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UNIT 1 Multidisciplinary Nature of Environmental Studies

"Melting ice ... a hot topic!"

Slogan, World Environment day (5th June 2007)

Objectives

- Introduction– Objectives and Importance of Environmental Studies
- Need for Public Awareness
- Introduction to the Concept of Green Technology

1.1 INTRODUCTION

Environment (from the French *environner*: to encircle or surround) can be defined as the circumstances or conditions that surround an organism or group of organisms. Alternatively it can be defined as the combination of

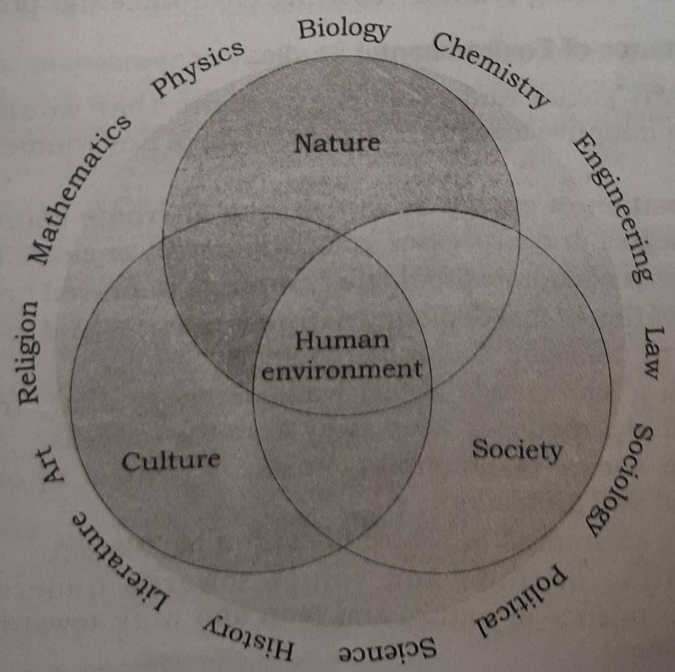

Fig. 1.1 The intersections of the natural world with the social and cultural worlds encompass our environment. Many disciplines contribute to environmental science and help us understand how our worlds intertwine as well as our proper role in them.

social or cultural conditions that affect an individual or community. Since humans inhabit the natural world alongwith technological, social and cultural world, together these constitute important parts of our environment (Fig 1.1).

Environmental Studies, is the systematic understanding of our environment and our existence in it. It includes many interconnected problems involving human population, Earth's natural resources and environmental issues or problems. It is highly interdisciplinary and integrates natural sciences, social sciences and humanities in a broad holistic study of the world around us.

1.1.1 Objectives of Environmental Studies

The objectives and guiding principles of environmental studies are as follows: (UNESCO, 1971)

1. **Awareness:** To acquire an awareness and sensitivity to the total environment and its allied problems.
2. **Knowledge:** To gain experience and acquire basic understanding of the environment and its associated problems.
3. **Attitude:** To acquire set of values and develop feelings of concern for the environment and build motivation for active participation in environmental improvement and protection.
4. **Skill:** To develop skills in identifying and solving environmental problems.
5. **Participation:** To provide an opportunity to be activily involved at all levels in working towards resolving environmental problems.

1.1.2 Importance of Environmental Studies

The important social and economic benefits that would result from government's initiative towards the propagation of Environmental education are:

- Conservation of energy by introducing alternate sources, improved technologies and processes compatible with environment.
- Increase in economic productivity through improved health of people.
- Conservation of fast depleting natural resources and to find ways and means to maintain ecological balance.
- Imparting knowledge about waste management, treatment and disposal techniques to keep away from the hazards.
- Develop social responsibility towards control of environmental pollution and protection.
- Creating awareness in people to control population.
- Inculcating attitude and values towards understanding the interdependence of nature and man and work towards sustainable development.

