

CHAPTER: 4

IMPORTANCE AND CHALLENGES OF CONSERVATION AND SUSTAINABLE DEVELOPMENT OF THE ENVIRONMENT

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Abstract: Environment protection is essential for long-term sustainable growth and development in all aspects of life. The ultimate goal of sustainable development is to achieve a balance between the environmental, economic, and socio-political parameters without jeopardizing the quality of life and environment. Sustainable development is constantly pushing us to increase and conserve our resource use through cutting-edge technologies. Every country must meet the fundamental needs for employment, food, energy, water, and sanitary facilities. Everyone has the right to live in a safe and healthy environment. This can be accomplished quickly by reducing pollution, poverty, and unemployment. To legitimize sustainability across all industries, India has passed legislation like the National Green Tribunal Act, 2010. However, the seriousness and efficacy of these laws in terms of the country's environmental standards are being called into question due to a lack of implementation. The importance and challenges of environmental sustainability are discussed in the current chapter. Along with this, India's environmental regulation is also emphasized.

Keywords: Sustainable development, environment, economic, biodiversity, regulations, and strategies

Introduction: Demand for human needs at all stages of life, including social, nutritional, and economic needs, is rising quickly as the population grows. The rate of consumption of natural resources outpaces the rate of production. Destruction of the forest, increasing global warming, creation of non-degradable toxic chemicals, resistance to drugs, increasing the rate of genetic variability among the species, and novel outbreaks are the major threat and concerns of today's world. Over-exploitation of natural resources leads to over-exploitation of the environment. If it exists in this form, then the world may soon be a part of a limited resource era, resulting in a strenuous lifestyle with a major fight to meet our requirements shortly. Sustainable developments hold the key to the alarming concern. Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. An essential component of attaining sustainable development is environmental protection. Since humans depend on the environment in so many ways, protecting it directly supports the survival of individuals, human communities, and

consequently social sustainability [1]. Conservation and sustainable development (CSD) is one of the most significant new approaches in natural resource management and policy, serving as a reference for countries developing or revising national indicators of sustainable development. Human society is progressively dealing with a wide range of closely related social problems and environmental conservation. Larger geographical scales are being used for the conservation of biodiversity, management of watersheds, and rural development, all of which highlight the intricate relationships between people and the environment [2]. Environmentalists engaged in sustainable development, simultaneously encourage biodiversity-related conservation to meet human livelihood and development demands, as they are much concerned about the short-lived benefits of development based on natural resource destruction [3,4]. The International Union for the Conservation of Nature and Natural Resources (IUCN) stated in The world conservation strategy report (1980) that for development to be sustainable, it must take into account social and economic issues as well as ecological ones. The 2015 United Nations resolution led to the creation of the 2030 Agenda, a set of 17 goals for sustainable development. That must incorporate newly developed and modified strategies for sustainable development based on appropriate principles to overcome all the hurdles on the way to a well-sustained future [5].

The key challenges that must be addressed by sustainable development are those caused by social inequality, finite resources, and population expansion. The world's population will be close to 10 billion in 2100, yet the Earth's resources are finite, especially given that individual consumption has been rising significantly as less developed nations try to catch up with the developed ones. One of the primary effects of human activity that contributes to the acceleration of global warming is greenhouse gas emissions. The problems associated with this warming include water shortages, the disruption of some natural cycles, such as the depletion of agricultural soil, deforestation, and decreased biodiversity. This indicates that the continued evolution of all species living on Earth, eventually including humans, is in danger. Sustainable development is a long-term strategy for how we can plan our continuous advancement in the future without harming the environment to ensure a healthy habitat for the following generations, who will go on developing their economies, society, and environmental awareness with a similar objective in mind. Without hindering others' opportunities, it satisfies our needs. The idea encompasses a wide range of topics, including environmental, social, and economic development, which keeps demonstrating how important it is to our lives because it has an impact on every part of them. To provide direction for future and ideal conscious growth, the United Nations has established 17 Sustainable Development goals and objectives.

