

The Multidisciplinary Nature of Environmental Studies

Let's understand

- The definition of environmental studies, its scope and importance in the educational system
- Why people have to be aware of the environment
- What the institutions that deal with the environment are
- Who the people involved in conservation are

1.1 DEFINITION, SCOPE AND IMPORTANCE

1.1.1 Definition

Environmental studies deals with every issue that affects a living organism. It is essentially a multidisciplinary approach that brings about an appreciation of our natural world and human impact on its integrity. It is an applied science, as it seeks practical answers to the increasingly important question of how to make human civilisation sustainable on the finite resources that are available.

Its components include biology, geology, chemistry, physics, engineering, sociology, health, anthropology, economics, statistics, computers and philosophy.

1.1.2 Scope

Environment is not a single subject; it is an integration of several subjects that include both science and social studies. To understand all the different aspects of our environment, we need to understand biology, chemistry, physics, geography, resource management, economics and population issues. Thus, the scope of environmental studies is extremely wide and covers some aspects of nearly every major discipline.

If we study the natural history of the areas in which we live, we would see that our surroundings were originally a natural landscape, such as a forest, a river, a mountain, a desert, or a combination of these elements. Most of us live in landscapes that have been profoundly modified by human beings—in villages, towns or cities. But even those of us who live in cities must get our food supply

from the surrounding villages and these, in turn, are dependent on natural landscapes such as forests, grasslands, rivers, seashores, for resources such as water for agriculture, fuelwood, fodder and fish. Thus, our daily lives are inextricably linked to our surroundings and inevitably affect them.

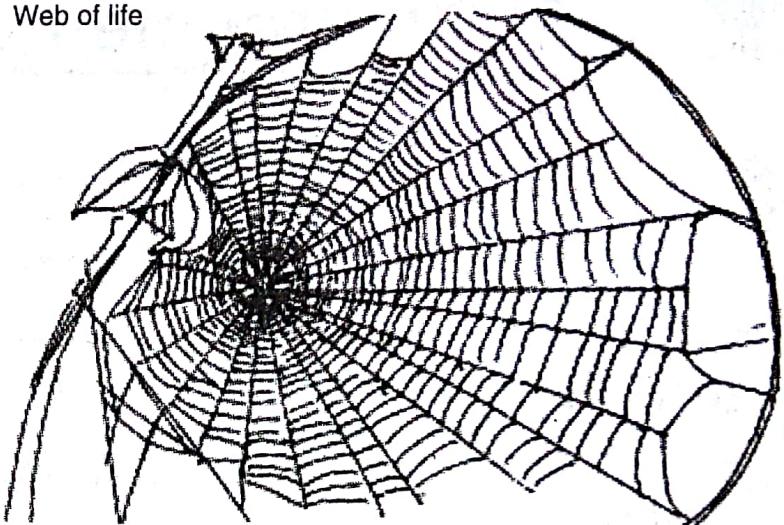
We use water to drink and for other day-to-day activities. We breathe air, we use resources from which food is made, and we depend on the community of living plants and animals which form a web of life, of which we are also a part. Everything around us forms our environment and our lives depend on keeping its vital systems as intact as possible.

Our dependence on nature is so great that we cannot continue to live without protecting the earth's environmental resources. Thus, most traditions refer to our environment as *Mother Nature* and most traditional societies have learned that respecting nature is vital for protecting their own livelihoods. This has led to many cultural practices that have helped traditional societies protect and preserve their natural resources. Respect for nature and all living creatures is not new to India; all our traditions are based on these values. Emperor Ashoka's edict proclaimed that all forms of life are important for our well-being, back in the 4th century BCE.

Over the past 200 years, however, modern societies began to believe that easy answers to the question of producing more resources could be provided by the indiscriminate application of technological innovations. Some examples are: growing more food by using fertilisers and pesticides, developing better strains of domestic animals and crops, irrigating farmland through mega-dams and developing industry. All this has led to rapid economic growth; and this type of ill-considered development has inevitably led to environmental degradation, besides several harmful effects as well.