1.1.3 Role of Environmental Scientists

Environmental Scientists try to establish general principles about how the natural world functions. They use these principles to develop viable

solutions to environmental problems based on scientific knowledge. The five elements or stages which contribute to addressing an environmental problem are (Fig 1.2):

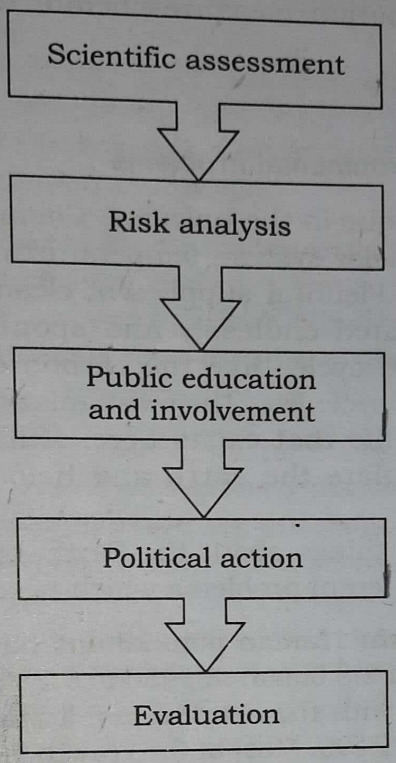

Fig. 1.2 Addressing environmental problems. These five steps provide a framework for addressing environmental problems

1. **Scientific assessment:** The first stage is the collection of information. The problem is defined and then the data are collected and experiments and simulations are performed to construct a model. This model then helps to understand how the problem arose and how to predict the future course of events.
2. **Risk analysis:** Using the results of the scientific investigation, the potential effects or the risk of one or more remediation options are calculated.
3. **Public education and involvement:** In a democratic country like India, public awareness and endorsement through media is an essential part of addressing environmental problems. When alternative courses of action exist, then the affected parties i.e., the public must be informed. This involves the explanation of the problem and the alternatives for action alongwith probable costs of each option.
4. **Political action:** The affected parties, through their elected officials, decide a course of action and implement it. Ideally the course of action is based on the best evidence. But during a political process the action is based on economic, social and political considerations rather than scientific evidence.
5. **Evaluation:** The results of any action taken should be carefully monitored to see if the problem is really being addressed and also to improve the initial assessment and modeling of the problem.

However, in real life, addressing environmental problems is quite complex particularly when the problem is of regional or global level. Quite often the public becomes aware of the problem and starts discussing remediation measures before the problem is clearly identified.

1.1.4 Major Global Environmental Problems

Our planet, Earth is unique in the universe. Compared to the conditions on other planets in the solar system, temperatures on the earth are mild and relatively constant. Plentiful supplies of clean air, fresh water and fertile soil are regenerated endlessly and spontaneously by various geological and biological cycles like the carbon cycle, Nitrogen cycle, phosphorus cycle, sulfur cycle, etc. The most amazing feature of the Earth is the rich diversity of life that exists here. Millions of beautiful and intriguing species populate the earth and help sustain a habitable environment.

While there are many things about the Earth, which make it unique, there are many Environmental problems which need to be addressed:

Rapid population growth: Human populations have grown at alarming rates in this century, from 2.5 billion in 1950 to 6.25 billion in 2001. Unless birth rates are balanced with the death rates, it may reach 10–11 billion by 2050 and 14 billion by 2100. Most of the growth is in the developing and poorer countries where resources and services are already strained by present populations.

Food shortage and famines: These are too familiar in many places and may increase in frequency and severity if population growth, soil erosion, and nutrient depletion continue at the same rate in the future as they have in the past. ***Food security*** often is linked to *poverty*, *democracy* and *equitable distribution* than it does with the amount of food available.

Water shortage: Water deficits and contamination of existing water supplies are threatening environmental issues in the future for agricultural production as well as for domestic and industrial uses. Many countries already have serious water shortages and more than one billion people lack access to clean water and proper sanitation. This may lead to violent conflicts over control of natural resources if we donot learn to live within nature's budget.

Depletion of non-renewable fossil fuels: Fossil fuels are rapidly depleting due to their overutilisation by the growing population alongwith growth in industrialization all over the world. Their use is leading to air pollution and damage to the environment. Cleaner renewable energy resources like solar, wind, thermal and biomass etc. together with conservation may replace environmentally destructive energy sources if appropriate technologies are applied.

