and habitat for economically important fisheries. However, aquatic systems have been increasingly threatened, directly and indirectly, by human activities. In addition to the challenges posed by land-use change, environmental pollution, and water diversion, aquatic systems are expected to soon begin experiencing the added stress of global climate change.

**Natural Resources**

Any biological, mineral, or aesthetic asset afforded by nature without human intervention that can be used for some form of benefit, whether material (economic) or immaterial. What is considered a “resource” (or, for that matter, “natural”) has varied over time and from one society to another. Examples of assets that can be considered natural resources include forests, surface water and groundwater, and the fertile lands or the soil and minerals within them (rather than the crops that grow on them), as well as energy resources (such as petroleum, natural gas, and heated water [that is, geothermal energy]) contained within layers of rock. Natural resources are materials from the Earth that are used to support life and

meet people's needs. Any natural substance that humans use can be considered a natural resource. Oil, coal, natural gas, metals, stone and sand are natural resources. Other natural resources are air, sunlight, soil and water. Animals, birds, fish and plants are natural resources as well. Natural resources are used to make food, fuel and raw materials for the production of goods. All of the food that people eat comes from plants or animals. Natural resources such as coal, natural gas and oil provide heat, light and power. Natural resources also are the raw materials for making products that we use everyday from our toothbrush and lunch box to our clothes, cars, televisions, computers and refrigerators.

### **Renewable and Nonrenewable Resources**

Renewable resources are those natural resources such as trees, water, sun and wind that can be replenished at about the same rate at which they are used. Renewable resources, however, can be depleted if not properly managed or conserved.

Nonrenewable resources are those natural resources that are depleted more quickly than they can regenerate. Fossil fuels like oil and natural gas were formed over millions of years. Once mined and used completely, nonrenewable resources are gone forever.

### **Biodiversity**

Biodiversity is one of the basic principles of sustainable development. Biodiversity covers all species of plant, animal and micro-organism plus the genetic variability that they embody and the ecosystems of which they form part. Today the threats to biodiversity are truly disheartening. The majority of the biodiversity on the planet is in tropical forests in developing countries, which are experiencing rapid population growth. This population growth and the development necessary in order to sustain it threaten to wipe out 70% of all living species by the end of the century.

The importance of biodiversity lies in the large number of organisms on earth and the variability within the same species. All this information is a potentially valuable source for new pharmaceuticals, chemicals and materials. The most immediate consequence of loss of these species would be to upset the balance of the ecosystems and of the planet. In the long term, however, the loss of potentially extremely valuable information would be more important. For this reason, these problems are serious enough to demand a rapid response. Individual countries are taking measures, such as drafting legislation on conservation of their species, declaring sites with great biological riches as heavily protected areas of natural interest, etc.

### **Effects of Global Warming On the Environment**

Global warming is the long-term warming of the planet's overall temperature. Though this warming trend has been going on for a long time, its pace has significantly increased in the last hundred years due to the burning of fossil fuels. As the human population has increased, so has the volume of fossil fuels burned. Climate scientists have concluded that we must limit global warming to 1.5 degrees Celsius by 2040 if we are to avoid a future in which everyday life around the world is marked by its worst, most devastating effects: the extreme droughts, wildfires, floods, tropical storms, and other disasters that we refer to collectively as climate change. Although people tend to use these terms interchangeably, global warming is just one aspect of climate change. "Global warming" refers to the rise in global temperatures due mainly to the increasing concentrations of greenhouse gases in the atmosphere. "Climate change" refers to the increasing changes in the measures of climate over a long period of time – including precipitation, temperature, and wind patterns.

Below, you can find a list of climate change's main consequences;

- The climate crisis has increased the average global temperature and is leading to more frequent high-temperature extremes, such as heatwaves. Higher temperatures can cause increased mortality, reduced productivity and damage to infrastructure. The most vulnerable members of the population, such as the elderly and infants, will be most severely affected.

- Due to the changing climate, many European regions are already facing more frequent, severe, and longer lasting droughts. A drought is an unusual and temporary deficit in water availability caused by the combination of lack of precipitation and more evaporation (due to high temperatures). It differs from water scarcity, which is the structural year-round lack of fresh water resulting from the over-consumption of water..

- As the climate heats up, rainfall patterns change, evaporation increases, glaciers melt and sea levels rise. All these factors affect the availability of fresh water. More frequent and severe droughts and rising water temperatures are expected to cause a decrease in water quality.

- Climate change is expected to lead an increase of precipitation in many areas. Increased rainfall over extended periods will mainly lead to fluvial (river) flooding, while short, intense cloudbursts can cause pluvial floods, where extreme rainfall causes flooding without any body of water overflowing.

-The sea level rose over the course of the 20th century, and the tendency has accelerated in recent decades. The rise is mostly due to thermal expansion of the oceans because of warming. But melting ice from glaciers and the Antarctic ice sheet is also contributing. It is predicted that Europe will experience an average 60 to 80 cm sea-level rise by the end of the century, mainly depending on the rate at which the Antarctic ice sheet melts.

- Climate change is happening so fast that many plants and animal species are struggling to cope. There is clear evidence to show that biodiversity is already responding to climate change and will continue to do so. Direct impacts include changes in phenology (the behaviour and lifecycles of animal and plant species), species abundance and distribution, community composition, habitat structure and ecosystem processes.