Industrial development and intensive agriculture that provides the goods for our increasingly consumer-oriented society also uses up large amounts of natural resources like water, minerals, petroleum products, wood and so on. Non-renewable resources, such as minerals and oil, will be exhausted in the near future if we continue to extract these without a thought for subsequent generations. Renewable resources, such as timber and water, can be used but be regenerated by natural processes such as regrowth and rainfall. However, these too will be depleted if we continue to use them faster than nature can replace them. For example, if the removal of timber and firewood from a forest is faster than the regrowth and regeneration of trees, the supply of wood cannot be replenished. And the loss of forest cover not only depletes the forest of its resources, such as timber and other non-wood products, but also affects our water resources because an intact natural forest acts like a sponge which holds water in the rainy season and releases it slowly over the drier periods. In addition, deforestation leads to floods in the monsoon season and dry rivers once the rains are over.

Web of life



Such multiple effects on the environment resulting from routine human activities must be understood by each one of us, if it is to provide us with the resources we need in the long term.

Our natural resources can be compared with money in a bank. If we use it rapidly, the capital will be reduced to zero. On the other hand, if we use only the interest, it can sustain us over the longer term. This is called sustainable development. Thus each professional in their field should strive to achieve sustainable development through their actions.

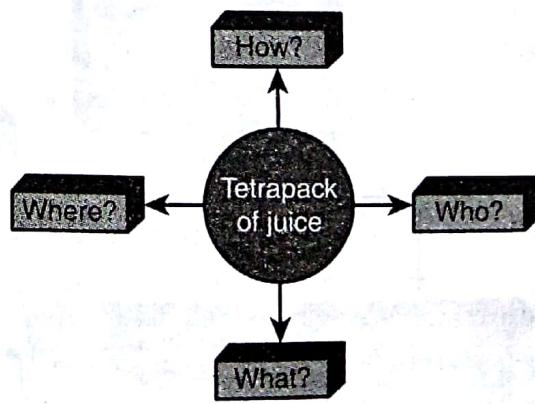
Let's do it!

- Take any article that you use in daily life—a bucket full of water, an item of food, a table or a book.
- Trace its components through a journey backwards from your home to its origins as natural resources in our environment.
- Are you using that resource unsustainably?
- In what ways could you reduce, reuse and recycle that resource?
- Is there an unequal distribution of this resource, so that you are more fortunate than many others who have less access to it?
- What can you do to prevent waste and reuse articles that you normally throw away? What recycled materials can you use?
- Think of the various energy sources you use every day. How could you reduce their use?

Understanding and making ourselves more aware of our environmental assets and problems is not enough. Each one of us must become more concerned about our environment and

For every resource we use, we must ask ourselves the following questions:

- What is the value of the resource and where does it originate?
- Who uses it most intensively and how?
- How is it being overused or misused?
- Who is responsible for its improper use—the resource collector, the middle-man, the end-user?
- How can we help conserve it and prevent its unsustainable use?



change the way in which we use every resource. Most of us indulge in wasteful behaviour patterns without ever thinking about their environmental impact. Thus, for all our actions to be environmentally friendly, we need to analyse them from the new perspective of how we use resources.

Once we begin to ask these questions of ourselves, we will begin to live lifestyles that are more sustainable and will support our environment.

1.1.3 Importance

We live in a world where natural resources are limited. Water, air, soil, minerals, oil, the products we get from forests, grasslands, oceans and from agriculture and livestock, are all a part of our life-support systems. Without them, life itself would be impossible. As we keep increasing in number and the quantity of resources each of us uses also increases, the earth's resource base must inevitably shrink. The earth cannot be expected to indefinitely sustain this expanding level of utilisation of resources. Added to this is the risk of misuse of resources. Increased amounts of waste and pollution contaminating our existing supply is a threat to the quality of life for all. This situation will only improve if each of us begins to take actions in our daily lives that will help preserve our environmental resources.

Figure 1.1 illustrates the Total Economic Value—direct and indirect use value of a given ecosystem. This is a tool commonly used in environmental economics to determine the function-based values provided by an ecosystem. Figure 1.2 illustrates the importance of preserving ecosystems by listing the services they provide at global, regional and local scales.

