

Principles of Environment Management

OVERVIEW

Unplanned developmental activities as well as ever-increasing population have caused enormous strain on the environment resources and hence societies across the world face several problems of environmental degradation. However, it is imperative to maintain a balance between the capacity of the environment and the sustainable utilization of resources. This is only possible by understanding the environment in its totality and the principles of its scientific management.

Today, 'Environment Management' (EM) is a significant term. To comprehend the term, one must understand the issues that relate to it. Development activities related to population growth can lead to environmental degradation in a number of ways, not least depletion of resources.

The critical task of EM is to balance the capacity of the environment against developmental requirements effectively. This task can be achieved through application of sustainable development/utilization mechanisms which are based on scientific principles of environment.

LEARNING OBJECTIVES

After completing this Unit, you should be able to:

- explain the fundamentals of EM;
- identify the tools in use for EM;
- Explain the role of professionals and ethics in EM.
- Explain fundamentals of ecology and environment along with its management

INTRODUCING ENVIRONMENT MANAGEMENT (EM)

The natural environment, harbouring myriad life forms and ecosystems, is an outcome of millions of years of evolution and mutation. We depend on the environment to meet our basic requirements such as food, fuel, fibre, fodder, minerals and vital support systems (e.g., water and air). However, due to our continuous indulgence in the exploitation of nature for immediate gains, we contribute to environmental degradation and depletion of natural resources, and this should be arrested. It is, therefore, essential that we understand the function and interaction of physical and biological elements of the environment and apply this knowledge for sound management programmes to conserve the natural resources we are endowed with. Sustainable management of renewable resources in industry, agriculture, recreation, health, forestry, fisheries, education or urban development is, therefore, critical. The conservation of resources and maintenance of the quality of ecosystem requires as much imaginative and innovative technology as the active participation of the public.

Environment management thus involves managing the environment while ensuring the prudent use of natural resources without reducing their productivity and quality. Due to impacts of modern human society the environment is depreciating in life sustaining capabilities at ever increasing pace, and this should be regulated. It is therefore, essential to understand the function and interaction of physical and biological elements of the environment and develop management programs to conserve natural resources. Objective of this course is to explore ways to reduce environmental footprints in day to day activities. Sustainable environmental management of *renewable resources* **oceans, atmosphere, freshwater, land, energy, food, materials, forestry, fisheries, etc..** Major requirements to attain sustainability are to develop innovative and imaginative technologies in an eco-friendly system of working along with active participation of the public towards the environment.

Essentially, EM represents the management of various activities, including environmental action plan, conservation of resources, environmental status evaluation and environmental legislation and administration, and focuses more on implementation, monitoring, auditing, and practice and real-world issues than on theoretical planning.

Definition and scope

Different people define environmental management differently, depending on the context in which they work. For the purposes of this Course, let us consider the following two views:

- (i) The process of allocating natural and artificial resources so as to make optimum use of the environment in satisfying basic human needs at the minimum, and more if possible, on a sustainable basis (Jolly, 1978).

- (ii) A generic description of a process undertaken by systems-oriented professionals with a natural science, social science, or less commonly, an engineering, law, or design background, tackling problems of the human altered environment on an interdisciplinary basis from a quantitative and/or futuristic viewpoint (Dorney, 1989).

Some of the characteristics of EM include the following:

- It is often used as a generic term.
- It supports sustainable development.
- It deals with a world affected by human beings.
- It demands a multidisciplinary or interdisciplinary approach.
- It has to integrate different development viewpoints.
- It seeks to integrate science, social science, policy-making and planning.
- It recognizes the desirability of meeting, and if possible exceeding basic human needs.
- The time-scale involved extends beyond the short-term and concerns range from local to global.
- It should show opportunities as well as address threats and problems.
- It stresses stewardship, rather than exploitation.

Role of environmental manager is to interface with ecology, economics, law, politics, etc. while developing **EM action plan** (key elements include environmental policy, audit, EM systems standards and external standards). In fact planning

activities have long term impacts on the environment hence they should be managed at all levels: regional, national and international. This implies that an environmental manager must 'think globally and act locally' and adopt a long-term holistic outlook.

Goals of EM

The goals of EM, which is an approach for environmental stewardship integrating ecology, policy-making, planning and social development, include:

- preventing and resolving environmental problems;
- establishing limits;
- establishing and nurturing institutions that effectively support environmental research, monitoring and management;
- identifying threats and opportunities;
- sustaining and, if possible, improving existing resources;
- improving the quality of life;
- Identifying environmentally sound technologies or policies.