## **Session 2: Reasons for the depletion of natural resources**

### **Duration**

1 hour

### **Resources Required**

- Hand out
- Flip chart
- Markers

### **Methodology:**

- Analytical group work
- Discussion
- Sharing thoughts
- Presentation
- Activity sheets
- Inventory development

### **Learning Outcome:**

Participants will be able to identify reasons for the depletion of natural resources and propose measures to prevent it

### **Procedure:**

1. First enable the participants to understand the depletion of natural resources through a presentation.
2. Divide the participants into groups according to the total number of participants and distribute flip charts and markers in each group.
3. Assign each group one reason for the depletion of natural resources theme (pollution, deforestation, high utilization of resources, mining, climate change, overconsumption, and waste), and ask them to list down five major effects of that theme on natural resources. Give 15 minutes to finish the assignment.
4. After 15 minutes take feedback from them.
5. Reinforce the topic through discussion with the participants for 20 minutes using the list of major effects of the depletion of natural resources.

### **Questions:**

1. Could you please explain the reasons for the depletion of natural resources?
2. Why is it necessary to prevent the depletion of natural resources?
3. Why are water resources important?
4. What are the main causes of pollution?
5. Could you please explain the benefits of taking measures to prevent the depletion of natural resources?

## **The Reasons For The Depletion of Natural Resources**

The depletion of natural resources has emerged as a critical issue with profound implications for environmental sustainability, economic stability, and social well-being. Natural resources, which include water, minerals, fossil fuels, and biological assets, constitute the essential building blocks of human civilization and economic development. The natural resources contribute at large to the economic development of a nation. However, the unsustainable exploitation and consumption of these resources have led to their accelerated depletion, posing significant challenges at both local and global scales. On the other hand, the results indicate that natural resource depletion and mineral depletion have been major causes to destroy the economic growth of many countries.

The primary drivers of resource depletion are multifaceted and interconnected, encompassing demographic pressures, industrial and technological advancements, and unsustainable consumption patterns. Rapid population growth increases the demand for resources, while industrialization and urbanization exacerbate resource extraction and environmental degradation. Furthermore, the pursuit of economic growth often overlooks the ecological limits of resource availability, leading to overexploitation and irreversible environmental impacts.

Compounding these challenges are anthropogenic factors such as pollution, deforestation, and climate change, which not only degrade natural resources but also disrupt the delicate balance of ecosystems. These processes collectively diminish the regenerative capacity of natural systems, threatening biodiversity and the resilience of ecological networks. Understanding the complex interplay of these factors is crucial for developing effective strategies for resource management and conservation. This necessitates a holistic and interdisciplinary approach that integrates ecological, economic, and social dimensions to mitigate the adverse consequences of resource depletion and promote sustainable development for future generations.

The depletion of natural resources is a complex issue caused by multiple factors, including:

**Overpopulation:** Increased population leads to higher demand for resources such as water, land, and energy, causing faster depletion rates. Rapid population growth continues to be a major underlying force of environmental degradation and a threat to sustainable use of natural resources. It reduces the quality and quantity of natural resources through overexploitation, intensive farming, and land fragmentation.

**Industrialization and Urbanization:** Rapid industrial and urban development consumes large quantities of natural resources, including fossil fuels, minerals, and timber, and often leads to environmental degradation. One of the requirements of industrialization is the need for energy. Natural resources are needed to meet the energy need. This situation emerges as a factor in the depletion of natural resources due to industrialization. Industrialization significantly drives environmental pollution in newly industrialized countries, while renewable energy and natural resources mitigate environmental degradation in the long run. Urbanisation has led to degradation of environmental quality especially the quality of water, air and noise. The domestic waste, industrial effluents and other waste that were dumped directly to the river have affected the water quality. Besides, the air pollution has also increased due to emission from motor vehicles, industrial development and use of non-environmental friendly fuel sources. Meanwhile, the noise pollution is generated from the various humanactivities which are increasing. The increase in population has generated a very high volume of solid waste in the urban areas.

**Agricultural Expansion and Deforestation:** Agricultural expansion, while critical for meeting the food demands of a growing global population, often comes at the cost of natural resource depletion. This phenomenon involves converting forests, wetlands, and grasslands into agricultural land, which can have several environmental and socio-economic consequences like deforestation, soil depletion, and loss of biodiversity. Clearing of forests for agriculture, urban

development, and logging reduces biodiversity and disrupts ecosystems, leading to the loss of resources like timber and affecting water cycles.

**Pollution:** Pollution from industrial activities, agriculture, and urban areas can contaminate resources like water and soil, making them unusable and thus contributing to their depletion. Pollution and depletion of natural resources are interlinked issues that pose significant challenges to the sustainability of the planet. These problems are exacerbated by human activities and can have long-term consequences on ecosystems, human health, and global economies. Pollution types can be classified as air, water, soil and plastic pollution. The reasons for these pollutions can be shown as dense population, human consumption habits, industrial production wastes, proliferation of agricultural lands, and the necessity of large lands and water for agricultural lands. Such pollution leads to the overuse of various natural resources. This means the use of water, forests, fossil fuels, minerals and metals, marine resources. Over-exploitation of natural resources disrupts the habitat in forests, waters, and negatively affects the natural water cycle.