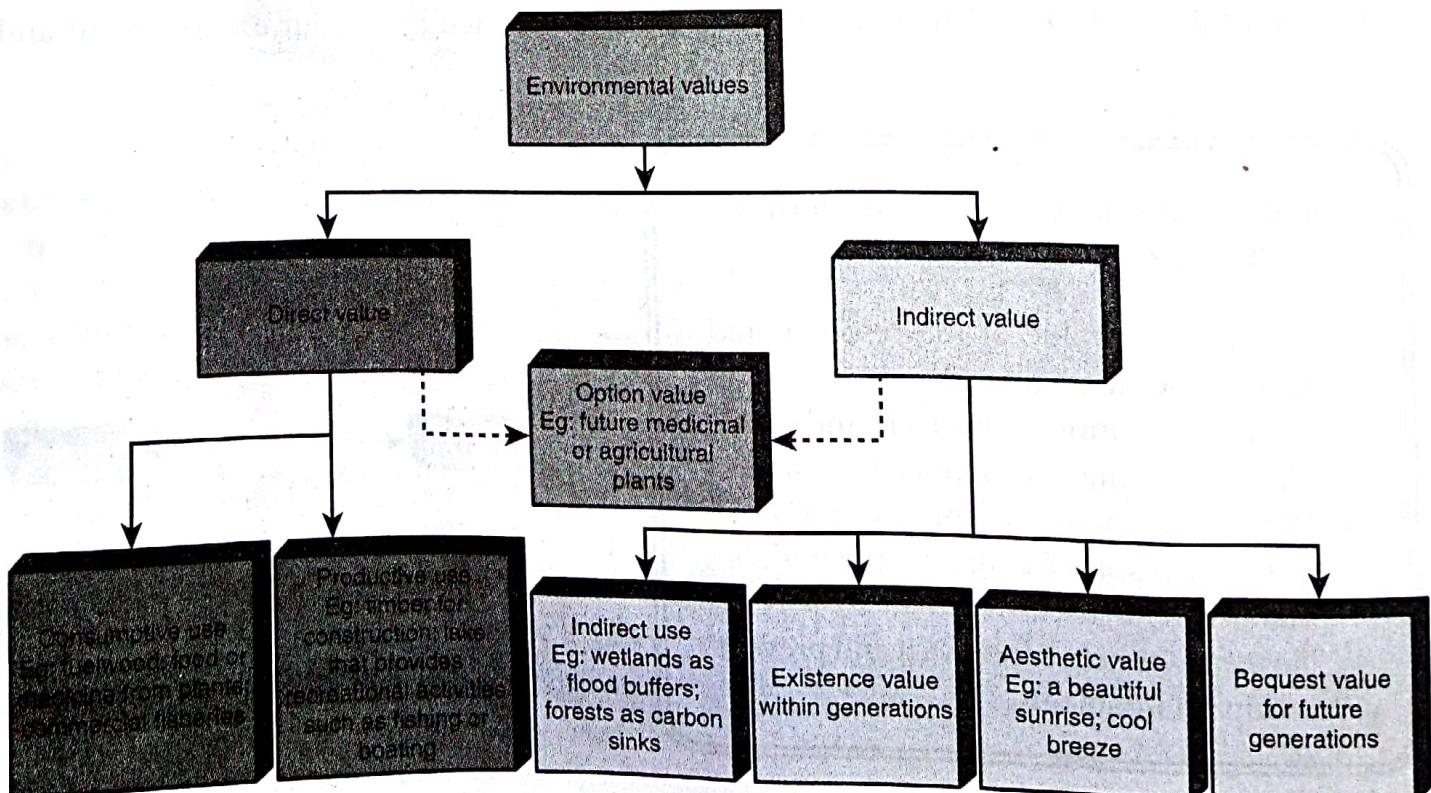


Fig. 1.1 Ecosystem valuation

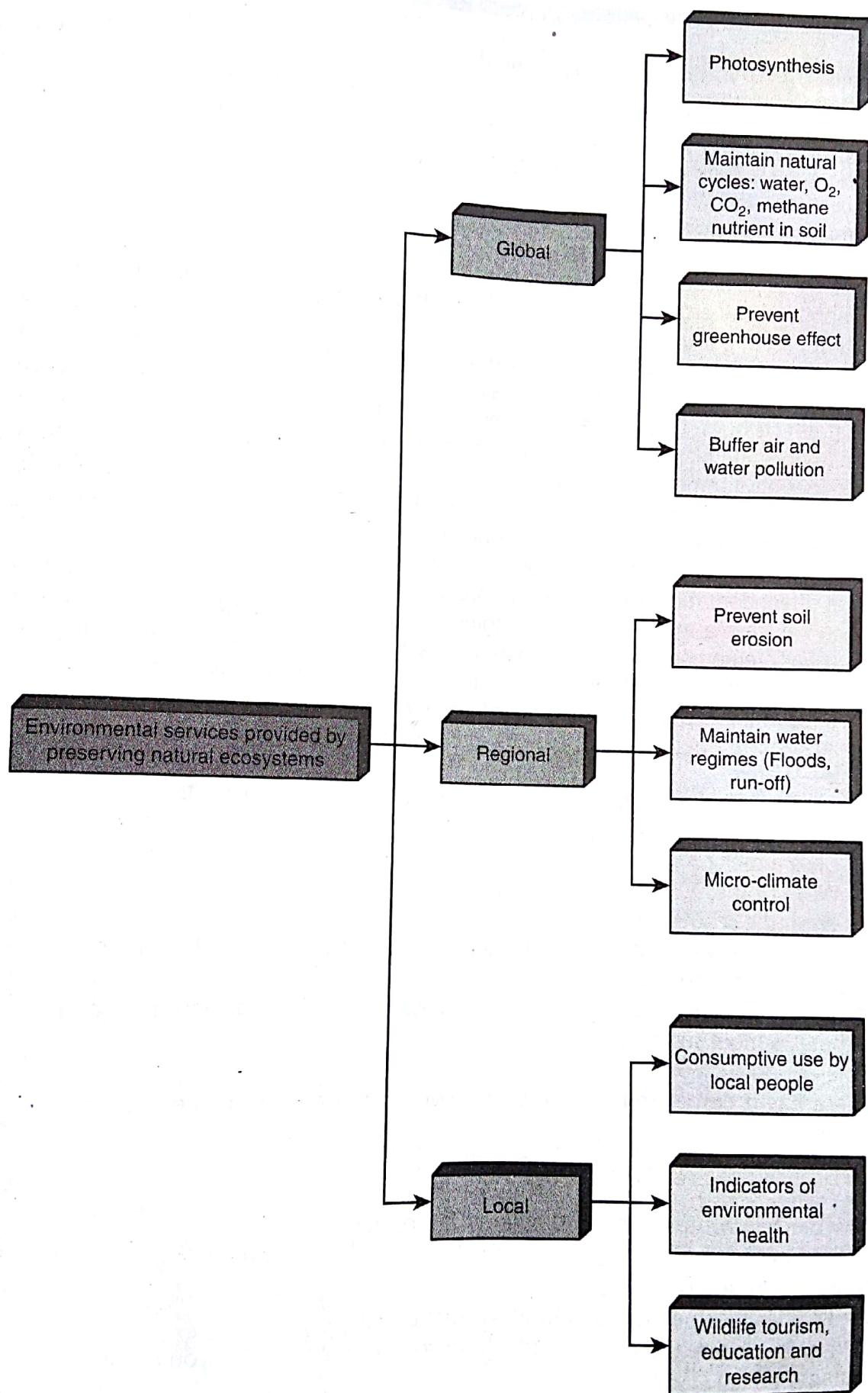


Fig. 1.2 Environmental services provided by ecosystems

Let's do it!

Make an attempt to assess the level of damage to the environment due to your actions that have occurred during your last working day, the last week and the last year. Then estimate the damage you are likely to do in your lifetime if you continue with your present ways.

Use the following examples for the above exercise:

(i) Example—Plastic: plastic bags, plastic ball pens

Think about all the articles you use daily that are made of plastic. Plastic plays an important part in our modern lives.

- Make a list of the plastic articles you usually use.
- How can you reduce the amount of plastic you use?
- What effects does plastic have on our environment?
- Where does the plastic come from and how is it made? Are the manufacturing processes environmentally friendly?
- What happens to it when you throw it away? Where does it go?

(ii) Example—Fossil fuels: petrol, diesel, natural gas

- How much do you use? Can you reduce your consumption?
- What effect does it have on the air we breathe?
- When we leave a motorbike or car engine running during a traffic stop, we do not usually remember that the fuel we are wasting is a part of a non-renewable resource that the earth cannot regenerate. Once all the fossil fuels are burnt off, it will mean the end of oil as a source of energy. Only if each of us contributes to conserving fossil-based energy can we make it last longer.

(iii) Example—Water

- How much do you really need to use, as against how much you waste when you:
 - (a) Brush your teeth?
 - (b) Have a bath?
 - (c) Wash clothes?
 - (d) Wash the scooter or car?
- Where did the water come from? What is its actual source? How has it reached you?
- Where will the waste water go?
- Do you feel you should change the way you use water? How can you change this so that it is more sustainable?

(iv) Example—Food

- Where has it come from? How is it grown? What chemicals are used in its production?
- How does it reach you?
- How is it cooked?
- How much is wasted? How is the waste disposed of?

