

Green environment and green future with green technology for a sustainable green development

Kunjlata Lal¹ & M. T. Dan²

¹Department of Education, Ranchi University, Ranchi Women's College, Ranchi, Jharkhand, India.

²Department of Zoology, Ranchi University, Ranchi, Jharkhand, India

Received : 29th July, 2023 ; Accepted : 29th August, 2023

ABSTRACT

The use of technology for environmentally beneficial goals, such as cutting down on waste, conserving energy, and safeguarding the environment, is known as "green technology" (GT). It consists of several technological facets that create new avenues for sustainable growth and lessen the influence of human activity on the environment. By employing green technology, we can help reduce pollution and safeguard the environment. It also enables us to use renewable resources, conserve energy, and clean up the globe. In addition to helping the environment, being green also allows us to save money, time, and resources, allowing us to live longer and ensure that future generations may also enjoy clean water and air. Although green technology is not new, it has gained popularity since sustainable development programmes have been implemented. Green technology is also referred to as "clean" or "environmental technology" because it is ecologically beneficial. It makes eco-friendly products by utilising creative techniques. The depletion of natural resources and the growth in pollution brought about by the widespread use of non-renewable energy sources are the reasons behind the need for green technology.

Key Words - Green Environment, Green technology, environmental technology

***Corresponding author** : Kunjlata_lal@yahoo.co.in

INTRODUCTION

"Green" refers to natural resources, including oceans, land, forests etc.

Green Environment (GE) is related to the concerns for environmental conservation and improves health of the environment. This includes supporting practices like informed consumption, conservation practices and investment in renewable energy. A Green Environment (GE) literally means abundance of trees and greenery. Trees are instrumental in purifying air by absorbing the dangerous gases and giving out Oxygen.

A Green Environment (GE) implies absence of pollution and a better quality of life. Green



Fig 1. Green Environment

Environment (GE) has a direct link to promoting good health. The Green Environment (GE) includes the use of renewable materials, applying sustainable consumption and production, minimizing waste and reduce toxic pollutants (land,

water and soil). The main objective of implementing these practices is saving the Earth by preventing the exploitation of natural resources and preserving the environment by the help of Green Technology (GT).

Green Technology (GT) is a field of new innovative ways to make environmentally friendly change in daily life. It is the use of technology with intentions to mitigate the effects of human activity on the environment. It is inevitable and it is the need of the hour (Peattie and Ratnayaka, 1992; Mc Donagh, & Prothero, 1997). It is an umbrella term that describes the use of technology and science to reduce human impact on the natural environment such as ecological degradation, population progression, weather alteration, climate change, unproductive usage and exhaustion of natural resources.

Green Technology (GT) encompasses a wide area of scientific research including energy, atmospheric science, agriculture, material science and hydrology.

The goal of Green Technology (GT) is to protect the environment, repair damage done to the environment in the past and conserve the Earth's Natural Resources.

The Green Technology (GT) is related to "Clean Technology" which refers to products or services that improve operational performance which reduces costs, energy consumption, waste or negative effects on the environment.

"Clean" refers to a low-pollution, low-emission world in which cleaner air, water and oceans enable people to lead healthy, productive lives.

Clean Technology is also known as Green Technology (GT). It is a set of technologies that either reduces or optimize the use of natural resources, which reduces the negative effect those technologies, has on the planet and its ecosystem. Example of clean technology are relatively new sustainable energy sources, such as wind and wave power or improved conventional energy production processes such as smart electric grid. It requires an interdisciplinary approach with

engineers and scientists from various disciplines joining together to create a clean environment. It refers to avoiding environmental damage at the source through use of materials, processes or practices to eliminate or reduce the creation of pollutants or wastes.

The main aim of clean technology is to reduce the environmental footprint and to minimize environmental pollution.

Green Technology (GT) refers to the use of technology to make positive environmental impacts or reduce negative environmental impacts which may include the reduction of CO₂ emission or minimizing waste in daily practice.

Green Technology (GT) is also known as "Environmental Technology".

Environmental Technology is also known as "Green or Clean Technology". It refers to the development of new technologies which aim to conserve, monitor or reduce the negative impact of technology on the environment and the consumption of resources.