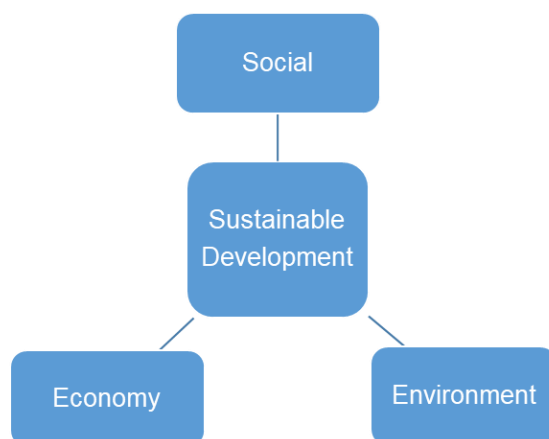


Figure 1. Environment, economy, and society are all known as the three pillars of sustainability.

Need for conservation in sustainability development: The basic goal of conservation is to carefully use natural resources, including land, water, air, and other minerals, to satisfy the needs and aspirations of future generations while maintaining the privileges of the current generation. Increased human population led to increased human requirements. Human beings began using natural resources more extensively as a result of scientific and technical advancements. The complete eradication of some rare species for whom there may be no other options is another problem of conservation. Every day we attain hype in terms of the global economy and technological advancement whereas the environment is becoming worse every day. However, the state of the environment will always be worse than it was. As a result, the idea of sustainable development poses specific problems for the current generation to solve [6].

Sustainable Development: Sustainable development was described as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." in the 1987 Brundtland report "Our Common Future" by the World Commission on Environment and Development. The definition comprises two key ideas: first, the idea of "needs," particularly the basic needs of the world's poor, to whom top priority should be given; and second, the idea of environmental restrictions brought about by the current state of technology and social organization [7]. In simple terms, "sustainable development" refers to the integration of social, economic, and environmental goals to maximize human well-being in the here and now without compromising the capacity of future generations to meet their requirements. This means making compromises when necessary and pursuing mutually beneficial strategies whenever possible. **Social goals** place a high priority on meeting the diverse requirements of the people, including food, health care, and education are among the most fundamental. While educational systems are primarily responsible for preserving human capital (knowledge, skills, and capabilities), firms also offer significant training opportunities to their workers. **Economic goals** support advancements in population welfare. Key ideas are around achieving or maintaining economic growth, maximizing profits, boosting competition, and growing markets. Economic development has taken on a new dimension thanks to

globalization, which has made a wider range of comparative advantages possible. Globalization, like all economic processes, encourages growth differently as different areas and social classes take different opportunities. Inequalities have resulted from this. **Environment goals** deal with how human activity affects environmental systems, especially their carrying capacity. Particularly on the topic of carbon emissions, the general issue of climate change remains important [8].

At the 2002 World Summit on Sustainable Development (WSSD), the UN placed a special emphasis on implementing sustainable development. At the 2015 summit, 17 sustainable goals for the 2030 agenda for sustainable development were established. Each of these goals will lead to advancements in society, the economy, or the environment for the next generation that are as follows:-

S. No.	Goals	Objectives
1.	No Poverty	Eliminate all forms of poverty worldwide
2.	Zero Hunger	End hunger, ensure food security, enhance nutrition, and advance sustainable agriculture.
3.	Good Health & Well-Being	Make sure everyone leads healthy lifestyles and encourages well-being at all ages.
4.	Quality Education	Assure everyone receives a high-quality education that is inclusive and equitable and encourages opportunities for lifelong learning.
5.	Gender Equality	To achieve gender equality and to provide all women and girls the power.
6.	Clean Water Sanitation	Ensure availability and sustainable management of water and sanitation for all.
7.	Affordable & Clean Energy	Ensure that everyone has access to modern, sustainable, affordable energy.
8.	Decent Work & Economic Growth	Encourage consistent, inclusive, and sustainable economic growth, complete and productive employment, and respectable employment for all.
9.	Industry, Innovation & Infrastructure	Build resilient infrastructure, advance inclusive, sustainable industrialization, and support innovation.
10.	Reduced Inequalities	Reduce inequality both within and between nations.
11.	Sustainable Cities & Communities	Make human settlements and cities inclusive, secure, durable, and sustainable.
12.	Responsible Consumption & Production	Ensure sustainable production and consumption habits.