Damage to the Environment: Burning of fossil fuels and biomass fuels release carbon dioxide and other heat absorbing species like black carbon,

hydrocarbons etc. that cause **global warming** and may bring about sea-level rise and catastrophic climate change. Acids formed in the air due to Sulphur dioxide and Nitrogen oxides emissions from fossil fuel combustion cause extensive damage to the building materials and sensitive ecosystems in the form of **acid rain.**

Chlorinated compounds, such as chlorofluoro carbons used in refrigeration and air conditioning, also contribute to **global warming,** as well as **damage to the stratospheric ozone** that protects us from cancer-causing ultraviolet radiation in sunlight.

Deforestation and threat to biodiversity: Deforestation of tropical forests, coral reefs, wetlands and other biologically rich landscapes is causing an alarming loss of species and a reduction of biological variety and abundance that could severely limit our future options. Many rare and endangered species are threatened directly or indirectly by human activities like agriculture, building of dams, factories, highways, mining operations etc.

Disposal of solid and hazardous wastes: Mountains of solid and hazardous wastes are becoming an overwhelming problem throughout the world. We produce millions of tons of these hazardous materials annually and much of it is disposed off in dangerous and irresponsible ways.

The health effects of pollution, toxic wastes, stress and other environmental problems of this modern age have become a greater threat than infectious diseases for the whole world. The serious Global issues illustrate the importance of environmental science and environmental education for everyone.

"We have not inherited this beautiful earth from our ancestors, rather we have borrowed it from our children"

What we are doing to this world and what they may mean for our future and to our children is of paramount concern as we proceed through the twenty-first century.

1.1.5 Solutions Toward Global Issues (Ray of hope ...)

Increasing awareness towards the environmental issues have led the society to work towards finding solutions to these problems. Progress has been made by establishing laws, policies and treaties in controlling air and water pollution and reducing wasteful resource uses. Food production has improved the nutrition of millions in the developing world, and the percentage of individuals who are undernourished has declined from 35% to 20% over the past thirty years. Population has stabilized in most industrialized countries and even in some very poor countries where social security and democracy have been established. Over the last twenty years, the average number of children born per woman world wide has decreased from 6.1 to 3.4. This is still above the zero population growth rate of 2.1

Note: Biodiversity is the number and variety of organisms found within a specified geographic region. It refers to the varieties of plants, animals and micro-organisms and the ecosystems they form.

children per couple, but still it is an encouraging improvement. If this rate of progress continues in the next twenty years as it has in the past, the world population could stabilize early in this century.

The incidence of life threatening infectious diseases has been reduced sharply in most countries during the past century, and the average life expectancy has nearly doubled. Many alternate resources have been discovered and more efficient ways of using existing supplies have been invented that allow us to enjoy luxuries and conveniences that would have seemed miraculous only a few generations ago.

We, individually and collectively can do much more to protect and restore our environment. Being, aware of the problems we face is the first step towards finding their solutions. We are in a position to address these issues because we have resources, motivation and knowledge to do something about our environmental problems.

"If we don't act now, we may not have another chance to do so".

1.2 NEED FOR PUBLIC AWARENESS

Environmental Studies/Education is a process of recognising values and clarifying concepts in order to develop skills and added tools necessary to understand and appreciate the inter-relationship among man, his culture and his bio-physical surrounding. It creates an overall perspective, which acknowledges the fact that natural environment and man-made environment are interdependent. The protection and preservation of environment in totality is thus a foremost issue. Every person, organisation and institution has an obligation and duty to protect it. Environmental consciousness deserves to be propagated at all levels. Environmental conservation can be achieved if we all share a single thought, the thought of creating a better world to live in, the thought to give a better deal to everyone, human or otherwise, to the present as well as to the future generation who all have to share the Almighty's great gifts of clean environment and abundant natural resources on this planet earth.

Environmental protection encompasses not only pollution but also sustainable development and conservation of natural resources and the eco-system. Environmental degradation can be either localised such as the depletion of a nation's forest resources, or global, such as destruction of the ozone layer. Environmental studies/Education is thus a continuous lifelong process beginning at the pre-school level and continuing through all stages. It is of inter-disciplinary nature and examins major environmental issues from local, national and international point of view. It should utilize various educational approaches to teach and learn about and from the environment with stress on practical activities and first-hand experience. It is through this process of education that people can be sensitized about the environmental issues.