Despite the negative impact of technology on environment, a recent rise in global concern for climate change has led to the development of new environmental technology aiming to help solve some of the biggest environmental concern that we face as a society through a shift towards a more sustainable, low carbon economy.

"Green Sustainability" improves our living quality and protects our ecosystem.

Green Technology (GT) is also known as "Sustainable Technology". It takes into account the long- and short-term impact something has on the environment. The green products are environmentally friendly, energy efficient, recyclable and also have health concerns, renewable resources and more.

Sustainable Technology is the combination of two complementary ideas. The first is the technology that is meant to remedy, improve or offset carbonization, environmental setbacks or problems. The second is technology that is

produced using green or ecologically responsible materials or processes.

The Green Technology is not a new technology; it has picked momentum with the introduction of sustainable development initiatives because it is an environmentally friendly technology and therefore and therefore known as "Environmental technology or Clean Technology". It uses innovative methods to create environmentally friendly products.

The need of Green Technology arises because natural resources are declining and pollution has increased due to the abundant use of non-renewable sources.

GREEN ENVIRONMENT

Green Environment (ET) aims to protect the environment. The concept is derived from sustainable living. It covers several points including the use of renewable materials, applying sustainable consumption and production, minimizing waste and reducing toxic pollutants (land, water and soil).

The main objective of implementing these practices is saving the Earth by preventing the exploitation of natural resources and preserving the environment.

NATURAL RESOURCES

Natural resources are materials from the Earth that are used to support life and meet human needs. Any natural substance that humans use such as oil, coal, natural gas, metals, stone, sand etc., are termed as Natural Resources. Other natural resources are Air, Sunlight, Soil and Water etc. Animals, birds, fish, plants etc., are natural resources as well.

These natural resources are used to make food, fuel and raw materials for the production of goods. All the food that humans consume comes from plants and animals.

Natural resources such as coal, natural gas and oil provide heat, light and power. Natural resources are the raw materials and sources of energy that we use. Petrol, metals, soil, sand, wind, water and everything in between are natural resources.

Manufactured items such as plastics, sheet metals, fabrics, microchips, electricity and concrete are not natural resources but are most definitely derived from natural resources.

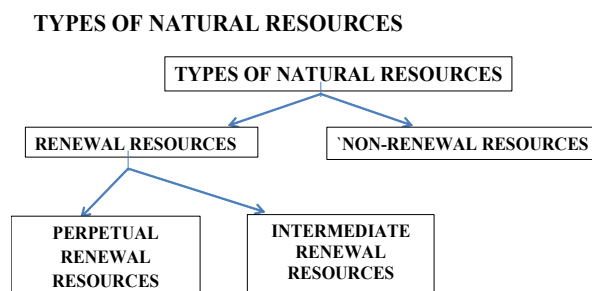


Fig 2.– Types of Natural Resources

RENEWAL RESOURCES

Renewable resources produce clean energy, which means less pollution and greenhouse emissions, which contribute to climate change. Renewable energy is that energy that comes from a source that won't run out. They are natural and self-replenished and usually have a low or zero carbon footprint. It includes biomass energy (ethanol), hydropower, geothermal power, wind energy and solar energy.

BIOMASS ENERGY

It refers to organic material from plants or animals. This includes wood, sewage and ethanol (which come from corn or other plants). Biomass can be used as a source of energy because this organic material has absorbed energy from the Sun. this energy in turn is released as heat energy when burned.

HYDROPOWER

Hydropower is one of the oldest renewable resources and has been used for thousands of years. With hydropower the mechanical energy from flowing water is used to generate electricity. Hydropower is created using the movement of flowing or falling water. It uses the flow of rivers and streams to turn a turbine to generate power and release electricity. Hydropower plants are found at dams and generate electricity through underwater turbines that turn a generator. Hydropower also encompasses wave and tidal power which rely on ocean forces to generate

electricity at the mouths of large bodies of water, using similar technologies.

GEOTHERMAL ENERGY

It is a form of renewable energy created by powering electrical generators with the heat of the earth and naturally occurring subterranean hot water reservoirs. It comes from the heat generated deep within Earth's core. Geothermal reservoirs can be found at tectonic plate boundaries near volcanic activity or deep underground. Geothermal energy can be harnessed by drilling wells to pump hot water or streams to a power plant. This energy is then used for heating and electricity.