**Over-exploitation:** Over-exploitation refers to the excessive use of natural resources at a rate faster than they can be replenished. This often leads to resource depletion, where the availability of these resources declines significantly or is exhausted entirely. Overexploitation of natural resources can also be associated with industrialization, urbanization and overpopulation. Forests, fossil fuels, water, marine resources and soil are most affected.

**Climate Change:** Climate change and the depletion of natural resources are closely interconnected issues, each exacerbating the other in a cyclical pattern. Changes in climate patterns can affect the availability of water, soil fertility, and biodiversity, leading to the depletion of these resources. Addressing these challenges requires understanding their interplay and the broad range of impacts they have on the environment, economy, and society. In particular, deforestation to clear agricultural land leads to an increase in carbon emissions, which in turn leads to a warming of the world. In addition, the consumption of fossil fuels is another reason for the increase in carbon emissions. Excessive agriculture causes soil erosion and disruption of the natural water cycle, while industrial wastes cause soil and water pollution. These situations also lead to a reduction in natural resources, as rivers dry up and forests decline. Each of these factors contributes to the complex problem of natural resource depletion, often with interconnected and compounding effects. As can be seen, the causes of natural resource depletion are connected processes. Industrialization requires labour. Labor means population growth. Population growth brings urbanization. Industrial plants and industrial production produce waste. In addition, the increasing population being potential consumers, expanding agricultural areas to meet their needs, expanding farming, harmful gases emitted by the vehicles used by urban dwellers for private or commercial purposes, increasing the amount of garbage, increasing population and urbanization increase the heat and change the climate. All these are effective in depleting natural resources.

### **The Need to Prevent the Depletion of Natural Resources**

Natural resources form the foundation of our planet's ecosystems and are integral to the survival and prosperity of human societies. These resources, including water, forests, minerals, and fossil fuels, support life, drive economic growth, and provide essential ecosystem services. However, the over-exploitation and depletion of these resources pose a significant threat to both environmental stability and human well-being. It is crucial to understand why preventing the depletion of natural resources is essential for sustainable development and the preservation of our planet.

### **Environmental Sustainability and Biodiversity Preservation**



One of the most pressing reasons to prevent the depletion of natural resources is to maintain environmental sustainability and protect biodiversity. Natural resources such as forests, wetlands, and oceans are home to a myriad of species, many of which are interconnected in complex ecological networks. The loss of these habitats due to deforestation, mining, and other extractive activities disrupts these networks, leading to a decline in biodiversity. This not only threatens individual species with extinction but also undermines the stability and resilience of entire ecosystems.

Healthy ecosystems provide invaluable services, including pollination, water purification, soil fertility, and climate regulation. For instance, forests act as carbon sinks, absorbing carbon dioxide from the atmosphere and mitigating the effects of climate change. Wetlands filter pollutants and recharge groundwater, while oceans regulate global temperatures and support marine life. The depletion of these resources disrupts these services, leading to environmental degradation that can have far-reaching consequences for both nature and human society.

### **Climate Regulation and Mitigation of Global Warming**

Natural resources play a crucial role in regulating the Earth's climate. Forests, for example, sequester vast amounts of carbon dioxide, helping to mitigate global warming. However, deforestation, driven by agricultural expansion, logging, and urbanization, releases this stored carbon back into the atmosphere, contributing to an increase in greenhouse gas concentrations. Similarly, the extraction and burning of fossil fuels release significant amounts of carbon dioxide and methane, exacerbating the problem of climate change.

As the climate changes, it also impacts natural resources. Altered precipitation patterns, more frequent and severe droughts, and rising temperatures can lead to the degradation of soil, reduced water availability, and loss of agricultural productivity. These changes create a vicious cycle, where resource depletion contributes to climate change, and climate change, in turn, accelerates the depletion of natural resources. Preventing this cycle is essential to stabilizing the climate and ensuring a sustainable future.

### **Economic Stability and the Well-Being of Communities**

The depletion of natural resources has profound economic implications, particularly for communities and nations that are heavily dependent on these resources for their livelihoods. For many developing countries, natural resources such as timber, minerals, and fisheries are major sources of income and employment. Unsustainable exploitation of these resources can lead to economic instability, loss of jobs, and increased poverty. Moreover, as resources become scarcer, the cost of extraction rises, and the economic benefits diminish, making it harder for these communities to sustain their economies.

In addition to local and national economies, the global economy is also affected. Resource depletion can lead to volatility in global markets, particularly for commodities like oil, gas, and metals. This volatility can result in higher prices for consumers and increased costs for industries reliant on these raw materials. By managing resources sustainably, we can avoid economic disruptions and ensure that these resources continue to contribute to prosperity.

### **Social and Human Health Impacts**

The depletion of natural resources also has direct and indirect impacts on human health and well-being. Access to clean water, for example, is fundamental to life. Over-extraction of groundwater, pollution of rivers and lakes, and the destruction of watersheds can lead to water scarcity, affecting millions of people around the world. This scarcity can result in poor sanitation, increased disease, and reduced agricultural productivity, which in turn can lead to food insecurity and malnutrition.

Air pollution, often a byproduct of resource extraction and industrial activities, poses another significant health risk. Burning fossil fuels for energy and transportation releases pollutants that contribute to respiratory diseases, cardiovascular problems, and premature deaths. Soil degradation and deforestation, meanwhile, reduce the land's capacity to support agriculture, threatening food security and livelihoods. These impacts disproportionately affect the most vulnerable populations, exacerbating social inequalities and undermining human development.