13.	Climate Action	Combat climate change and its effects require immediate action.
14.	Life Below Water	Use the oceans, seas, and marine resources wisely and sustainably to promote sustainable development.
15.	Life On Land	Protect, restore, and encourage the sustainable use of terrestrial ecosystems, manage forests sustainably, fight desertification, prevent and reverse land degradation, and stop biodiversity loss.
16.	Peace, Justice & Strong Institutions	Encourage inclusive and peaceful societies for sustainable development, ensure that everyone has access to justice, and create inclusive institutions at all levels.
17.	Partnerships for the Goals	The global collaboration for sustainable development should be strengthened and reactivated.

Table 1. 17 Goals of sustainable development

Principles for environmental conservation: The goals of the natural system must be the maintenance of diversity, stability, mutualistic symbiosis, and synergism (interaction and interconnectedness), whereas the goals of the social system must be the promotion of cultural diversity, social stability, and social synergism (Social interaction and interconnectedness). If these objectives are not supported and maximized in both natural and social systems, sustainable development will just produce meaningless political rhetoric. The following five principles, which contain both intrinsic and instrumental values, could serve as a comprehensive policy framework and set of rules for a socially responsible and environmentally friendly planning process that includes environmental preservation, ecosystem balance, and socially sustainable development.

1. The first principle is the maintenance of ecosystem health, also known as ecological health or ecological integrity, in a way that allows for the sustainable use of ecosystems while maintaining ecological processes, diversity, and life support functions of the system.
2. The second principle is the idea of population control, which is predicated on the idea that the earth's resources are limited and cannot support an ever-increasing human population.
3. The third principle is that people must be integrated into the ecosystem since it is only by meeting basic human needs that the eco complex can be preserved.
4. The fourth principle is equity and social justice, without which it is difficult to meet the requirements of the current generation's people and preserve a range of possibilities for future generations.
5. The fifth principle is the adoption of ecologically friendly consumption and production patterns, which is founded on the idea that cultural adaptation by humans must be ecologically compatible to achieve sustainable development over the long term.

These principles emphasize the importance of meeting basic human needs, enhancing the quality of life through cultural and material advancement, and achieving equity and social justice through community empowerment. They also highlight the importance of adopting ecologically sound consumption and production patterns in developed nations and prompt population control measures in developing nations. These principles also seek similar goals in natural systems. They emphasize the need of maintaining ecological processes, ecosystem diversity and stability, and the productive potential of the natural resource base for the biosphere, of which the human social system is merely one element. Only if the biosphere is healthy and generally stable will human life and non-human biota be able to flourish [9].

Strategies of environmental protection for sustainable development: All of the environmental effects are thought to be transient. Therefore, a proper strategy must be developed for long-term benefits and sustainable environmental management.

- **Sustainable industrialization:** Economic growth depends on industrialization, but it's also necessary to consider sustainability. It is crucial to switch to less energy-intensive industries, uses cleaner fuels and technology, and implement proper energy-efficient laws to achieve sustainable industrialization [10]. Additionally, certain zones should be designated for the development of enterprises because trash from one business can be used as a raw material for another [11]. To cut emissions without hurting the national economy, industrial zones should have been shut down after a set amount of time.
- **Use of green and public transport:** It is vital to promote the usage of public transportation over private vehicles to reduce emissions. Additionally, it is important to promote cycling for short distances, and public bike sharing (PBS) programs like those in China should be made widely accessible for everyone to utilize. Cycling is not only healthy but also favorable to the environment.
- **Use of renewable energy:** Utilizing renewable energy sources can reduce the need for fossil fuels like coal, oil, and natural gas, which can be crucial in lowering greenhouse gas (GHG) emissions [12], [13].
- **Renewable energy sources are low-carbon and environmentally beneficial:** There are no greenhouse gases (GHGs) produced by solar, wind, geothermal, or hydroelectric electricity. To protect the environment, many nations have implemented renewable energy technology in recent years. Additionally, several causes, including the security of the energy supply, energy dependence, climate change, the volatility of energy prices, health concerns, and natural disasters, encouraged emerging economies to use renewable energy sources [14].