(v) Example—Paper

- What is it made from?
- Where does it come from and how is it manufactured?
- How much do you use and how much do you waste? How can you prevent this wastage?

1.2 NEED FOR PUBLIC AWARENESS

As the earth's natural resources are rapidly dwindling and our environment is being increasingly degraded by human activities, it is evident that something needs to be done. We often feel that managing all this is something that the Government should do. But if we continue to endanger our environment, there is no way by which the Government can perform all these clean-up functions. It is the prevention of environmental degradation that must become a part of all our lives. Just as for any disease, prevention is better than cure, protecting our environment is economically more viable than cleaning it up once it is damaged. Individually, we can play a major role in environment management. We can reduce wastage of natural resources and we can act as watchdogs that inform the Government about sources that lead to pollution and degradation of the environment.

This can only be made possible through public awareness. Mass media such as newspapers, radio and television strongly influence public opinion. However, someone has to bring this about. If each of us feels strongly about the environment, the press and media will add to our efforts. Politicians in a democracy always respond positively to a strong publicly-supported movement. Thus, if you join an NGO that supports conservation, you might be able to influence politicians to make green policies. We are living on 'spaceship earth' with a limited supply of resources. Each of us is responsible for spreading this message to as many people as possible. There are several Government and Non-Government Organisations (NGOs) working towards environmental protection in our country. They have created a growing interest in environmental protection and conservation of nature and natural resources.

Let's also do these!

- Join a group to study nature, such as World Wildlife Fund for Nature-India (WWF-I) or Bombay Natural History Society (BNHS), or another environmental group.
- Begin reading newspaper articles and periodicals like *Down to Earth*, *WWF-I Newsletter*, *BNHS*, *Hornbill*, *Sanctuary* magazine or others, which will tell you more about our current environmental issues. There are also several environmental websites.
- Lobby for conserving resources by taking up the cause of environmental issues during discussions with friends and relatives. Practice and promote issues such as saving paper, saving water, reducing the use of plastics, practising the 3Rs principle of 'Reduce, Reuse, Recycle', and proper waste disposal.
- Join local movements that support activities like saving trees in your area, go on nature treks, recycle waste, buy environmentally-friendly products.
- Practice and promote good civic sense and hygiene such as enforcing no spitting or tobacco chewing, no throwing garbage on the road, no smoking in public places, no urinating or defecating in public places.
- Take part in events organised on World Environment Day, Wildlife Week and other environment-significant days (Table 1.1).
- Visit a national park or sanctuary, or spend time in whatever natural habitat you have near your home.

Table 1.1 Environmentally significant days

Day and month	Event
02 February	World wetland day
28 February	National science day
21 March	World forestry day
22 March	World water day
18 April	World heritage day
22 April	Earth day
22 May	International biodiversity day
05 June	World environment day
11 July	World population day
16 September	World ozone day
28 September	Green consumer day
03 October	World habitat day
1–7 October	Wildlife week
04 October	Animal welfare day
02 December	Bhopal tragedy day

1.2.1 Institutions in Environment

Among the large number of institutions that deal with environmental protection and conservation, a few well-known organisations include government organisations like the Ministry of Environment and Forest (MoEF), Environmental Information System (ENVIS), Pollution Control Boards and Zoological Survey of India (ZSI), and NGOs like the BNHS, WWF-I and others.



Bombay Natural History Society (BNHS), Mumbai

The BNHS began as a small society of six members in 1883. It grew from a group of *shikaris* and people from all walks of life into an important research organisation that substantially influences conservation policy in the country. Its influence on wildlife policy building, research, popular publications and peoples' action has been a unique feature of the multifaceted society. Undoubtedly its major contribution has been in the field of wildlife research. It is India's oldest conservation research-based NGO and one that has been at the forefront of the battle for preservation of species and ecosystems. The BNHS publishes a popular magazine called the *Hornbill* and also an internationally well-known *Journal on Natural History*. Its other publications include Salim Ali's *Handbook on Birds*, JC Daniel's *Book of Indian Reptiles*, SH Prater's *Book of Indian Mammals* and PV Bole's *Book of Indian Trees*. One of its greatest scientists was Salim Ali, whose ornithological work on the birds of the Indian subcontinent is world famous. The BNHS has over the years helped the Government to frame wildlife-related laws and has taken up battles such as the 'Save the Silent Valley' campaign.