The major goals of imparting Environmental Education and training are:

- Development of educational/teaching materials and aids in the formal education sector;

- To encourage non-governmental organisations, mass media and other concerned organisations for promoting awareness among the people at all levels;
- To promote environment education through existing educational/ scientific/research institutions;
- To ensure training and manpower development in environment education; and.
- To mobilise people's awareness for the preservation and conservation of environment.

To achieve the above goals, the Ministry of Environment and Forests has been implementing several schemes and programmes. Some of the major schemes implemented for imparting environmental education and for creation of environmental awareness among the general public are as follows:

1.2.1 Formal Environmental Education

Though formal education is the mandate of the Ministry of Human Resource Development (MHRD), the Ministry of Environment & Forests has been interacting with the MHRD, NCERT, State Departments of Education etc. to ensure that environmental components are adequately covered at the school levels by infusion into the school curricula at various levels. The major initiatives taken by the Ministry in this direction recently are mentioned below:

(i) Environmental Education in School System

Under this project, which was initiated in 1999, an exercise to strengthen environmental education in the formal school curriculum has been undertaken. During the first phase of this project, a comprehensive study was conducted to assess the status of infusion of environment content in the school curriculum in the country and to assess the effectiveness of classroom teaching. The study was conducted in all the States and Union territories of the country and textbooks of all the classes from standards I to XII were analysed. Based on the findings of the study, the textbooks in Science, Social Science and Languages of middle school level have been modified to strengthen the infusion of environmental concepts. The modified textbooks are being used since 2002 in the schools around the country. The concerned teachers of the selected schools have also been trained to effectively teach the modified textbooks.

(ii) Environmental Education at College & University level

There are nearly two hundred departments of Environmental Studies in the universities and colleges all over India. They offer degree or diploma programmes covering all aspects of environmental science and engineering. There are also diplomas, bachelor's degree, M.Sc, M.Phil and Ph.D programmes in Environmental Sciences or Environmental Studies. Besides these, M.E., M.Tech and Ph.D programmes in Environmental Engineering are offered by Civil Engineering and Chemical Engineering departments.

Post graduate degree programmes in Environmental Management and courses, which lead to M.Sc in Environmental Chemistry/ biology/Geology or environmental toxicology are also available. Environmental eduction at doctoral level is also available in a large number of autonomous Research and Development (R and D) institutions founded by central government, state governments and agencies such as CSIR, ICAR and ICMR i.e. formal eduction in environmental science or engineering is available in India upto the highest possible level.

(iii) Environmental Appreciation Course

Though there are several courses on environmental sciences at present in the formal system, there were no structured courses available outside the formal system for people who desire to learn about environmental issues. IGNOU alongwith Ministry of Environment and Forests (MOEF) have developed on a non-credit awareness course of three months duration. The main objectives of the course are to create environmental consciousness and facilitate development of environmental leadership among individuals who may organize/participate in environmental upgradation programmes.

(iv) Environmental Concepts in Management & Business Studies

Realising that the industry Managers and leaders need to be sensitized towards environmental issues and concepts of Environmental Management so that they can play an important role in introducing environmentally sound practices in their operations, the Ministry has taken an initiative to introduce/enhance environmental concepts in the Business/ Management Education. A committee comprising representatives from Management Institutions, Industries, All India Council of Technical Education (AICTE), University Grants Commission (UGC), and Ministry of Environment and Forest (MOEF) is already looking into various aspects like course content and syllabi of the existing courses so that gaps could be identified and suggestion could be given for enhancing/introducing the environmental content where necessary.