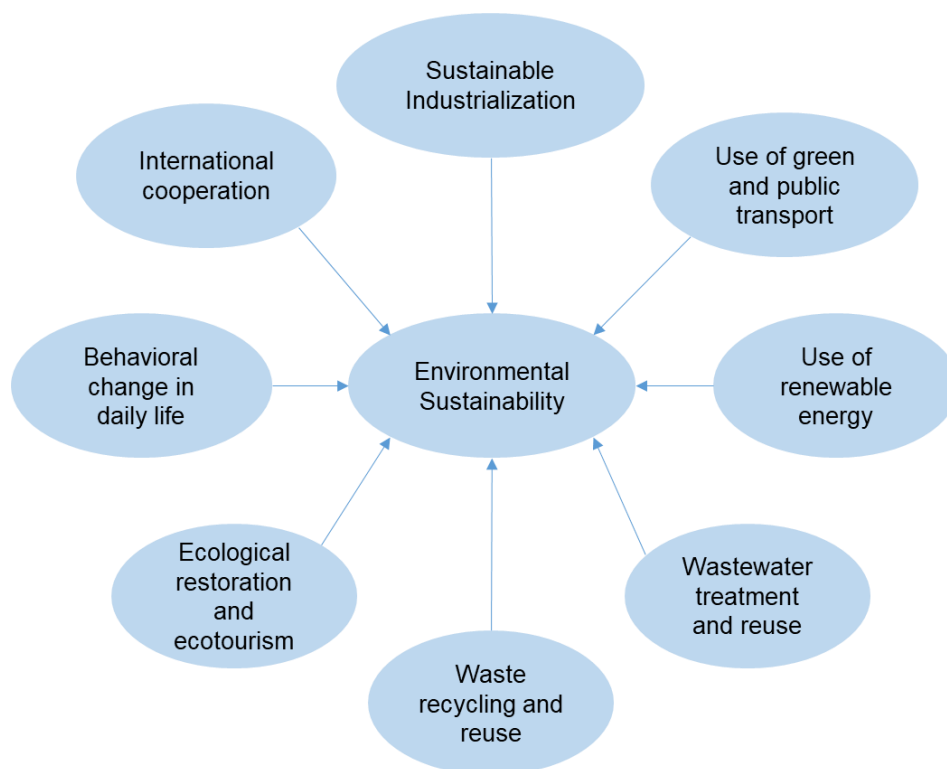


Figure 2. Schematic representation of various strategies that are primarily required to achieve environmental sustainability.

- **Wastewater treatment and reuse:** Industrial and municipal wastewater should both be appropriately treated before disposal to combat the difficulties of water contamination. Additionally, the burden of excessive water withdrawal can be lessened by reusing treated wastewater in non-production activities like road cleaning and toilet flushing.
- **Waste recycling and reuse:** Industrial and municipal trash should both be recycled and repurposed to lessen the burden of waste and environmental degradation. To reduce the consumption of raw materials and waste output, circular economy or circularity systems should be incorporated into the production process [11].
- **Ecological restoration and ecotourism:** Tourist attractions should regularly close after a set amount of time for ecological repair. Additionally, ecotourism practices need to be improved to support biodiversity preservation, cultural preservation, and sustainable livelihoods [15].
- **Behavioural change in daily life:** Changes in everyday behaviour and wise resource use are required to lower carbon footprints and global carbon emissions, such as avoiding processed food in favour of locally grown options, turning food scraps into compost, turning off or unplugging electronic devices when not in use, and using bicycles in place of cars for shorter distances.
- **International cooperation:** A concerted worldwide effort is necessary to achieve sustainable environmental goals and conserve global environmental resources, such as the world's climate and biological variety [16]. As a result, a responsible international

organization like the United Nations Environment Programme (UN Environment) should play a significant role in developing time-sensitive policies, setting up international gatherings, and coordinating the efforts of world leaders to ensure effective implementation [17].

Importance of environmental conservation for sustainable development:

Environmental conservation is the preservation of the natural ecosystem and other aspects of the environment on which we humans depend. Our harmful effects include habitat damage, overfishing, pollution, and deforestation. All of them are harming nature and creating terrible situations for people. That is the major reason we need to reconsider and revise our plans for achieving our sustainable development goals. It will assist us in protecting the environment from alarming problems including acid rain, wildfires, natural disasters (frequently caused by anthropogenic factors), and global warming. The best way to preserve our natural resources is to be sustainable in our practices and care for the environment.

