UNIT-1 What is Enviornmental Management

Learning Outcomes

By the end of this unit the learner will be able to:

- ✓ Explain defination and scope of enviroenmental management
- ✓ Understand fundamentals of sustainable development.

Unit 1

What is Environmental Management

Introduction

Over ages, man, with his desirable and non-desirable activities, has affected the environment unquestionably and sometimes irrevocably. However, awareness of the damage has also given rise to a lot of clamour about minimising these effects. Across the globe, governments, trade associations, supply chains and other social and financial stakeholders are bent on pressing the issue further. The concept of environment management is the offspring of this widespread awareness about the human impact on the environment.

Now the key question is: what is environmental management? In layman's language, it is the process by which environmental health is regulated. Human beings cannot aspire to manage the environment itself, but it is the process of taking steps and behaviour to have a positive effect on the environment. Environmental management involves the wise use of activity and resources to impact the world. Many organisations develop a management plan or system to implement, manage and maintain environmental goals. Management plans for the environment are conceptualised by many companies and organisations, because taking care of the planet has become the prime responsibility of everybody in every type of profession.

Successful companies today are not only measured by how much profitable their products are but also how well they respond to the call to protect the natural environment. Global companies are increasingly recognising that green products do not necessarily cost more but provide market niche that could help the company thrive. For example, the success stories of Kodak single-use camera and Xerox re-manufacturing programmes have made businesses rethink their strategies and pay attention to environmental management.

There are many benefits associated with the effective management of environmental issues, including reduced risk, improved utilisation of resources and employees, better management of regulatory compliance, reduced costs, increased revenue and improved public reputation. Many organisations have significantly improved their profits and turnover through improving materials utilisation rates, reducing energy consumption, manufacturing green products and reducing pollution and waste. On the other side of the equation, it is only necessary to look at accidents such as Bhopal and the *Exxon Valdez* to demonstrate that events that cause significant harm to human health or the environment can cost millions of dollars in clean up costs, compensation and legal fees.

The importance of the environment to overall business success is widely recognised. Indeed, it is almost a mantra among business and government leaders that the environment is not a fringe issue but, rather, is a mainstream business issue and an integral part of business excellence and total quality management.

International organisations such as the World Business Council for Sustainable Development and the International Chamber of Commerce have developed environmental guidelines and standards and have promoted environmental issues among their members.

Both public and private sector organisations have responded to environmental pressures and opportunities by integrating environmental issues into their business practices through cleaner production, life cycle analysis, environmental impact assessment and public reporting.

Today, companies are adapting their strategies in response to environmental concerns. World communities have reacted by adopting international and national laws to ensure compliance to environmental standards. It is also clear that green products may in fact, provide competitive advantage. Recently, there has been significant growth in the development of such products since the 1990s.

The energy industry has also reacted to ***green power*** which has been defined by the National Association of Attorney Generals [NAAG] as the use of replenish able or sustainable fuel sources in the generation and transmission of electricity and the disposal of spent fuels. These releases into the environment would not create harmful substances and would pose no significant concern to the ecosystem and to land use. The focus is on renewable energy supply.

The trend toward green is on the rise in every sector of the economy. According to a study by Yanklovich Clancy Schulman, 78% of people are "influenced greatly" to buy products that make environmental claims. The Organic Trading Association notes that products with the word "organic" have 34% sell-through rate compared to conventional products. Furthermore, the rate of growth of natural or organic food has been steady at 18-25% while conventional foods remain flat at **3-4%3.** The demand for organic products has also affected the clothing industry where the current trend calls for the use of organic cotton.

There is also a growing demand for hybrid vehicles. Companies like Toyota and Honda that were among the first to manufacture hybrid cars that combine gas engines with battery-powered electric motors have witnessed surge in demand. These products are not only environmentally friendly but are also economical.

The Definition and Scope of Environmental Management

Environmental management is a process concerned with human–environment interactions, and seeks to identify: what is environmentally desirable; what are the physical, economic, social and technological constraints to achieving that and what are the most feasible options.

Environmental management displays the following characteristics:

- it supports sustainable development;
- it is often used as a generic term;
- it deals with a world affected by humans

Some Definitions of Environmental Management;

- Formulation of environmentally sound development strategies
- An interface between scientific endeavour and policy development and implementation
- (S. Macgill, Leeds University, UK: personal communication).
- 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).
- Management of the environmental performance of organisations, bodies and companies
- (Sharratt, 1995).

Environmental management must do three things:

1. Identify goals;
2. Establish whether these can be met;
3. Develop and implement the means to do what it deems possible.