### **Intergenerational Equity and the Rights of Future Generations**

One of the fundamental principles of sustainable development is intergenerational equity – the idea that we should meet the needs of the present without compromising the ability of future generations to meet their own needs. Depleting natural resources at an unsustainable rate violates this principle, as it leaves future generations with fewer resources to support their lives and economies.

If we continue on our current path, future generations will inherit a planet that is less fertile, less biologically diverse, and more prone to extreme weather events. They will have fewer resources to meet their needs and will face greater challenges in addressing the impacts of climate change. By conserving natural resources and using them sustainably, we can ensure that future generations inherit a world that is capable of supporting their aspirations and well-being.

Preventing the depletion of natural resources is a fundamental aspect of sustainable development. It ensures the health of the planet, supports economic and social stability, and safeguards the well-being of current and future generations.

### **The Importance of Water Resources**

Water is one of the most essential resources on Earth, vital for all forms of life and a cornerstone of sustainable development. Covering about 71% of the planet's surface, water is integral to human survival, agriculture, industry, and the environment. Despite its abundance, only a small fraction of this water is accessible and suitable for human use, making the conservation and management of water resources critically important.

#### *Supporting Life and Human Health*

Water is fundamental to life. It is required for basic physiological processes in the human body, including digestion, circulation, temperature regulation, and the elimination of waste. Access to clean, safe drinking water is essential for health and well-being, yet millions of people around the world still lack this basic necessity. Contaminated water sources contribute to waterborne diseases such as cholera and diarrhea, which are leading causes of illness and death, particularly in developing countries. Ensuring the availability of clean water is, therefore, a key public health priority.

### *Agricultural and Economic Importance*

Water resources are also crucial for agriculture, which accounts for approximately 70% of global freshwater use. Irrigation is essential for growing crops and raising livestock, especially in arid and semi-arid regions where rainfall is insufficient. Without reliable access to water, food production would be severely limited, threatening food security and livelihoods. Beyond agriculture, water is indispensable for industrial processes, energy production, and numerous other economic activities. From powering hydroelectric dams to cooling power plants and manufacturing goods, water supports economic growth and development.

### *Environmental and Ecosystem Health*

Healthy ecosystems depend on the availability and quality of water resources. Rivers, lakes, wetlands, and aquifers provide habitats for a wide range of species and support biodiversity. They also offer critical ecosystem services, such as water purification, flood regulation, and the maintenance of soil health. However, over-extraction, pollution, and climate change are putting immense pressure on these natural systems. Protecting and restoring water bodies is essential for preserving biodiversity and maintaining the resilience of ecosystems in the face of environmental changes.

## **Main Causes of Pollution**

Pollution arises from various human activities and natural processes that introduce harmful substances or energies into the environment, negatively impacting air, water, soil, and living organisms. The primary reasons for pollution can be categorized as human activities (industrialization, transportation, agriculture, urbanization and construction, waste disposal, energy production, deforestation etc.), natural causes (volcanic eruptions, wildfires, dust storms etc.), inadequate environmental policies and regulation (unchecked industrial emissions, improper waste disposal, and over-exploitation of natural resources etc.), consumer behavior and overconsumption, technological and production inefficiencies, globalization and trade, lack of public awareness and education.

## **The Benefits of Preventing the Depletion of Natural Resources**

Natural resources such as water, forests, minerals, and fossil fuels are the building blocks of life and the foundation of modern economies. However, these resources are finite and, if not managed sustainably, risk depletion with dire consequences for both the environment and human society. Taking measures to prevent the depletion of natural resources is essential, and the benefits of doing so are numerous and far-reaching. The benefits of preventing the depletion of natural resources extend beyond environmental protection. Sustainable resource management is fundamental to economic stability, food and water security, social well-being, and intergenerational justice. By adopting sustainable practices and policies, we can build a more resilient and prosperous future for both people and the planet. Investing in the conservation of natural resources is not just a necessity for our current survival but also a legacy for future generations.

### **Session 3: Waste Diversion**

#### **Duration**

1 hour

#### **Resources required**

- Hand out
- Flip chart
- Markers
- Activity sheet

#### **Methodology:**

- Roleplay
- Discussion
- Sharing thoughts
- Presentation
- Activity sheet

#### **Learning Outcome:**

The participants will be able to identify types of waste and explain the origins of the waste generated.

#### **Procedure:**

1. Give a presentation to the participants about the types of waste and where they come from.
2. Provide flip charts and markers to the participants and encourage them to list the problems environmental wastes cause.
3. Allow 15 minutes to complete the activity, take feedback from participants, and display lists on the wall.
4. Discuss the types of waste identified, their status, and the problems that environmental wastes cause.

#### **Questions:**

1. What are the main types of waste generated in your school?
2. What are the activities that cause the most waste in your school?
3. Can you give some examples of problems caused by environmental waste?
4. Can you explain the relation between environmental waste and the depletion of natural resources?
5. How does avoiding producing waste help to conserve natural resources?

#### **Possible Types Of Waste Generated in a School**

The main types of waste generated in a school environment typically include a variety of materials, reflecting the diverse activities that occur in educational settings. Here are the primary categories:

### **1. Paper and Cardboard Waste:**

- **Sources:** Notebooks, worksheets, examination papers, handouts, cardboard boxes, and packaging materials.
- **Impact:** This is often the largest category of waste in schools, contributing significantly to environmental impact if not properly recycled.