1. **To prevent natural resource exploitation:** The world meter reports that there are currently 8 billion people on earth, with a predicted 10 billion people living on the planet by the year 2057. The use of resources has increased along with the growth in the human population. Water, air, sunlight, agricultural land, metal ores, and fossil fuels are among the main natural resources we rely on to survive and maintain a reasonable standard of living. Coal, copper, iron ore, and potash are the most heavily mined minerals, according to a Statista analysis. The two nations with the most people, China and India, are also noted for having the highest coal consumption rates. Additionally, a Statista report states that in 2021, the world consumed 160.1 exajoules of coal. Since fossil fuels account for the majority of the energy we use, their shortage could cause unanticipated difficulties in the world. This is also because it takes millions of years for these fuels to develop. Furthermore, we are aware that only 3% of the world's total water bodies are freshwater resources. Only 1% of the available water can be used for ordinary use, irrigation, and the production of power. Our current practices with these bodies may ultimately result in a problem for our offspring. The rising deforestation and other human activities are to blame for abusing our natural forests and their species, not simply for the minerals and water they contain. Additionally, it causes some additional environmental problems. Therefore, we must comprehend the necessity of environmental conservation.
2. **To maintain ecosystem balance:** Maintaining the ecosystem is the second and most crucial reason to recognize the significance of environmental conservation. That is due to the following reasons:
 - A large portion (about one-third) of the world's most renowned cities' drinking water comes from our forests. It also serves as home to 68% of the mammal species, 75% of the bird species, and 80% of the amphibian species [18].
 - 68 million people may benefit from more street trees if the summertime air temperature was reduced to 0.5 to 2.0 degrees Celsius [19].

- In the world, 40% of people have been impacted by ecosystem deterioration and according to research by the International Resource Panel, by restoring the landmass, we can achieve all 17 of the sustainable development goals by 2030.

All of these statistics show that we need to protect our planet from the ongoing exploitation of species (both plant and animal), which upsets the equilibrium of our food chain and food web and degrades ecosystems. Thus, protecting our natural environment is the most important step we can do to prevent further effects.

3. **To stop natural disasters caused by humans:** Some natural disasters are predominantly caused by increased human activities, in addition to the mishaps caused by human activity that occur every year. The most notable illustration is the current COVID-19 epidemic, which mimics a natural disaster but is caused by people. This anthropogenic coronavirus will be responsible for roughly 59 lakh deaths worldwide between 2020 and 2022. And it has caused numerous losses to the economies of other nations. In the 20th century, 6.8 million people died as a result of other natural calamities, including floods. And you'll be shocked to learn that it's a result of human activity as well. Some of these natural disasters' effects on people include deforestation, climate change, extended rain, and sea level rise. We also have a significant impact on other natural disasters, not simply floods. Because of this, we must begin environmental conservation as soon as feasible.
4. **To minimize the effects of global warming:** Climate change, glacier melting, sea level rise, acid rain, the greenhouse effect, ocean acidification, etc. are a few of the negative side effects of global warming. And if we look closely, we can see that the reason for the slow rise in global temperature is a combination of our irresponsible actions and an increase in population. World Meteorological Organization (WMO) studies found that between 2017 and 2021, the global surface temperature increased from 1.06 degrees Celsius to 1.26 degrees Celsius, which is comparatively higher than it was during the preindustrial era. Before it begins to have an impact on other environmental elements, it won't be a concern. We can experience impacts like climate change and acid rain as a result of a rise in atmospheric carbon concentration. Additionally, one of the main killers in the most polluted nations is the acid produced when precipitation and atmospheric carbon combine. Furthermore, this acid raises pH when combined with ocean water. Additionally, certain organisms cannot survive at pH levels above their optimum pH. As a result, the entire food chain is affected by the effects on a few lower groups of creatures, which degrades the environment. Additionally, the glaciers are melting quickly because of the rise in global temperature. According to studies, between 2000 and 2019 glaciers eroded 267 gigatons of ice annually, which will result in a 21% rise in sea level in the twenty-first century [20]. In addition, there are other connected effects of the elevated sea level rise. However, by properly appreciating the value of environmental conservation, we can protect our planet from forthcoming, unforeseen natural disasters.

5. **To bring awareness:** The last but not least motive for beginning environmental conservation is to raise public awareness. Our decade-long irresponsible behaviors have caused all the environmental problems we can see now and have put us in the most horrible circumstances we can conceive. The first step in every environmental conservation or preservation endeavor is to recognize how important it is. This is so that the cumulative influence of our activities might be affected by the outcomes. Furthermore, it can quickly lessen the effects if responsible people start raising awareness by participating in various environmental conservation activities [21].