Thus, EM demands *scoping*, i.e., deciding goals and setting limits on efforts. Having touched upon the definition and characteristics of EM, we will discuss some of the crucial issues relating to EM such as its need as a result of drastic population growth, sustainable development and EM tools. But, let us first workout Learning Activity 1.1.

Need for Environment Management

The world population is estimated to be over 6 billion. The growth of human population is continuously increasing. In the last 10, 000 years, the population of the world has increased over a 1000-fold and much of that change has occurred in the last century. This phenomenal growth in population has put pressure on the means of subsistence, throwing it out of balance with the environment.

The interaction between population and environment is very complex and dynamic. Admittedly, however, we are yet to understand this complex interrelationship at its micro-level and its spatio-temporal ramifications over a region or the globe in its

entirety. What is, nevertheless, certain is that as the population grows, the level of consumption of natural resources and production of wastes proportionately increases (Harrison, 1990). And, we know that the environment is constantly changing, due to human activities, leading to such problems as soil erosion, floods, droughts, climate changes, desertification and general degradation of the environment. In a finite world, there are *limits*, and there indeed are complex environment-population linkages and feedback.

Sustainable development is, therefore, necessary to sustain the quality of life without exceeding environmental limits. We will study this, next.

Need for sustainable development

The great surge in development and technology over the last two centuries has contributed to the increase in quantities of chemicals sufficient to damage natural systems on a grand scale, more often than not, involving the whole world. Acid rain, desertification, destruction of species, greenhouse modification and ozone layer depletion are well known examples of these impacts.

Protection of the natural ecosystem has long-term benefits for humans in utilitarian terms through maintenance of gene pools, bio-diversity and other potentially useful factors and, in spiritual terms, through living in harmony with nature. The ecosystem's intrinsic values and rights, regardless of human needs, therefore, should be taken into account apart from considering it a resource to be exploited for human settlement, food and energy production.

Sustainable development, therefore, is imperative. It is defined as a pattern of social and structured economic transformation (i.e.,

development), which optimises the economic and societal benefits available in the present, without jeopardising the likely potential for similar benefits in the future. A primary goal of sustainable development is to achieve a reasonable and equitably distributed level of economic well being that can be perpetuated continuously for many human generations. This implies using natural resources in a renewable manner that does not eliminate or degrade them, or diminish their usefulness for future generations. It further implies using non-renewable (i.e., exhaustible) mineral resources in a manner that does not unnecessarily preclude easy access to them by future generations.

Three of the several definitions that capture these aspects are given below:

- (i) *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).*

- (ii) *Sustainable development ensures that the maximum rate of resource consumption and waste discharge for a selected development portfolio would be sustained indefinitely, in a defined planning region, without progressively impairing its bio-productivity and ecological integrity. Environmental conservation, therefore, contrary to general belief, accelerates rather than hinders economic development. Therefore, the development plans have to ensure:*
 - 1. Sustainable and equitable use of resources for meeting the needs of the present and future generations without causing damage to environment;*
 - 2. To prevent further damage to our life-support systems;*

3.To conserve and nurture the biological diversity, gene pool and other resources for long-term food security (MoEF, 1999).

- (iii) *The primary objective of the Sustainable Development is to reduce the absolute poverty of the world's poor through providing lasting and secure livelihoods that minimize resource depletion, environmental degradation, cultural disruption and social instability*

Thus, the doctrine of sustainability provides a mechanism for developments to occur in harmony with environmental protection and enhancement. It presents a challenge to technologists to manage construction and manufacturing procedures so as to cause no net environmental harm and to preserve environmental resources for future generations.

Some of the approaches to EM to achieve sustainability include the following:

- **Ad hoc approach:** This means an approach developed in reaction to a specific situation.
- **Problem-solving approach:** This refers to an approach that follows a series of logical steps to identify problems, needs and solutions.
- **Systems approach:** This approach focuses on ecosystem (e.g., mountain; high latitude; savannah; desert; island; lake, etc.), agro-ecosystem, etc.
- **Regional approach:** This is based on ecological zones or biogeophysical units such as watershed, river basin, coastal zone, islands, etc.

- **Specialist discipline approach:** This refers to the approach often adopted by professionals like air quality management, water quality management, land management, environmental health, urban management, conservation area management, etc.
- **Voluntary sector approach:** This represents the approach NGOs (Non-Government Organisations) encourage and/or support.