WIND ENERGY

Wind power is the largest producer of renewable electricity. The onshore and offshore wind farms generate electricity by spinning the blades of wind turbines. The turbines convert the kinetic energy of the spinning blades into electric energy by turning a drive shaft and gear box, which is connected to a generator. Electricity is then converted into higher voltages and fed into the national grid. This electricity can supply power to homes and other buildings and it can even be stored in the power grid.

SOLAR ENERGY

Sunlight is one of the planet's most freely available energy resources, which is the number one source of renewable energy. Radiation from the sun can be used as a power source.

Solar energy generates electricity by capturing sunlight on solar panels in a joint chemical and physical reaction known as the 'photovoltaic effect' or PV. Photovoltaic cells can be used to convert this solar energy into electricity. These cells only generate enough energy to power a calculator but



Fig. 3- Solar Energy

when combined to create solar panels or even large arrays, they provide much more electricity.

1. PERPETUAL RENEWAL RESOURCES

Perpetual Renewal Resources are the natural resource that constantly replenished by the Sun's and Earth's natural processes. Every day the sun delivers an average of 198 watts of energy to every square meter (m²) of the Earth's surface. Every day without fail for at least 5 billion years, the Sun has delivered this solar energy.

Together with geothermal energy, the Sun's perpetual energy powers the wind, ocean currents, precipitation and most of the Earth's plant life. The Solar and Geothermal natural resources currently energize a significant and growing percentage of many nations' electrical grids.

It is perpetually renewable that in terms of human time-scale the Sun and the Earth will always make more.

2. INTERMEDIATE RENEWAL RESOURCES

Intermediate Renewal Resources are only renewable resources if we don't use them too quickly. These are resources such as freshwater, soil, crops and trees for timber. If we didn't use them, they would be perpetually renewable but because they require time on human time-scale to regenerate or grow, we can overuse them until they are no longer available.

Freshwater is great example of an intermediate renewable resource. Though the water cycle, the sun evaporates water from the surface of salt water oceans that travels over land and falls back to earth as freshwater rain. This rain fills the lakes, rivers and aquifers we use for agriculture, industry and drinking water.

Intermediate Renewal Resources must be carefully managed to ensure that they are not depleted.

NON - RENEWAL RESOURCES

The non-renewable resources are the natural resources that will not regenerate on human time scale. Once they have been depleted they will no longer be available and will not be made anymore. The most common examples of non-renewable

resources are fossil-fuels; it is so called because most of them were created by processes that take millions of years.

Fossil fuels include crude-oil, natural gas, coal and uranium. Other non-renewable resources include metals, lithium and rare earth elements.

The non-renewable resources consist of fossil fuels and nuclear fuels.

FOSSILFUELS

Fossil fuels are formed from the remains of ancient plants and animals that underwent a process of decomposition, heating and compressed over millions of years. The deposits are extracted through drilling or mining and they can be liquid, gas or solid form. Fossil fuel is highly combustible, making them a rich source of energy. They are categorized into three main types:

NATURAL GAS

Natural Gas is a gaseous fossil fuel composed mainly of methane, but may also contain other forms of natural gas such as propane, ethane and butane. Methane is odorless and it is mixed with a special additive to give it an odor for easy detection in case there is gas leakage. Once natural gas is extracted, it is sent to processing plants to remove propane and butane, which are used as Liquefied Petroleum Gas (LPG). Natural gas is a versatile energy source used for heating, cooking, electricity generation and as a fuel for vehicles.

COAL

Coal is a sedimentary rock that humans practically use. Coal is mostly composed of carbon and several other elements like hydrogen, sulfur, oxygen and nitrogen. Coal is primarily used as fuel, resulting in the industrial revolution around the world. It is the most used form of a non-renewable resource. Coal is created by compressed organic matter and it contains carbon and hydrocarbon matter. It is formed from plant-filled swamps that have been covered by sediments for millions of years. Coal is extracted by digging up the ground and taking out the coal solids for processing into energy.

The main types of coal are Anthracite, Lignite, Bituminous and Sub-bituminous coal. Bituminous

coal contains 45% to 86% of Carbon. It has high heat content and is used in generating energy and in making steel and iron. Anthracite contains 86% to 97% Carbon and it has the highest heating value. It is much harder to find than the other types of coal and is used in the metal industry.