1.2.2 Non-formal Environment Education and Awareness

Environmental Education, Awareness and Training plays a significant role in encouraging and enhancing people's participation in activities aimed at conservation, protection and management of the environment, essential for achieving sustainable development. The Ministry, therefore, accords priority for the promotion of non-formal environment education and creation of awareness among all sections of the society through diverse activities using traditional and modern media of communication. Some of the major activities undertaken in this regard are as follows:

(i) National Environment Awareness Campaign (NEAC)

The NEAC was launched in mid-1986 with the objective of creating environmental awareness at the national level. It is a multi-media campaign which utilises conventional and non-conventional methods of

communication for disseminating environmental messages to a wide range of target groups. Under this campaign, nominal financial assistance is provided to registered NGOs, schools, colleges, universities, research institutions, women and youth organisations, army units, State Government Departments etc. from all over the country for organising/conducting awareness raising activities. These activities which include seminars, workshops, training programmes, camps, padyatras, rallies, public meetings, exhibitions, essay/debate/painting/poster competitions, folk dances and songs, street theatre, puppet shows, preparation and distribution of environmental education resource materials etc., are followed by action like plantation of trees, management of household waste, cleaning of water bodies etc. Diverse target groups encompassing students, youth, teachers, tribals, farmers, other rural population, professionals and the general public are covered under NEAC. The programme is being implemented through 28 designated Regional Resource Agencies (RRAs) for specific states/regions of the country.

(ii) Eco Clubs (National Green Corps)

The main objectives of this programme are to educate children about their immediate environment and impart knowledge about the eco-systems, their inter-dependence and their need for survival, through visits and demonstrations and to mobilise youngsters by instilling in them the spirit of scientific inquiry into environmental problems and involving them in the efforts of environmental preservation.

Since the modification of the scheme in 1993, large number of Eco-clubs have been provided grants in various parts of the country. Keeping in view the potential of this programme in sensitizing the school students, this programme is being intensily covered in each and every district of the country.

A programme of raising 'National Green Corps' (NGC) through the Eco clubs was, launched during 2001-2002. Under this programme, Eco-clubs are being set up in more than 100 schools of each District of the country. Almost 50,000 Eco-clubs have been set up so far in the country. This programme is being implemented in each State/Union Territory through the Nodal agency appointed by the State/Union Territory Govt.

The Government of India provides financial assistance for establishment of Eco clubs, training of Master Trainers, teacher training and distribution of resource materials.

(iii) Global Learning and Observations to Benefit the Environment (GLOBE)

The GLOBE is an international Science and Education Programme, which stresses upon hands-on participatory approach. India joined this programme during August, 2000. This programme, which unites students, teachers and scientists all over the world, is aimed at school children. The students of GLOBE schools are required to collect data about various basic environmental parameters under the supervision of a GLOBE trained teacher and use it for explaining hypothesis as well as to enhance their scientific understanding of the earth. This data is also used by the scientists in their research work. The GLOBE also provides an opportunity to the

students to interact not only with the GLOBE scientists but also with the students from GLOBE schools in other parts of the world. Many schools spread over different parts of the country have already joined this programme. The teachers of these schools have also been trained in various GLOBE protocols. International training workshops for trainers are held from time to time and the participants at these workshops are trained in Basic and Advanced GLOBE Protocols by a training team from GLOBE Headquarters in USA.

(iv) Mass Awareness

Despite great efforts to spread environmental awareness by the Ministry through several schemes, it is felt that a large population especially in rural areas is still left out. The best way to reach out to them and make them aware of the environmental problems is through media, particularly the electronic media. "Mass Awareness" has therefore been identified as one of the thrust areas of the Ministry, not only to intensify the efforts already being made in this direction but also to launch new initiatives. The Doordarshan and few other television channels are extensively used for telecasting environment based programmes and commercials. Professional Media agencies which are hired to assist the Ministry in carrying out the campaign also play a major role. To encourage individual efforts in producing films/documentaries on environment/wildlife related themes in the country, the Ministry sponsors organisation of film festivals.

(v) Other Awareness Program

The Ministry also sponsors various programs which do not fit into programs like NEAC, NGC, etc., and are aimed at creating environmental awareness among children. These include environment quiz (both written as well as televised), organization of activities for observation of special occasions such as earth day, special programs for children, etc. These proposals which are received throughout the year from various NGOs and other agencies, are considered on merit as and when received and are supported. Few examples of such programs are:

- An international written Environment Quiz program known as Green Olympiad conducted by TERI. It is conducted in more than 200 centers across the country. Every year the quiz is conducted in both Hindi and English and more than 80,000 school students from India, Russia and UAE and other countries participate in this competition.
- Awareness activities/events by NGOs, academic institutions etc. on the occasion of special Environment days like Earth Day etc.
- Written environmental quiz programs in different regional languages is also being done. The winners of written quiz participate in a televised quiz program.
- Organization of an annual Vacation Program on Environmental Resources for high school level students namely "Vacation program on Natural resources- building a broader constituency of support for conservation" by Ashoka Trust for Research in Ecology and the Environmental (ATREE) an NGO.