Botanical Survey of India (BSI)

The BSI was established in 1890 at the Royal Botanic Gardens, Calcutta. However it closed down for several years after 1939. After reorganisation, with the development and establishment of different regional centres, the aims and objectives of the Survey were redefined by the Programme Implementation and Evaluation Committee in 1976 with a view to encourage taxonomic research and to accelerate scientific expertise for the preparation of a comprehensive list of the flora of the country, under the 'Flora of India' project, ethnobotanical study, modernisation and maintenance of herbaria and museums, and creating interests among botanists and the public in general. In a recent review (1987), the aims and objectives of Botanical Survey remained unchanged except that activities like the survey and exploration of plant resources, listing of endangered species, publication of national flora, preparation of national data bank on herbarium and live collection, plant distribution and nomenclature were prioritised.



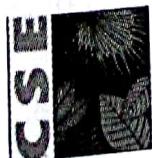
Bharati Vidyapeeth Institute of Environment Education and Research (BVIEER), Pune

This is part of the Bharati Vidyapeeth Deemed University. The Institute has a PhD and a Masters program in Environmental Sciences and Geoinformatics. It also offers an innovative Diploma in Environment Education for in-service candidates. It implements a large outreach program that has covered over 435 schools which involves training teachers and conducting Environment Education Programmes. Research at the institute focuses on biodiversity conservation, urban planning, clean technology, environment education and wildlife management. It develops low-cost Interpretation Centres for natural and architectural sites that are highly locale-specific as well as a large amount of innovative environment educational material for a variety of target groups.



Central Pollution Control Board (CPCB)

It is a statutory organisation which was constituted in 1974 under the Water (Prevention and Control of Pollution) Act, 1974 and under the Air (Prevention and Control of Pollution) Act, 1981 to prevent and control pollution to improve the quality of India's environment. A large number of activities and programmes have been started such as the development of source-specific pollution control norms and guidelines based on available scientific understanding, setting up of ambient air and water quality criteria, monitoring of ambient air and water quality, auto fuel quality and emission norms for controlling vehicular pollution and planning for environmentally sound industrial development. Besides the CPCB, there are 22 State Pollution Control Boards/ Pollution Control Committees which are responsible for regulating and implementing environmental protection and pollution control within the state. These State Pollution Boards are autonomous statutory bodies which are bound to report to the CPCB for any critical matter.



Centre for Science and Environment (CSE), New Delhi

The activities of this centre include organising campaigns, holding workshops and conferences, and producing environment-related publications. It has published a

major document on the *State of India's Environment*, the first of its kind to be produced as a Citizen's Report on the Environment. The CSE also publishes a popular magazine, *Down to Earth*, which is a science and environment fortnightly. It is involved in the publication of material in the form of books, posters and video films and also conducts workshops and seminars on biodiversity-related issues.



CPR Environmental Education Centre (CPR-EEC), Chennai

This was set up in 1988. It conducts a variety of programs to spread environmental awareness and create an interest in conservation among the general public. It focusses attention on NGOs, teachers, women, youth and children, to generally promote conservation of nature and natural resources. Its programmes include components on wildlife and biodiversity issues. CPR-EEC also produces a large number of publications.



Centre for Environment Education (CEE), Ahmedabad

This was initiated in 1989. It has a wide range of programmes on the environment and produces a variety of educational material, for various target groups.



Ministry of Environment and Forest (MoEF)

The MoEF is primarily concerned with the planning, promotion and coordination of the implementation of India's environmental and forestry policies and programmes. The primary concern of the Ministry lies in the implementation of policies and programmes relating to the conservation of the country's natural resources including lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of its animals and prevention and abatement of pollution. These objectives are well supported by a set of legislative and regulatory measures, aimed at the preservation, conservation and protection of the environment. The Ministry also serves as the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Cooperative Environment Programme (SACEP), International Centre of Integrated Mountain Development (ICIMOD) and for the follow-up of the United Nations' Conference on Environment and Development (UNCED). The Ministry is entrusted with issues relating to multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment Facility (GEF) and of regional bodies like the Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Cooperation (SAARC) on matters relating to the environment.

As a part of the MoEF's planning of environmental policies, the Environmental Information System (ENVIS) was established in 1982 by the Government of India. The focus of ENVIS is to provide environmental information to decision makers, policy planners, scientists, engineers and research workers all over the country. ENVIS is a decentralised system with a network of distributed subject-oriented centres ensuring integration of national efforts in environment information collection, collation, storage, retrieval and dissemination to all concerned. A large number of nodes, known as ENVIS centres, have been established in the network to cover the broad subject areas of environment with a focal point in the MoEF. These centres have been set up on areas such as pollution control, toxic chemicals, central and offshore ecology, environmentally sound and appropriate technology, biodegradation of waste and environment management.