OIL

Oil is a liquid fossil fuel that results from the decomposition of smaller organisms like zooplankton and algae under prolonged heat and pressure, which were subjected to immense pressure over time. Oil is a crucial energy resource used in transportation, manufacturing and producing various petrochemical products.

Petroleum or crude oil is a naturally occurring yellowish black liquid formed over a million years. It is extracted by oil drilling, after which the oil is refined and separated, which results in the formation of several other by-products like kerosene, gasoline, diesel, asphalt, etc.

NUCLEAR FUEL

Nuclear fuels are utilized in nuclear power plants, where energy is generated through nuclear fission. The most commonly used nuclear fuel is Uranium, which is found in the Earth's crust in relatively low concentration. The mineral generates power through a process known as Nuclear Fusion, which creates enough pressure to run turbines and generate nuclear power. Uranium undergoes fission reactions, releasing large amount of energy.

NEED FOR MANAGEMENT OF NATURAL RESOURCES

Natural Resource Management alludes to the feasible use of normal assets such as - land, water, air, minerals, woodlands, fisheries and wild greenery. All these assets give the environment benefits that give better quality to human life.

The resources of the world are limited due to the rapid increase in human population, the demand for resources is increasing day-by-day, the right management can make sure that the natural resources are used judiciously, in order that they fulfill the requirement of present generation and also last for the generations to return. The proper

management of natural resources takes into consideration long-term perspective and prevents their exploitation to hilt for short-term gains.

The proper management can ensure equitable distribution of natural resources in order that all the people can enjoy the event of those resources.

The proper management will take into consideration the damage caused to the environment during the 'extraction' or 'use' of the natural resources and find ways and means to minimize this damage.

It is very important to conserve non-renewable resources because if we use them too quickly there will not be enough, most natural resources are limited. We should encourage the protection and restoration of water sources and promote water use optimization; it also requires the implementation of system for wastewater treatment before reuse or disposal. Forest conservation and improved carbon stocks, it also promotes waste reduction, recycling and responsible disposal.

THE CHALLENGES OF USING NATURAL RESOURCES

Natural resources are prone to exploitation, which is the biggest problem, as a result of the use of these resources, economic expansion often degrades the environment. Extracting processing and using Natural Resources can cause environmental problems such as:- Air Pollution, Water Pollution and Land Pollution, which disrupts and destroys the ecosystem, as a result there is decrease in Biodiversity.

Carbon-dioxide is produced from burning coal, oil and natural gas (fossil fuels), it is a critical greenhouse gas. Greenhouse gases absorb and retain heat from the Sun. Greenhouse gases include - methane, ammonia, sulfur-di-oxide and certain chlorinated hydrocarbons. It is believed that the buildup of greenhouse gases in the atmosphere can cause global climate change (change in the average global temperature of the atmosphere of the atmosphere near the Earth's surface). As the time is passing this condition could be dangerous for the world such as flooding, drought and different kinds of diseases.

GREEN TECHNOLOGY

Green technology (GT) refers to a type of technology that is environmentally friendly. It is also referred to clean energy production, the use of alternative fuels and technologies that are less harmful to the environment than fossil fuel.

Green technology (GT) is an umbrella term that describes the use of technology and science to reduce human impacts on the natural environment.

Green technology (GT) encompasses a wide area of scientific research, including energy, atmospheric science, agriculture, material science and hydrology.

Green technology (GT) aims to reduce emission of carbon-di-oxide and other greenhouse gases in order to prevent climate change.

Solar power is one of the most successful green technologies and is now cheaper to deploy than fossil fuels in many countries.

Green technology (GT) means any product design, formula, algorithm, procedure, method, discovery, process, technique, idea, know-how or software that can help us reduce our environmental footprint and ultimately achieve sustainable development.

Green technology (GT) is also known as Environmental Technology or Clean Technology. It utilizes some combination of Environmental Science, Chemistry, Environmental Monitoring and Electronic Device to produce new technology and methods for conserving the natural environment and the resources necessary for continued prosperity on Earth.

THE GOAL OF GREEN TECHNOLOGY

The primary goal of Green Technology (GT) is to reduce the negative impacts humans impose upon the planet, like plastic pollution in the ocean, fossil fuel use and deforestation.