(vi) Centres of Excellence

This scheme was started in 1983 to strengthen awareness, research and training in priority areas of environmental science and management.

So far the following nine Centres of Excellence have been established by the Ministry for providing financial assistance:

1. Centre for Environment Education Nehru Foundation for Development, Thaltej Tekra, Ahmedabad
2. C.P.R. Environmental Education Centre, Chennai
3. Centre for Ecological Sciences, Indian Institute of Science, Bangalore – 560 012. (Karnataka).
4. Centre for Mining Environment, Indian School of Mines, Dhanbad – 826 004. (Bihar).
5. Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore.
6. Centre for Environmental Management of Degraded Ecosystems University of Delhi, New Delhi
7. Tropical Botanical Garden and Research Institute, Thiruvananthapuram.
8. Madras School of Economics, Chennai.
9. Foundation for Revitalization of Local Health Traditions, Bangalore

The proposals on the priority areas on environment received by the Ministry are referred to experts for comments and considered by an Internal Committee constituted under the scheme.

1.3 INTRODUCTION TO THE CONCEPT OF GREEN TECHNOLOGY

Technology in the 20th century was a boon for mankind. It brought prosperity and modernization in the society by the utilization of natural environmental resources. The advancement in science & technology threatened the ecological security of the earth due to over utilization and indiscriminate exploitation of scarce and exhaustible resources. The use of natural resources in such unsustainable manner led to the generation of huge amounts of chemical and synthetic wastes and pollutants as by-products of the development. These synthetic materials generated as a by-product or as waste after their use cannot be decomposed in nature and hence their safe disposal is creating extraordinary technical, health, environmental, economic, political and social problems. Another serious concern is that all living organisms including human beings have been exposed to such synthetic and toxic materials on the road to technological development for which there has been no evolutionary adoption and experience.

Thus today, the social pressure is working towards evolving environment friendly technologies for the sustainable development. Thus development is redefined as the "Development to meet the needs of the present without compromising with the abilities of the future generations to meet their

own needs and a system of stable economic development that should improve the total quality of life on earth now and in the future too, while maintaining the social and ecological integrity of the earth upon which all life depends".

Thus "green technology" abbreviated as Clean Tech (Clean Technology) is the application of Environmental Sciences to conserve the natural environment and resources and by curbing the negative impacts of human involvement. It is a continuous process of development of materials and methods for generating energy to give non-toxic products. It is believed that the changes which this technology will bring, will be of similar magnitude to that of Information Technology.

Expected Goals from this Technology

Sustainability: It will help to meet the present needs of the society without compromising the needs of future generation.

Cradle to Cradle Design

The products obtained by this technology should not have any toxic effects on the environment. On the contrary, if any by-products are obtained, they should be used in other processes.

Source Reduction

Emphasis is laid here on 'atom economy' so that the waste generated (by products or the unreacted reactants) are minimum in the reaction technology.

Innovation

This technology will look into the alternatives to the existing technologies which are harmful to human health and environment, for instance these days a lot of research is being done on biofuels which can be used instead of the existing fossil fuels causing global warming.

Viability

The technology used should not only be environmentally benign but also at the same time be economical to enhance its implementation.

1.3.1 Areas Covered Under Green Technology

Energy

This is one of the most important areas of green technology which lays emphasis on the opportunities for development of the future alternative fuels for generating energy.

Green Buildings

This includes the substances used as building materials and the location of the building.

Environmentally Preferred Purchasing

This is targeted mainly on the 'governmental purchasing' where care should be taken to avoid buying of toxic substances.

Green Nanotechnology

Nanotechnology means when the materials used are reduced to the nano scale i.e. one billionth of a meter. The application of Green technology to hand scale will bring a lot of development changes.