Madras Crocodile Bank Trust (MCBT)

MCBT, the first crocodile conservation breeding centre in Asia, was founded in 1976 to conserve Indian crocodiles and establish a programme for the conservation and propagation of other species of endangered reptiles. Over the years, over 1500 crocodiles and several hundred eggs have been supplied to various State Forest Departments for restocking programmes in the wild and for setting up breeding facilities in other states of India and neighbouring countries. MCBT started the first sea turtle survey and conservation programme in India, including a sea turtle hatchery.

The Crocodile Bank is the site of the Irula Snake Catchers' Cooperative Society, which is an Adivasi self-help project and supplies all of India's snake and scorpion venom needed for the production of anti-venom and for medical use.

State Department of Environment

It is present in every state of India. It is responsible for improving the overall environmental quality within that state. The Department actively engages in environmental assessment, monitoring, protection and awareness amongst people in the state.



Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore

This institution was Salim Ali's dream, which became a reality only after his demise. Initially conceived as being a wing of the BNHS, it later evolved into an independent organisation based at Coimbatore in 1990. It has instituted a variety of field programmes that have added to the country's information on our threatened biodiversity.



World Wide Fund for Nature-India (WWF-I), New Delhi

The WWF-I was initiated in 1969 in Mumbai, after which the headquarters were shifted to Delhi with several branch offices all over India. The early years focused attention on wildlife education and awareness. It runs several programmes, including the Nature Clubs of India programme for school children and works as a think-tank and lobby force for environmental and developmental issues.



Wildlife Institute of India (WII), Dehradun

This institution was established in 1982, as a major training establishment for Forest Officials and for research in Wildlife Management. Its most significant publication has been *Planning a Wildlife Protected Area Network for India* (Rodgers and Panwar, 1988). The organisation has over the years added an enormous amount of information on India's biological wealth. It has trained a large number of Forest Department officials and staff as Wildlife Managers. Its MSc Program has trained excellent wildlife scientists. It also has an Environment Impact Assessment (EIA) cell. It trains personnel in ecodevelopment, wildlife biology, habitat management and nature interpretation.



Zoological Survey of India (ZSI)

The ZSI was established in 1916. Its mandate was to do a systematic survey of the fauna in India. It has over the years collected 'type specimens' on the basis of which our animal life has been studied. Its origins were collections based at the Indian

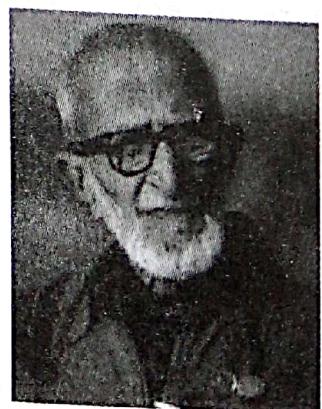
Museum at Calcutta, which was established in 1875. The older collections of the Asiatic Society of Bengal, which were made between 1814 and 1875, as well as those of the Indian Museum, made between 1875 and 1916, were then transferred to the ZSI. Today, it has over a million specimens! This makes it one of the largest collections in Asia. It has done an enormous amount of work on taxonomy and ecology. It currently operates from 16 regional centres.

1.2.2 People in Environment

There are several internationally-known environmental thinkers. Among those who have made landmark contributions, the names that are usually mentioned are Charles Darwin, Ralph Emerson, Henry Thoreau, John Muir, Aldo Leopold, Rachel Carson and EO Wilson. Each of these thinkers looked at the environment from a completely different perspective. Charles Darwin wrote the *Origin of Species*, which brought to light the close relationship between habitats and species. It brought about a new way of thinking about our relationship with other species that was based on evolution. Ralph Emerson spoke of the dangers of commerce to our environment way back in the 1840s. Henry Thoreau, in the 1860s, wrote that the wilderness should be preserved after he had lived in it for a year. He felt that most people did not care for nature and would sell it off for a small sum of money. John Muir is remembered as having saved the great ancient sequoia trees in California's forests. In the 1890s, he formed the Sierra Club, which is a major conservation NGO in the USA. Aldo Leopold was a forest official in the US in the 1920s. He designed the early policies on wilderness conservation and wildlife management. In the 1960s, Rachel Carson published several articles that caused immediate worldwide concern on the effects of pesticides on nature and humans. She wrote a well-known book called *Silent Spring*, which eventually led to a change in Government policy and public awareness. EO Wilson is an entomologist who envisioned that biological diversity was the key to human survival on earth. He wrote *Diversity of Life* in 1993, which was awarded a prize for the best book published on environmental issues. His writings brought home to the world the risks to humans from artificial disturbances in natural ecosystems that are leading to the rapid extinction of species at a global level.