The goal of Green technology (GT) is to protect the environment, repair damage done to the environment in the past and conserve the Earth's Natural Resources.

Producers of Green technology (GT) work to accomplish this by harnessing the power of

Renewable Energy sources such as the sun, wind, moving water, organic plant material and the earth's heat.

GOALS OF GREEN TECHNOLOGY

The main goals of green technology are of 3 types. They are.

1. Environmental
2. Economic and
3. Social

The 3 key objectives of green technology are to:

1. Reduce the environmental footprint of human activities.
2. Be economically viable and profitable.
3. Improve the quality of life in harmony with nature.

Green technology aims at improving our quality of life while respecting the environment.

The goals of green technology are aligned with the 3 pillars of sustainability, helping us to reach that sweet spot where human development is ethical and in harmony with nature.

The 3 objectives of Eco-friendly Technology

1. REDUCE THE ENVIRONMENTAL FOOTPRINT

The first objective of green technology is to help us protect the environmental and conserve natural resources.

Distinct types of green technologies may pursue different goals for the environment.

◆ REPAIRING THE DAMAGES DONE TO OUR PLANET IN THE PAST

Cleaning our oceans from plastics, preserve biodiversity, restore forests, carbon capture to reduce global warming etc.

◆ REDUCING THE USE OF NATURAL RESOURCES

Renewable energy, digital technology, hydroponic etc.

◆ REDUCING WASTE AND EMISSION

Bio-gas, plant based packaging, reducing CO₂ emission etc.

2. ECONOMICAL VIABILITY

Economic viability is another important goal of green technology because technology should be sustainable to be effective in long term and this can't happen if it isn't economically viable and profitable.

3. IMPROVE THE QUALITY OF LIFE

Among the goals of green technologies, improving the quality of life is also important because if green technology improves our well-being, it will be more valuable and easier to adopt.

ADVANTAGES OF GREEN TECHNOLOGY

Green Technology (GT) refers to the systems and products that minimize the negative effects on the environment and human activities. It does not emit any gas that causes any harm to the air and it uses energy and natural resources that reduce environmental degradation. [Bhardwaj and Neelam, (2015); www.ajcebeats.com/the-importance-of-green-technology; Banerjee and Alkuli, (2014); Soni, (2015); <https://www.epa.gov/greenpower/what-green-power>].

1. Green Technology does not emit anything harmful for the environment.
2. Green Technology helps to reduce energy consumption by pursuing energy efficiency in every aspects of the product lifecycle.
3. Green Technology has become popular as consumers of the technology are becoming more environment conscious.
4. Reducing energy consumption is one of the most evident advantages of green technology. Recycling has the benefit of turning waste into a resource.
5. Green Technology requires less cost for maintenance. This reduces operating cost and hence overall cost on the long run.
6. As Green Technology uses renewable natural resources and hence we will never run out of vital resources such as water and electricity.

7. Green Technology will slow down effects of global warming due to reduction in CO₂ emission.

DISADVANTAGES OF GREEN TECHNOLOGY

1. Initial Investment or implementation cost is very high.
2. People are still not familiar with the technology and it will take time to adopt it for large population.
3. The technology is still evolving and many of the products are at Research and Development Stage. Hence, people are unaware of performance results.
4. Lack of skilled human resources are available to install or implement the green technology based products or systems.
5. In most of the countries policies have not been finalized for the green technology based systems.

TYPES OF GREEN TECHNOLOGY

There is a wide spectrum of Green Technology environmental solutions available for both household and industrial applications to create sustainable technology environment.

1. ENERGY PRODUCTION

Energy production is one of the most important branches. A big fraction of our energy is still produced with the help of fossil fuel, large amounts of greenhouse gases are emitted into our atmosphere on a daily basis. Our natural fossil resources like coal, oil and gas also become depleted over time. It is crucial to use green technology in order to transit from fossil to green renewable energy sources as soon as possible in order to ensure the sustainability of our energy generation in the long run.

2. WASTE MANAGEMENT

Waste management is an area in green technology; it plays an important role in waste management and recycling. In order to use our natural resources as efficiently as possible, we should try to reduce our waste production and to recycle as efficiently as possible.