EM tools

One of the outcomes of the three decades of policy development since 1970 has been the evolution of the techniques for the analysis and management of environmental effects. The tools considered in this Course include:

- (i) Environment assessment (EA).
- (ii) Economic assessment, usually through cost-benefit analysis (CBA).
- (iii) Environmental Impact Statement (EIS).
- (iv) Environment audits.
- (v) Waste minimisation programs and environmental management systems.
- (vi) Life cycle assessments (LCA).
- (vii) Environmental design (ED).

These tools are indispensable as far as environmental management is concerned. But, rather than being comprehensive, self-contained procedures, these tools are really aids that can be adapted for various situations. Legislative and bureaucratic frameworks for environmental management differ considerably, not only between nations, but also among states or regions within countries. Some procedures fit within others, for example, an environment impact statement is a tool or instrument, used within a more general environment assessment process. The methods are contributions to decision-making, rather than complete decision-making procedures. You will learn these tools in greater detail

PARTICIPANTS IN EM

Adam (1990) identified the following two groups involved in environment and development:

- (i) People or governments who are uninformed of the implications of development, or who are unable to voice their views adequately and affect change.
- (ii) Consultants, scientists, economists and bankers and those bent on riches or blinkered by concern for sovereignty, religion or national security.

In any given environmental management situation there are likely to be a number of different perspectives, and hence the various possible responses. An environmental manager has to grasp the

sum total of the perspectives and try to avoid conflicts between participants and minimise damage to the environment. The participants of environmental management can be categorised as existing users, groups seeking change, groups with little control, the public, facilitators and controllers. In what follows in this Section, we will discuss these participants in EM.

Existing users

This category refers to those who currently use land or other resources. And, those using the environment or resources usually evolve rights and develop management skills. However, problems arise where unwritten traditional strategies and rights break down or get usurped, typically, by incoming migrants and settlers, urban elites or powerful commercial organisations. Worldwide, the expropriation of common resources from traditional users has become a problem (The Ecologist, 1993).

There has, however, been a growing practice of seeking to consult and involve local people (i.e., indigenous groups) in environmental management, and to understand and make wider use of indigenous knowledge (Klee, 1980). EM can learn a lot from the study of local people's livelihood strategies.

Since the 1975 - 1985 UN Decade for Women, there has been an interest in studying the role of women in EM. According to the different perspectives adopted, these studies take different shapes as under:

- **Women, environment and development:** This focuses on women as having a special relationship with the environment as its users and managers.

- **Gender and development:** This seeks gender as a key dimension of social difference affecting people's experiences, concerns and capabilities.
- **Women in development:** This focuses on reasons for women's exclusion or marginalisation from decision-making and receipt of the benefits of development.

Groups seeking change

This category consists of governments (with conflicting demands from various ministries or policy-makers), commerce (e.g., national, local, multi-national companies, etc.), individuals seeking personal gain or seeking to change the prevailing situation, international agencies, NGOs, media, academics, etc. It is probably the exception to the rule for special-interest groups not to control policymaking and development, although a few do so with the aim of improving environmental care. The environmental manager should be vigilant for such control, and seek to reduce it if it acts against environmental quality. When environmental management involves more than one country, which is often the case, negotiation skills are at least as important as access to technology, knowledge and management strategies (Vogler and Imber, 1995).

Groups with little control

This category consists of the poor with no option but to over-exploit what is available without investing in improvement; refugees, migrants, relocates, eco-refugees (i.e., those forced to move or marginalised so that they change the environment to survive), workers in industry/mining, etc., who face health and safety challenges, while carrying out changes. Many identify poverty alleviation and environmental care as two challenges for those in charge of development. These two issues are closely related, although linkages are often unclear and complex.

The poor, it is often claimed, degrade their environment in an effort to survive – a trap of poverty. Getting people out of poverty may be important for protecting the environment, but environmental managers must consider each local case to be sure of causes. For example, the causes of environmental degradation in urban areas may lie with policies affecting agriculturalists hundreds of kilometres away, causing them to migrate and increase city population. There are also situations where there is likely to be poverty-related environment stress: cities where population growth is outstripping employment and infrastructure; marginal, often vulnerable land where people have relocated, areas where traditional livelihood strategies are degenerating.

The public

People, who are affected as bystanders, may wish to develop, conserve or change practices (if aware of what is happening) and those out of global concern form part of this category. The public usually consists of more than one group of people who probably have different, perhaps conflicting, views and goals with powerful groups dominating the situation. Environmental managers must, therefore, establish the needs of the weak and ensure that they are not ignored, yet work with the influential.