### **2. Plastic Waste:**

- **Sources:** Disposable plastic bottles, food wrappers, packaging materials, plastic bags, stationery items (pens, rulers), and single-use items like cutlery and plates from the cafeteria.
- **Impact:** Plastic waste is non-biodegradable and can persist in the environment for hundreds of years, posing a significant challenge for waste management.

### **3. Organic Waste:**

- **Sources:** Food scraps from cafeterias and lunchboxes, fruit peels, garden trimmings, and other biodegradable waste.
- **Impact:** If not composted, organic waste can contribute to methane emissions in landfills, a potent greenhouse gas.

### **4. Electronic Waste (E-Waste):**

- **Sources:** Broken or outdated electronic devices such as computers, tablets, printers, calculators, and batteries.
- **Impact:** E-waste contains hazardous substances like lead, mercury, and cadmium, which can harm human health and the environment if not properly disposed of.

### **5. Hazardous Waste:**

- **Sources:** Chemicals from science laboratories (e.g., acids, solvents), cleaning agents, paint, and broken fluorescent tubes or bulbs.
- **Impact:** Hazardous waste requires careful handling and disposal to avoid contamination of the environment and potential health risks to students and staff.

### **6. Metal Waste:**

- **Sources:** Broken metal furniture, food cans from the cafeteria, and metal scraps from maintenance activities.
- **Impact:** Metal waste can often be recycled, but if disposed of improperly, it can contribute to landfill problems and resource depletion.

## 7. Glass Waste:

- **Sources:** Broken glassware from science labs, glass bottles, and containers.
- **Impact:** Broken glass poses a safety risk and needs to be carefully collected and recycled.

## 8. Textile Waste:

- **Sources:** Old uniforms, cloth-based project materials, and sports equipment.
- **Impact:** Textile waste, if not reused or recycled, can contribute to landfill volume and is often not biodegradable.

## 9. Stationery and Miscellaneous Waste:

- **Sources:** Old pens, pencils, markers, erasers, binders, and art supplies.
- **Impact:** These items often end up in landfills as they are difficult to recycle and contribute to environmental pollution.

## 10. Construction and Maintenance Waste:

- **Sources:** Debris from building repairs, paint cans, and materials from renovations.
- **Impact:** These materials can be bulky and require specific disposal or recycling methods.

## The Activities That Cause The Most Waste in a School

The activities that generate the most waste in a school setting are often related to daily operations, events, and the use of materials for educational purposes. Here are some of the key activities that contribute significantly to waste production in schools:

### 1. Classroom Activities:

- **Paper Usage:** Daily worksheets, assignments, tests, and project submissions result in substantial paper waste. Printed handouts and notes are frequently used in traditional teaching methods.
- **Art and Craft Projects:** Art classes often use a variety of materials such as paper, cardboard, paint, glue, and other supplies that can generate a lot of waste.
- **Stationery Usage:** Items like pens, pencils, markers, and notebooks, when discarded after use, contribute to waste.

### 2. Cafeteria and Lunch Breaks:

- **Food Waste:** Uneaten food, expired items, and food scraps contribute significantly to organic waste.
- **Disposable Packaging:** The use of single-use items like plastic cutlery, straws, paper napkins, and food wrappers creates a large amount of waste.

- **Beverage Containers:** Disposable plastic bottles, juice boxes, and milk cartons add to the volume of recyclable waste, which is often improperly disposed of.

### 3. School Events and Activities:

- **School Fairs and Festivals:** Events involving food stalls, decorations, and promotional materials often result in a large amount of single-use plastic and paper waste.
- **Sports Events:** Disposable water bottles, food packaging, and other single-use items are commonly discarded at sports events.
- **Cultural Events and Assemblies:** Decorations, banners, and disposable items used during these events contribute to waste.

### 4. Administrative Operations:

- **Printing and Photocopying:** Excessive use of paper for notices, newsletters, circulars, and administrative documents generates a significant amount of paper waste.
- **Office Supplies:** Discarded or outdated office supplies, including folders, paper clips, and outdated electronic devices, add to the waste.

### 5. Science and Laboratory Activities:

- **Chemical Waste:** Experiments in science labs can produce chemical waste that needs to be carefully managed and disposed of.
- **Glassware and Equipment:** Broken or outdated lab equipment, including glassware, contributes to waste if not properly managed.

### 6. Maintenance and Facility Operations:

- **Cleaning Supplies:** Disposal of cleaning materials, such as paper towels, disposable gloves, and packaging from cleaning products, contributes to waste.
- **Renovation and Repairs:** Activities related to building maintenance, such as painting, repairing furniture, and fixing facilities, generate construction and debris waste.

### 7. Technology and E-Waste:

- **Outdated Electronics:** Computers, printers, projectors, and other electronic devices that are no longer functional or needed contribute to e-waste.
- **Ink and Toner Cartridges:** Used cartridges from printers and copiers can be a significant source of waste if not properly recycled.

### 8. Extracurricular Activities:

- **Club Activities:** Various clubs, such as art clubs, robotics clubs, and other hobby groups, can produce waste from materials used in their projects.
- **Workshops and Camps:** Workshops and camps that use materials like paper, craft supplies, and disposable items also generate waste.