Then only we will be able to protect our natural resources for depletion and to ensure a livable future for the next generation.

3. GREEN BUILDING

The awareness regarding the importance of protection our planet is also importance of protecting our planet is also increasing in the construction sector. People now want their homes to be built out of eco-friendly materials. Houses should be energy-efficient in order to avoid the loss of heat so that people can save resources and money related to heating.

Thus, green buildings have become quite popular and this trend will likely continue in the future.

4. GREEN COMPUTING

Now days billions of people use the internet every day, the energy costs related to the IT-sector are enormous. On a global scale, we need myriads of servers in order to provide a stable internet.

Green computing aims to reduce the energy that is needed to operate those sever rooms. This includes the actual operation but also the cooling and the ventilation that are necessary for those servers to work properly.

5. NANOTRCHNOLOGY

In the nanotechnology sector, green technology can be used to make processes and products more energy efficient.

Nanotechnology is used for the construction of solar cells. By making the production and operation processes around solar cells more efficient, they may be able to produce higher amounts of energy, which may improve our ecological footprint since we will be able to produce more energy with the same amount of resources that have to be used for those solar cells.

6. SMART HOUSEHOLD DEVICES

We use many devices that use plenty of energy every day at home; these include the dishwasher, the washing machine, air conditioning or the fridge. Part of this energy can be saved through smart household devices. Smart air conditioning systems may save you plenty of energy and money in the

long run since they will make your energy use much more efficient.

There are many other devices that can be used in order to make your home eco-friendlier.

7. ECO-FRIENDLY VEHICLES

Our transportation sector is one main contributor to pollution and global warming; we also have to make sure to make this sector greener.

By using environmental technologies like electric cars or scooters, we can improve our ecological footprint also in this area. Most of our energy is still produced with fossil fuels, green vehicles are not as eco-friendly as we might think.

It is crucial to produce our energies in a green manner in order to make those electric vehicles actually green.

8. FOOD PRODUCTION

In the food production sector, green technology may start to play a bigger role. People become more aware of the conditions under which animals are raised, meat producers may have to adapt to a more animal-friendly production behavior. Large amounts of energy and water are used in factory farming.

It is crucial to introduce green systems that can lower energy and water consumption in order to protect our natural resources.

CONCLUSION

Green environment (GE) is a concept derived from Sustainable living and it aims to protect the environment.

Green Technology (GT) is the use of technology for eco-friendly purposes like reducing energy consumption, reducing waste and protecting the environment. It includes different aspects of technologies that reduce the impact of humanity on the environment and establish new ways of sustainability development. Green Technology allows us to use renewable resources, conserve energy and clean up the planet, by using green technology, we can help reduce pollution and protect the environment.

Green technologies have many important advantages and it will become even more important in the future since we have to solve our environmental problems sooner or later.

It is more important than ever to adopt a green lifestyle; all these small changes can help reduce the pollution that threatens our health and our environment and protecting our natural resources. It has never been easier to live a sustainable lifestyle.

Going green doesn't only benefit the planet but also helps us to save money, time and resources so that we can enjoy life more fully while making sure that our future generation have access to clean air and water too.

REFERENCES

- Banerjee S. and Alkuli R. K. 2014. Advantages of green technology. *Recent research in science and technology*, 6(1):97-100. ISSN:2076-5061. <http://recent-science.com/>
- Bhardwaj M. and Neelam. 2015. The advantages and disadvantages of green technology. *Journal of basic and applied engineering research*, p-ISSN:2350-0077; e-ISSN:2350-0255; 2(22): 1957-60. Krishi Sanskriti Publication. <http://www.krishisanskriti.org/publication.html>.
- <https://www.epa.gov/greenpower/what-green-power>
- Mc Donagh P., & Prothero A. 1997. *Green Management: A Reader*. International Thomson Business Press.
- Peattie K., and M. Ratnayaka. 1992. Responding to the Green Movement. *Industrial Marketing Management*. 21(2):103-110.
- Soni G. D. 2015. Advantages of green technology. *Internal journal of research- Granthaalayah. Social issue and environmental problems*, 3(9:SE). ISSN-2350-053(O) ISSN-2394-3629 (P).
- www.ajcebeats.com/the-importance-of-green-technology/