Green Chemistry

Chemists are addressing complicated environmental issues in safe and profitable manner under various names like clean chemistry, environmentally benign or favourable chemistry, sustainable chemistry and more popularly green chemistry, which means the judicious use of chemistry for prevention of pollution. It involves modified engineering practices, bioremediation, ecofirendly reaction media and concepts of atom economy leading to almost zero waste.

All green environmental technologies for sustainable development have to be cost-effective, economically viable, ecologically sustainable and socially acceptable. Acceptance of a technology by the society plays a very crucial role in its implementation and promotion. Cheaper and cost effective technology and technological products are easily acceptable by society. Sometimes the technology and its product appears costly, but is environmental friendly, it will be benefitial for the society. Thus it is the responsibility of the mankind to decide their future. For example, we should understand that use of fossil fuels and non-biodegradable plastic bags, which are apparently cheaper than the alternatives available, are proving very expensive in terms of degrading the environment and affecting human health.

Some green technologies developed in the past decades which have proved to be environment friendly are:

- A significant reduction in the air-borne lead and sulphur by developing un-leaded petrol and sulphur free clean coal technology. More fuel efficient and less polluting automobiles driven on Compressed Natural Gas (CNG), Liquefied Petroleum Gas (LPG), biofuels, and hybrid vehicles driven on rapidly chargeable electric batteries have further reduced the emissions of CO, HC and NO_X from transport sectors.
- The development of "genetically engineered crops" have brought significant reduction in the use of chemical pesticides due to their high genetic resistance against pests and diseases. Use of biodegradable pesticides and fertilizers have further reduced the degradation of the environment from agriculture sectors.
- More efficient air pollution control equipments and devices for industries such as electrostatic precipitators, flue-gas desulphurization units etc. to reduce particulates and SO_2 emissions.

Use of alternate renewable sources of energy such as solar energy, hydro energy, geothermal energy, Ocean energy etc. have further reduced the pollution in the Environment from industrial sectors.

- Recycling of community wastes such as paper, metal, glass and some hazardous industrial wastes like flyash, slag, phospho-gypsum and red mud for developing construction materials and useful consumer products.

Green technology promises mankind to

- Deliver clean, non polluting and renewable sources of energy.
- Work towards food security by developing safe and nutritive crops, which have short harvest cycles, are pest and disease resistant, without harming the natural ecosystems.
- Optimise the use of natural resources and improve the efficiency of resource use, specially of water and electricity.
- Manage all the wastes generated by their reduction, re-use and re-cycling and through cleaner production technologies which focus on zero-waste production.

EXERCISES

Short Answer Questions

1. Define the term 'Environment'.
2. Elaborate the term 'Environmental Science'.
3. What are the objectives of Environmental Studies? ***(GGSIPU, I term, 2008)***
4. What are the objectives and guiding principles of environmental Studies?
5. Explain in brief the measures taken by mankind to find solutions towards Global Environmental Problems.
6. What are the major goals of Environmental Education & training?
7. Explain the difference between formal and informal system of Environmental Education in India.
8. Define the term 'Green Technology'.
9. What are the goals of Green Technology?

Long Answer Questions

1. Explain the various stages which contribute to understand an environmental problem.
2. Explain the term 'Environment'. Explain the importance of environmental studies in the present context. *(UPTU 2006)*
3. What is 'Environmental Science'. Discuss the multidisciplinary nature of environmental science and its importance.
4. Discuss the importance of environmental studies. What is meant by Environmental Pollution? Discuss the requirement of a non-polluted environment *(UPTU 2007)*
5. Unawareness or ignorance with protection of environment will lead to detrimental consequences–comment. *(UPTU 2006)*

6. Explain the major Global Environmental issues which need to be addressed.
7. What could be the feasible solutions towards the Global issues?
8. Explain the need for public awareness to understand the different environmental problems.
9. What is Green Technology. How can sustainable development be achieved by this technology.
10. Explain briefly some technological developments towards sustainable future.
11. What are the advantages of Green Technology?
12. What is Green Technology? How has this technology proved to be environmental friendly in the agriculture and transport sectors?

(GGSIPU, I term, 2008)

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