## **The Impact of Environmental Waste: A Growing Concern**

Environmental waste is a significant issue affecting ecosystems, human health, and the overall well-being of the planet. Improper disposal and management of waste materials lead to numerous problems that have both local and global repercussions. Here are some key examples of the problems caused by environmental waste:

### **1. Water Pollution**

One of the most severe consequences of environmental waste is water pollution. When waste is improperly disposed of, it often ends up in rivers, lakes, and oceans. Industrial waste, agricultural runoff, and plastic debris contaminate water bodies, making them unsafe for human use and harming aquatic life. Chemicals such as heavy metals, pesticides, and untreated sewage can poison fish and other marine organisms, disrupting the entire aquatic food chain. Additionally, nutrient runoff from fertilizers can cause harmful algal blooms, leading to dead zones where oxygen levels are too low to support most marine life.

### **2. Soil Degradation**

Environmental waste, especially hazardous materials, can lead to soil contamination. Pesticides, heavy metals, and chemicals from industrial waste can leach into the soil, making it infertile and unsuitable for agriculture. This results in reduced crop yields and threatens food security. Furthermore, the accumulation of waste in landfills can alter the structure and composition of soil, contributing to erosion and desertification, and ultimately reducing the land's ability to support vegetation.

### **3. Air Pollution**

Burning waste, particularly plastic, releases toxic pollutants into the air. These include dioxins, furans, and particulate matter, which can cause respiratory and cardiovascular diseases in humans. Air pollution from waste burning also contributes to smog and poor air quality, affecting millions of people worldwide. Moreover, decomposing organic waste in landfills produces methane, a potent greenhouse gas that significantly contributes to global warming and climate change.

### **4. Wildlife Threats**

Wildlife is severely impacted by environmental waste. Animals often mistake plastic debris for food, leading to ingestion that can cause blockages, malnutrition, or even death. Marine creatures, such as turtles, seabirds, and fish, are particularly vulnerable to plastic pollution. Additionally, discarded fishing nets and other debris can entangle animals, causing injury or



death. Habitat destruction due to waste accumulation also threatens biodiversity, reducing the availability of safe environments for many species.

## **5. Human Health Risks**

Improper waste management poses direct and indirect risks to human health. Exposure to hazardous waste, such as chemicals and e-waste, can lead to serious health issues, including cancer, neurological disorders, and developmental problems. Waste accumulation can also attract disease vectors like rodents and insects, increasing the spread of diseases such as malaria, dengue fever, and cholera. Contaminated water and soil further exacerbate health risks, especially in communities lacking access to clean resources.

## **6. Economic Costs**

The economic impact of environmental waste is significant. Governments and communities often bear the high costs of cleaning up polluted areas, managing landfills, and addressing health impacts. Moreover, pollution can deter tourism, reduce property values, and harm industries like fishing and agriculture. These economic losses, combined with the costs of environmental degradation, create a substantial financial burden.

# **Environmental Waste And The Depletion Of Natural Resources**

The relationship between environmental waste and the depletion of natural resources is deeply interconnected. Waste generation and resource depletion both stem from unsustainable consumption patterns and poor management practices, creating a feedback loop that harms the environment and threatens the availability of essential natural resources. Here's how these two issues are related:

## **1. Overconsumption and Resource Extraction:**

- **Resource Depletion:** Environmental waste begins with the extraction of natural resources, such as fossil fuels, minerals, water, and forests, to meet the demand for consumer goods, energy, and industrial activities. This leads to the depletion of finite resources, especially when extraction exceeds the natural replenishment rate.
- **Waste Generation:** As more resources are extracted to produce goods, waste is generated throughout the entire lifecycle—during extraction, production, consumption, and disposal. This waste often includes non-biodegradable materials like plastics, metals, and chemicals, contributing to environmental pollution.

## **2. Inefficient Use of Resources:**

- **Depletion through Waste:** Many industries and consumers use resources inefficiently, leading to significant waste. For example, excessive water use in agriculture, deforestation for short-term gains, and over-reliance on fossil fuels contribute to both waste and resource depletion. As these resources are wasted or improperly managed, less is available for future use, accelerating their depletion.

- **Energy Use and Emissions:** Extracting and processing raw materials require vast amounts of energy, often derived from fossil fuels. This not only depletes energy resources but also contributes to greenhouse gas emissions, worsening climate change and further straining natural ecosystems.

### 3. Waste Disposal and Resource Scarcity:

- **Landfills and Pollution:** When waste is not properly recycled or reused, it ends up in landfills or polluting ecosystems. For example, plastic waste pollutes oceans and rivers, while hazardous waste can contaminate soil and water sources. This pollution damages natural ecosystems, reducing the availability of clean water, fertile soil, and other essential resources.
- **Resource Loss:** Many valuable materials, such as metals and rare minerals found in electronics, are discarded as waste rather than being recovered and reused. This not only contributes to resource depletion but also increases the need for further extraction, creating a cycle of unsustainable resource use.

### 4. Environmental Degradation:

- **Ecosystem Impact:** Waste accumulation disrupts ecosystems and diminishes their ability to provide essential services such as carbon sequestration, water purification, and soil fertility. When ecosystems are degraded due to pollution, they lose their capacity to support biodiversity and contribute to the natural replenishment of resources, leading to further depletion.
- **Habitat Destruction:** The disposal of industrial and agricultural waste can lead to the destruction of natural habitats, reducing the availability of resources such as timber, clean water, and arable land.