Sustainable development strategies need to be designed to fit local conditions and to be co-ordinated to ensure that one locality does not conflict with another. Environmental management should act as mediator and catalyst to develop collaborative approaches (Selin and Chavez, 1995). Advantages of public involvement in environmental management are as follows:

- (i) The public may be able to provide advice on management considering local conditions.

- (ii) Often planning and management should be more accountable and more careful.
- (iii) Fears and opposition to management may be reduced, if people are informed.
- (iv) The communication gap between the experts and locals can be reduced.

Facilitators

This category consists of funding agencies, consultants, planners, workers including migrants affected by health and safety issues, etc.

Funding bodies can support environmentally desirable developments or withhold money until proposals are modified to meet required standards. Starting with the World Bank in the early 1970s, most funding bodies have developed environmental management units, guidelines and manuals (Turnham, 1991). There is also a huge diversity of bodies conducting research aimed at improving environmental management: universities, private research companies, independent international research institutes and UN or UN-related agencies. Most research is applied in response to perceived needs, but some is anticipatory and warns about possible threats and potentially useful strategies.

Controllers

This category consists of government and international agencies, traditional rulers and religions, planners, law, consumer protection bodies and NGOs (including various green/environmental bodies),

trade organisations, media, concerned individuals, academics, global opinion, environmental managers, etc.

The skills of environmental managers and ecologists are vital to determine the best strategies for the survival of fauna and flora and to organise sustainable land and resource use. NGOs have become important watchdogs of corporate, government and special-interest group activities. They have a multifaceted role: lobbying at international meetings and at national government level; media campaigning to increase public awareness and empowerment; fund-raising for environmental management, conservation and environmental education; researching environmentally sound strategies and approaches; acting as ginger groups to identify environmental problems and fight for their control, etc.

A proper environment is essential to sustain all renewable resources: food, fiber, wood, air, water and even our health. However, the debate over the ethical values attached to the environment is as old as civilisation.

ETHICS AND THE ENVIRONMENT

“Environmental ethics is the discipline in philosophy that studies the moral relationship of human beings, and also the value and moral status of, the environment and its nonhuman contents”.

It is concerned with the issue of responsible personal conduct with respect to natural landscapes, resources, species, and non-human organisms. It is cluster of beliefs, values and norms regarding how humans should interact with the environment.

Human effects on the environment today have consequences for the future, and therefore, discussions of environmental ethics also involve the rights of future generations. The arguments for and against various principles in environmental

ethics are made more complex because of conflicting values. The resolution of the resulting conflict requires that we recognize differing values and have a basic scientific knowledge about the environment as well as the ability to clearly formulate a logical argument.

The study would make you understand topics such as, the environmental philosophy with illustration of Aldo Leopold's land ethic and factors that demand environmental ethics.

The Environmental philosophy

Environmental philosophy is that wing of philosophy that expresses trepidation with natural environment and livelihood of humans. Main areas of interest for philosophers include defining environment and its value, environmentalism and deep ecology, endangered species and restoration of nature. Its major components are environmental ethics, theology, environmental aesthetics and ecofeminism.

Aldo Leopold, (Annexure I) formulated ecological restoration focusing on Land ethic in a book 'A Sand County Almanac, 1949' (Annexure II), defined a new link between nature and people and has a stage for modern conservation movement. 'For embracing this ethic ecologically literate citizens are required who can also solve global environmental challenges.

“This Land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land.”

Environmental ethics and factors that necessitate it:

In early 1970's philosopher's formulated environmental ethics as a study concerned with the value of the physical and biological environment. The focus of this study contrasts with

traditional ethical studies, which had to do with the relationships among people. There are utilitarian, ecological, aesthetic and moral reasons for placing a value on the environment.

The major factors that necessitate environmental ethics are:

- (i) **New effects on nature:** Because our modern technological civilisation affects nature greatly, we must examine the ethical consequences of these new actions.
- (ii) **New knowledge about nature:** Modern science demonstrates how we have changed and are changing our environment in ways not previously understood, thus raising new ethical issues. For example, until the past decade, few people believed that human activities could be changing the Earth's global environment. Now, however, scientists believe that burning fossil fuels and clearing forests have changed the amount of carbon dioxide in the atmosphere, and this causes changes in our climates, and hence the need for global action. This new perspective raises new moral issues.
- (iii) **Expanding moral concerns:** Some people argue that animals, trees and even rocks have moral and legal rights, and that it is a natural extension of civilisation to begin including the environment in ethics. These expanded concerns lead to need for new ethics.

After knowing Leopold's philosophy and ethics of environment there is a need for us to understand the history behind a diverse scientific, social and political movement for addressing environmental issues which is discussed in the next section.