Key elements of sustainable development policies:

- **Long-term planning horizons:** In the absence of a sufficient framework for evaluating the impact of policies on various types of resources, initiatives aimed at achieving short-term goals may be chosen, even if they have detrimental long-term effects. Long-term welfare increases will be supported by the combination of man-made, natural, human, and social capital, even though trade-offs between various goals may be more prominent in the short term.
- **Pricing:** Prices should accurately reflect the complete costs and benefits to society of the produced commodities and services if markets are to promote sustainable outcomes. This may necessitate the removal of incentives for the excessive use of natural resources and environmental degradation or the creation of new incentives for environmental improvement.
- **Delivery of Public goods:** The advantages of government actions required to advance sustainable development have the characteristics of public goods (basic research, information, health, and education). Additionally, a lot of these public goods (such as knowledge about the condition of the world's ecosystems) are global in scope because they will benefit many nations. To effectively deliver these public goods, coordination barriers must be removed through burden-sharing regulations that take into account the various duties and reaction capabilities of many nations.
- **Cost-Effectiveness:** Policies should work to reduce their financial impact. To achieve this, it will be necessary to make sure that the costs of each additional resource are distributed equally across the range of potential interventions. Cost-effectiveness enables the reduction of overall expenses and the future creation of more ambitious targets.
- **Environmental Effectiveness:** Policies should ensure that: i. Regeneration- i.e., Renewable resources should be utilized wisely, and their long-term rates of natural regeneration shouldn't be allowed to be exceeded. ii Sustainability- i.e. It is essential to use non-renewable resources wisely and to keep them to levels that can be compensated by using other types of capital or renewable resources. iii. Assimilation- i.e. Releases of harmful or polluting compounds must not exceed the environment's ability to absorb them, and concentrations must be kept below set critical limits required for both environmental and human health protection. Zero release of such compounds is necessary to prevent their accumulation in the environment when the assimilative capability is

effectively zero. iv. **Avoiding Irreversibility:** i.e. avoiding irreversible harmful effects of human activity on ecosystems, biogeochemical cycles, and hydrological cycles. It is important to protect natural processes from the negative effects of human activity. These processes are capable of preserving or restoring the integrity of ecosystems. To preserve the populations of threatened, endangered, and important species within ecosystems, it is important to take into account the different levels of ecosystem resilience and carrying capacity.

- **Precaution:** Threats of the regenerative capacity of the environment crossing critical thresholds are undetermined. Therefore, when developing policies for sustainable development, nations should exercise prudence as needed in circumstances where there is a lack of scientific confidence.
- **International cooperation:** Spillovers grow increasingly common as global interdependence increases. When nations are faced with a variety of social and environmental concerns that have global repercussions, a narrow focus on national self-interest is not practical.
- **Transparency and Accountability:** To properly tackle the challenge of sustainable development, a participatory approach is crucial because the standards for sustainability cannot be established in simple technical terms. This necessitates that the decision-making process is transparent to the public, informed by the whole spectrum of potential outcomes [22].

India's environmental regulations for sustainable development: Major environmental regulations related to sustainable development have a substantial challenge in implementation at the grassroots level, raising concerns about the effectiveness and seriousness of environmental legislation across the nation. India is one of the few nations with comprehensive environmental laws.

- **Water Prevention and Control of Pollution Act, 1974:** The Water (Prevention and Control of Pollution) Act was passed in 1974 to establish procedures for the prevention and management of water pollution as well as for the preservation or restoration of the country's water wholesomeness [23].
- **The Air (Prevention and Control of Pollution) Act, 1981:** An act was passed in 1981 to prevent, control, and reduce air pollution in India [23].
- **The Environment Protection Act, 1986:** Act was passed in 1986 to ensure the environment's conservation and improvement. It gives the Central Government the authority to create authorities under sub-section (3) of section 3 with the responsibility of preventing environmental pollution in all of its forms and addressing particular environmental issues that are unique to certain regions of the nation [23].
- **The National Green Tribunal Act 2010:** The National Green Tribunal, a non-constitutional entity, was established by the NGT Act. This act gives this body essential

authority regarding environmental protection, the conservation of forests, and restrictions for significant resources in India [23].