A number of individuals have been instrumental in shaping the environmental history in our country. Some of the well-known names in the last century include environmentalists, scientists, administrators, legal experts, educationists and journalists. **Salim Ali**'s name is synonymous with ornithology in India and with the BNHS. He also wrote several great books including the famous *Book of Indian Birds*. His autobiography, *Fall of a Sparrow*, should be read by every nature enthusiast. He was our country's leading conservation scientist and influenced environmental policies in our country for over 50 years.

Indira Gandhi as Prime Minister played a very significant role in the preservation of India's wildlife. It was during her period as PM, that the network of Protected Areas (PAs) grew from 65 to 298! The



Wildlife Protection Act was formulated during the period when she was PM and the Indian Board for Wildlife was extremely active as she personally chaired all its meetings. India gained a name for itself by being a major player in the Convention on International Trade in Endangered Species (CITES) and other International Environmental Treaties and Accords during her tenure. BNHS frequently used her goodwill to get conservation action initiated by the Government.

MS Swaminathan is one of India's foremost agricultural scientists and has also been concerned with various aspects of biodiversity conservation, both of cultivars and of wild biodiversity. He founded



the MS Swaminathan Research Foundation in Chennai, which does work on the conservation of biological diversity.

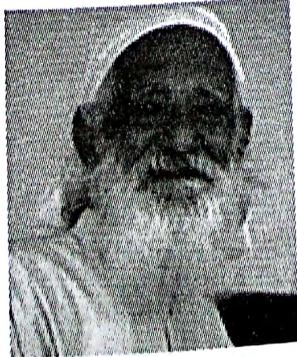
Madhav Gadgil is a well-known ecologist in India. His interests range from broad ecological issues such as developing Community Biodiversity Registers and conserving sacred groves to studies on the behaviour of mammals, birds and insects. He has written several articles, published papers in journals, is the author of 6 books, and the editor for the series *Lifescapes of Peninsular India*.

MC Mehta is undoubtedly India's most famous environmental lawyer. Since 1984, he has filed several Public Interest Litigations supporting the cause of environmental conservation. His most famous and long-drawn battles supported by the Supreme Court include protecting the Taj Mahal, cleaning up the Ganges River, banning intensive shrimp farming on the coast, urging the Government to implement environmental education in schools and colleges, and a variety of other conservation issues.



Anil Agarwal was a journalist who wrote the first report on the State of India's Environment in 1982. He founded the Centre for Ecological Sciences (CES), an active NGO that supports various environmental issues.

Medha Patkar, known as one of rural India's champions, has supported the cause of the down-trodden tribal people whose environment is being affected by dams on the Narmada River.



Sunderlal Bahuguna's Chipko Movement has become an internationally well-known example of a highly successful conservation action programme through the efforts of local people for guarding their forest resources. His fight to prevent the construction of the Tehri Dam in a fragile earthquake-prone setting is a battle that he continues to wage. The Garhwal Hills will always remember his dedication to the cause for which he has walked over 20 thousand kilometres.

Summary

- ◆ Environmental studies involves understanding human interactions with the environment. It requires an integrated approach to several disciplines of science and social studies.
- ◆ We live in a world where natural resources such as land, water, forests, minerals, oil, grasslands and wetlands are limited. We cannot continue to over-utilise these resources beyond the earth's assimilative capacity. Thus, the sustainable use of resources is of utmost importance.
- ◆ Everything around us forms our environment and our lives depend on keeping its vital systems intact. We need to individually take responsibility towards preserving our environmental resources.

Questions

1. What is the scope of environmental studies?
2. What is the importance of environmental studies?
3. What are some of the activities that you can be a part of to raise environmental awareness amongst people?
4. Name one well-known environmental thinker who inspires you and explain why.
5. Name and describe the activities of any environmental institution that you are aware of.
6. What are the environmental concerns in your area of work? Discuss the means to address the same.