## Avoiding waste production and Conserving Natural Resources

Avoiding waste production helps conserve natural resources in several key ways:

1. **Reduced Resource Extraction:** By using products more efficiently and minimizing waste, we decrease the demand for raw materials like minerals, timber, and fossil fuels. This reduces the need for extraction and preserves these finite resources for future use.
2. **Energy Savings:** Manufacturing new products from raw materials requires significant energy. Avoiding waste reduces the need for new production, saving energy and lowering greenhouse gas emissions associated with resource extraction and processing.
3. **Less Environmental Impact:** Avoiding waste reduces pollution of air, water, and soil. It prevents harmful materials from entering ecosystems, preserving natural habitats and maintaining the quality of essential resources like clean water and fertile soil.
4. **Promotes Reuse and Recycling:** Avoiding waste encourages the reuse and recycling of materials, keeping them in circulation longer and reducing the need for new resources. This supports a circular economy and helps ensure that resources are used sustainably.

In summary, avoiding waste helps conserve natural resources by reducing the need for extraction, saving energy, protecting the environment, and promoting sustainable practices.

## **Session 4: Natural Resources Conservation Practices; Reduce, Reuse, and Recycle**

### **Duration**

1 hour

### **Resources required**

- Hand out
- Flip chart
- Markers
- Activity sheet
- Reference material

### **Methodology:**

- Roleplay
- Discussion
- Sharing thoughts
- Presentation
- Activity sheet

### **Learning Outcome:**

Participants will be able to explain reduce, reuse, recycle and describe different resource conservation practices according to the type of waste in the school.

**Procedure:**

1. Give a presentation to the participants about 3R (Reduce, Reuse, Recycle).
2. Give participants different types of waste materials and ask them to sort out the types.
3. Ask participants best waste reduction method they can choose according to the type of waste.
4. Allow 15 minutes to complete the activity, and take feedback from participants.
5. Discuss the types of waste identified, their status, and the best waste reduction method they have chosen according to the type of waste.

**Questions:**

1. Can you explain reduce, reuse, recycle?
2. What is the most efficient way to conserve natural resources?
3. What types of waste can be recycled?
4. Can you give some examples of reusing waste materials?
5. How does reusing waste help to conserve natural resources?

**Reduce, Reuse, Recycle: A Brief Explanation**

The "Reduce, Reuse, Recycle" concept is a fundamental principle of waste management and environmental sustainability, promoting more responsible consumption and conservation of resources.

**1. Reduce:**

- Definition: Minimizing the amount of waste we generate by using fewer resources in the first place.
- Example: Choosing products with minimal packaging, avoiding single-use items, and buying only what is necessary. By reducing consumption, we lower the demand for resource extraction and decrease the volume of waste produced.

**2. Reuse:**

- Definition: Extending the life of products by finding new ways to use them instead of discarding them.
- Example: Using a reusable water bottle, repurposing old containers for storage, or donating clothes and items to others. Reusing items reduces the need for new products, conserving resources and reducing waste.

**3. Recycle:**

- Definition: Processing used materials to create new products, reducing the need for raw materials and decreasing the amount of waste sent to landfills.
- Example: Recycling paper, glass, plastic, and metals into new products. Recycling helps conserve natural resources, save energy, and reduce pollution by reintroducing materials back into the production cycle.

Together, these three actions help minimize waste, conserve resources, and protect the environment.

**How to Conserve Natural Resources**

The most efficient way to conserve natural resources is to adopt sustainable practices that focus on reducing consumption, increasing efficiency, and promoting the use of renewable resources. Here are some key strategies:

### 1. Reduce Consumption:

- **Minimize Waste:** Use only what is necessary, avoid single-use products, and opt for minimal packaging to reduce the demand for raw materials.
- **Energy and Water Efficiency:** Use energy-efficient appliances, reduce water usage, and implement energy-saving habits like turning off lights and fixing leaks.

### 2. Sustainable Resource Use:

- **Renewable Resources:** Prioritize the use of renewable energy sources such as solar, wind, and hydropower over non-renewable fossil fuels.
- **Sustainable Agriculture and Forestry:** Practice sustainable farming and forestry methods that maintain soil health, conserve water, and protect biodiversity.

### 3. Promote Recycling and Reuse:

- **Recycling:** Recycle materials like paper, glass, and metals to reduce the need for new raw materials and lower environmental impact.
- **Reuse:** Extend the life of products by reusing them in creative ways, repairing them, or donating items instead of discarding them.

### 4. Support Conservation Efforts:

- **Protect Natural Habitats:** Support and engage in efforts to protect forests, wetlands, and other ecosystems that are critical for maintaining biodiversity and natural resources.
- **Sustainable Development Policies:** Advocate for and support policies that promote sustainable development and resource conservation.

By integrating these strategies into daily life and policy decisions, we can significantly conserve natural resources and ensure a sustainable future for generations to come.

### Recyclable Waste

The types of waste that can be recycled include:

1. **Paper and Cardboard:**
  - Newspapers, magazines, office paper, cardboard boxes, and packaging materials.
2. **Plastics:**
  - Plastic bottles, containers, and packaging with recycling codes 1 and 2 (PET and HDPE).
3. **Glass:**
  - Bottles, jars, and containers made from clear, green, or brown glass.
4. **Metals:**
  - Aluminum cans, steel cans, and tin cans, as well as scrap metal like copper and brass.