- **Hazardous Wastes (Management, Handling, and Transboundary) Rules, 2008:** Hazardous Wastes (Management, Handling, and Transboundary) Rules, 2008 is a law that establishes regulations for the management of hazardous or dangerous toxic wastes as well as for the storage, importation, and manufacture of hazardous substances [23].
- **Biomedical Waste (Management and Handling) Rules, 1998:** This law enables the proper management of infectious wastes, including their segregation, transportation, and disposal [23].
- **Municipal Solid Wastes (Management and Handling) Rules, 2000:** The main goal of this law is to make it possible for local governments to dispose of their municipal solid waste in an incredibly eco-friendly and rational way [23].
- **Nuclear energy (Safe Disposal of Radioactive Wastes) Rules, 1987: GSR 125.** This law governs the administration of radioactive substances. Every use of materials, including the removal of waste from abandoned sources and nuclear management, is approved by the Atomic Energy Regulatory Board (AERB).

Challenges of conservation and sustainable development of the environment:

Regular, global evaluation projects do a good job of reviewing the numerous critical concerns and troubling trends that still need to be rectified. Although they frequently concentrate on environmental, social, or economic issues, these take a more comprehensive approach. Among the helpful resources are Global Environment Outlook 2000; Global Environment Outlook 3 (UNEP 1999, 2002); World Resources Report (WRI/UNDP/UNEP/World Bank 2000); DAC Development Report 2000 (OECD DAC 2001b); Human Development Report 1999 (UNDP 1999, 2001a). These publications, along with numerous others, point to several important and connected difficulties with achieving sustainable development:

- **Economic disparity and political instability:** Although most countries' economic fortunes have improved significantly over the past 20 years, there are still far too many countries that are experiencing economic decline and declining per capita incomes. The recent slowdown in Asian economies shows how growth could be flimsy. The income gap between rich and poor people within countries, between wealthy and poorer countries, and between many global corporations and the nations in which they do business (or don't) is only getting wider. The world's economic and natural resources are thus largely under the control of a very small number of people, countries, and businesses. This, along with the exclusion of racial and other minorities from political and economic decision-making processes, adds to instability. In many nations and regions, socioeconomic progress is further hampered by political instability, which can occasionally result in a violent war.
- **Extreme poverty:** One out of every five people in the developing world still suffers from severe poverty even in these prosperous times. More than 1.3 billion people (including over 1 billion in the Asia and Pacific region) were estimated to be trying to live on less

than \$1 per day in 1993 [24]. Sub-Saharan Africa, where half the population lived in poverty in 2000, has the highest percentage of the poor and the quickest rate of increase in poverty. In many nations with high rates of poverty, the social evils connected to poverty are growing. These include illness, dissolution of families, widespread criminal activity, and drug abuse.

- **Under-nourishment:** Although there is already enough food produced worldwide to cover everyone's nutritional needs, some 800 million people are still undernourished due to issues with the allocation of economic resources and food. Even while global food production is currently increasing, several indicators indicate that feeding a growing global population may become increasingly difficult. Major grain crops' rates of production growth are slowing down, and post-harvest losses are still significant. Production in some areas is threatened by soil degradation brought on by erosion and poor irrigation techniques. In general, it will be challenging to meet future food demands without increasing the environmental burden brought on by intensive agriculture without a shift to more resource-efficient and less polluting farming techniques.
- **Global energy use:** Although 2 billion people are still completely unconnected to the fossil fuel-based economy, worldwide energy demand has climbed by about 70% since 1971 and is expected to continue to rise by over 2% year over the next 15 years. More people will have access to energy services as a result of this growth, but unless significant efforts are made to improve energy efficiency and lessen reliance on fossil fuels, this rise will result in a 50% increase in greenhouse gas emissions over current levels. Although the use of renewable energy sources like wind, solar, geothermal, hydroelectricity, and others has grown significantly and technologically advanced, public infrastructure, the practicality of fossil fuels, and their low cost severely impede any significant shift to the use of such clean energy sources soon.
- **Climate change:** Annual CO₂ emissions were almost four times more in the late 1990s than they were in 1950, and CO₂ concentrations in the atmosphere reached their highest level in 160,000 years [24]. The Intergovernmental Panel on Climate Change states that "the balance of evidence implies that there is a discernable human influence on global climate change" [25]. This is anticipated to lead to shifting climatic zones, adjustments in ecosystem productivity and species composition, as well as an increase in extreme weather occurrences. All nations will be seriously impacted by these significant effects on human health and the sustainability of resource management in agriculture, forestry, and fisheries. Developing nations, especially the least developed ones, are predicted to be the most susceptible to the effects of global climate change, even though they now make a negligible contribution to the issue.
- **Nitrogen loading:** Massive amounts of nitrogen are being released into the environment by intensive agriculture, which is reliant on extensive fossil fuel combustion and the widespread cultivation of leguminous crops. This is worsening acidification, changing the species composition of ecosystems, raising nitrate levels in freshwater supplies above