5. **Electronics (E-Waste):**

- Old computers, mobile phones, printers, and other electronic devices.

6. **Batteries:**

- Rechargeable and single-use batteries, including those from electronics and vehicles.

7. **Textiles:**

- Old clothes, fabric scraps, and other textile materials.

Recycling these materials helps conserve natural resources, reduce waste, and lower environmental impact.

**Conservation of Natural Resources through Reuse**

Reusing waste helps conserve natural resources by extending the life of products and materials, reducing the need for new raw materials. This decreases resource extraction, lowers energy consumption, and minimizes environmental impact. By reusing items like containers, clothing, and electronics, we reduce demand for new products, conserve water, energy, and raw materials, and reduce waste sent to landfills.

**Session 5: Concept of Upcycling**

**Duration**

1 hour

**Resources required**

- Hand out
- Flip chart
- Markers
- Activity sheet
- Reference material

**Methodology:**

- Discussion
- Sharing thoughts
- Presentation
- Activity sheet
- Art/ poster competition

**Learning Outcome:**

Participants will be able to understand the concept of upcycling and suggest practices for upcycling.

**Procedure:**

1. Give a presentation examples of upcycling
2. Ask the participants to give ideas about upcycling.
3. Divide the participants in groups of 4-5 members.
4. Ask each group to prepare a poster about upcycling.
5. Allow 20 minutes to complete the activity, and choose the best poster.

**Questions:**

1. Can you identify upcycling?
2. What are the benefits of upcycling?
3. What are the types of waste that can be upcycled?

**What is Upcycling?**

Upcycling is the process of transforming waste materials, unwanted products, or discarded items into new, higher-value products with improved functionality or aesthetic appeal. Unlike recycling, which typically involves breaking down materials to create new raw inputs, upcycling focuses on creatively reusing and repurposing objects in their existing form to extend their lifecycle and reduce environmental impact.

**Environmental, Social and Economic Benefits of Upcycling**

One of the primary benefits of upcycling is its positive impact on the environment. By reimagining and repurposing old items, upcycling helps reduce the amount of waste sent to landfills and decreases the demand for new raw materials. This process conserves natural resources, lowers greenhouse gas emissions associated with manufacturing, and reduces pollution from waste disposal.

Upcycling also has significant economic and social benefits. It encourages innovation and creativity, providing opportunities for small businesses, artisans, and hobbyists to turn discarded materials into unique, marketable products. Upcycling can also promote sustainable consumer behavior by encouraging people to see potential in items they might otherwise discard.

**Waste Types That Can Be Used In Upcycling**

Upcycling can take many forms, from turning old glass bottles into lamps or planters to repurposing wooden pallets into furniture. Fashion is another popular area for upcycling, where old clothing is redesigned into new styles, reducing the need for fast fashion and its environmental footprint. The proper waste for upcycling includes any materials or items that can be creatively transformed into something new and valuable without undergoing extensive industrial processing. These materials are typically considered unwanted, discarded, or at the end of their useful life but still retain enough integrity and potential for reuse. Here are some common examples of waste materials suitable for upcycling:

## **1. Clothing and Textiles:**

- Old jeans, T-shirts, and fabric scraps can be upcycled into bags, rugs, quilts, or even new garments.
- Discarded textiles can be turned into decorative items like cushion covers, tablecloths, or wall hangings.

## **2. Furniture:**

- Broken or outdated furniture pieces can be refurbished, painted, or reassembled to create new, functional items such as shelves, tables, or even garden planters.
- Wooden pallets and crates can be transformed into rustic furniture, such as coffee tables or headboards.

## **3. Glass Bottles and Jars:**

- Glass containers can be repurposed into vases, lamps, storage jars, or candle holders.
- Bottles can also be cut and shaped to create unique glassware or decorative objects.

## **4. Metal and Tin Cans:**

- Tin cans can be used to make planters, lanterns, or storage containers with a bit of creativity and painting.
- Old metal pieces like cutlery, gears, or pipes can be upcycled into sculptures, furniture, or decorative items.

## **5. Plastic Containers:**

- Plastic bottles can be turned into planters, bird feeders, or even household items like brooms and organizers.
- Hard plastics like old crates or tubs can be used for building garden beds or outdoor furniture.

## **6. Wood and Pallets:**

- Scraps of wood and wooden pallets can be used to create furniture, garden structures, or wall art.
- Leftover wood can also be repurposed into small home decor items like picture frames or candle holders.

## **7. Paper and Cardboard:**

- Old newspapers, magazines, and cardboard can be transformed into papier-mâché items, decorative bowls, or gift boxes.
- Cardboard can also be used in DIY projects like making playhouses for children or organizational storage.



## **8. Electronics and E-Waste:**

- Outdated electronic parts, such as circuit boards or keyboards, can be upcycled into artistic pieces, jewelry, or decorative items.
- Old CDs or DVDs can be repurposed into coasters, mosaics, or reflective art.

## **9. Household Items:**

- Broken crockery or ceramics can be used in mosaic projects or as planters.
- Old books can be transformed into hidden storage boxes, decorative folded art, or even furniture pieces.