safe levels for human consumption, and causing eutrophication in freshwater and marine habitats. The atmosphere's nitrogen oxide emissions also contribute to global warming. Scientists are becoming increasingly concerned that the scale of the nitrogen cycle disruption may have global effects equivalent to those brought on by disruptions of the carbon cycle.

- **Natural resource deterioration:** With the substantial depletion of natural resources, such as soil erosion, and the destruction of forests and fisheries, environmental degradation is getting worse. The extent and condition of the world's forests continue to decline due to deforestation, which is typically caused by conversion to farms, pastures, human settlements, or for logging. Between 1990 and 1995, a total of 65 million hectares of forest were destroyed [24]. Recent forest fires have significantly destroyed and damaged forests in the Amazon and Indonesia. Coral reefs and freshwater wetlands are two examples of delicate aquatic environments that are seriously threatened by land-based pollution, damaging fishing methods, dam development, and climate change. According to estimates, human activities might put 34% of all fish species and over 60% of the world's reefs in danger. The variety of the Earth's ecosystems and the availability of renewable natural resources have both decreased by 33 percent during the past 30 years as a result of environmental deterioration, despite a doubling in demand for these resources.
- **Loss of diversity:** An estimated 40% of the world economy is made up of products and processes with biological origins. Many large-scale production techniques in agriculture and forestry depend on destroying local biodiversity and replacing it with monoculture production. Much of this production is based on the cultivation of an increasingly constrained range of species and genes. However, there is also a rising understanding of the worth of biodiversity, both as a kind of insurance if specific species or genes fail (due to disease, climatic change, or economic change) as well as "intellectual property" to create new uses. However, the same biodiversity pool that has been shrinking is progressively coming under the authority of the same large corporations. Many underprivileged populations may be highly reliant on a variety of habitats, species, and genes at the level of their livelihoods, especially when it comes to adjusting to changing conditions. They may also be effective managers of biodiversity.
- **Pollution:** Most nations currently endure moderate to severe levels of pollution, which is having an increasingly negative impact on the quality of the water, land, and air. Despite efforts to clean up in some nations and industries, exposure to pesticides, heavy metals, tiny particles, and other substances, as well as the availability and use of chemicals globally, constitute a growing hazard to human health and the environment.
- **Other Urban Problems:** The severity of environmental and socioeconomic issues is growing, which reinforces one another in densely populated places due to ongoing urbanization and industrialization, a lack of resources and knowledge, and poor governance. These urban regions have become environmental crisis areas as a result of

air pollution, inadequate solid waste management, hazardous and toxic wastes, noise pollution, and water contamination. Children from low-income families are especially at risk for inescapable health concerns [26].

Conclusion: The environment is under more stress as a result of economic development, which aims to increase the production of goods and services to meet the requirements of a growing population. In the early stages of development, the supply of environmental resources was greater than the demand. Environmental resources are now in greater demand than ever, but their availability is constrained due to abuse and overuse. The goal of sustainable development is to encourage the type of development that minimizes environmental issues while also addressing current needs without compromising the ability of future generations to meet their own needs. It is essential, not optional, to design appropriate policies and methods that lead to environmental conservation (of biological variety and natural ecosystems) and ecologically sustainable development. The greatest obstacle to sustainable development is still the lack of awareness of the need to address the problems left behind by the Industrial Revolution, such as unrestricted human and environmental exploitation, in every corner of the world, from homes to boardrooms.

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