The focus of environmental management is on implementation, monitoring and auditing; on practice and coping with real-world issues (e.g. modifying human habits that damage nature), rather than theoretical planning (Hillary, 1995). While a close integration with environmental planning is desirable, environmental management is dedicated to understanding human–environment interactions and the application of science and common sense to solving problems.

A typical scheme of practice adopted for environmental management is given below:

Figure 1.1 A typical scheme of practice adopted for environmental management

Note: Increasingly, stages 1, 2 and 3 are influenced by broad strategic policies, and are accountable to public scrutiny (as is stage 5). Ideally, lessons learned at every stage should be passed on to improve future environmental management – the evaluation of stages 4 and 5 is especially helpful in future management. At stage 1 the public or a developer may not have a clear idea of needs or goals, so the environmental manager may need to establish these.

The Evolution of Environmental Management Concept

Since prehistoric times, the human race has gathered environmental experience and has created strategies for making the best possible use of nature. To facilitate management of resource utilisation, people developed taboos, superstitions and common rights, devised laws to improve conservation and even engaged in national resource inventories (such as the twelfth century AD Doomsday survey). While a few managed to maintain practical lifestyles for long durations, the thought that pre-modern people 'close to nature' brought about slight environmental harm is mostly an Arcadian myth. In fact, with population's a fraction of today's, people in the prehistoric era, using fire and weapons of flint, bone, wood and leather, managed to change the vegetation of a majority of continents and most likely eradicated numerous species of large mammals (Tudge, 1995). Developments observed in the late twentieth century make it imperative that environmental management should be accurately comprehended. Such developments include, but are not limited to, global pollution, loss of biodiversity, soil degradation and urban sprawl. The challenges are enormous; however, there has been progress in perceiving the composition and function of the environment, in examining impacts, data handling and analysis, modelling, evaluation and planning. It is the responsibility of environmental management to organize and concentrate on such advancements, to augment human welfare and diminish or curb further destruction of Earth and its organisms.

There are a wide range of bodies and professionals involved in environmental management: government agencies, international bodies and aid organisations (e.g. the UNEP, FAO, World Bank, USAID), research institutes (e.g. the Worldwatch Institute, IIED), NGOs (e.g. WWF, IUCN, Friends of the Earth; the public). Identifying a single environmental manager in a given situation may be like trying to identify which individual built a Boeing 747 aircraft. What motivates environmental management? One or more of the following may lead to its adoption:

- Pragmatic reasons – fear or common sense makes people or administrators seek to avoid a problem.
- Desire to save costs – it may be better to avoid problems or counter them than suffer the consequences: pollution, species extinction, human deaths, costly litigation. There may also be advantages in waste recovery, energy conservation and maintaining environmental quality.
- Compliance – individuals, local government, companies, states and so on may be required by laws, national or international agreement to care for the environment.

- Shift in ethics – research, the media, individuals or groups of activists may trigger new attitudes, agreements or laws.
- Macro-economics – promotion of environmental management may lead to economic expansion: a market for pollution control equipment, use of recovered waste, more secure and efficient energy and raw materials supply; or there may be advantages in 'internalising externalities'.

Those involved with environmental issues have generally shifted their emphasis since the 1970s, from listing problems, issuing warnings and voicing advocacy, towards environmental management: problem solving, creating practical tools, developing governance, and policy formulation. Environmental management has, or is developing, a more flexible and sensitive style: assessment of a situation leading to an appropriate approach, emphasising stewardship rather than exploitation; managing a situation with the goal of long-term sustainable use; multidisciplinary, interdisciplinary, or even holistic.

Most environmental managers would accept that sustainable development is one of their key goals, but providing a universally acceptable definition of sustainable development is not easy.

Sustainable development is about improving the lot of people and avoiding environmental degradation. In a quest for sustainable development the goal of environmental management may be said to be: *to stretch what nature provides to the optimum and maintain that expansion indefinitely without environmental breakdown, in order to maximise human well-being, security and adaptability.* This demands high-quality management of the environment and human institutions, and the ability to recognise and avoid, mitigate or adapt to socio-economic and physical threats.

Fundamentals and Goals

In 1975, Laurence Sewell (1975: ix) thought that the environmental manager ought to be capable to control both social institutions as well as suitable technologies, however should execute these with the perception of an artist, understanding of a poet and, maybe, the ethical purity and willpower of a pious devotee.

Environmental Management System (EMS):

- Serves as a tool to improve environmental performance
- Provides a systematic methodology for managing an organization's environmental behaviour
- Is that aspect of the organization's overall management structure that addresses immediate and future impacts of its products, services and processes on the environment
- Gives order and consistency for organizations to address environmental concerns through the allocation of resources, assignment of responsibility and consistent evaluation of practices, procedures and processes
- Focuses on continuous improvement of the system

An environmental management system model

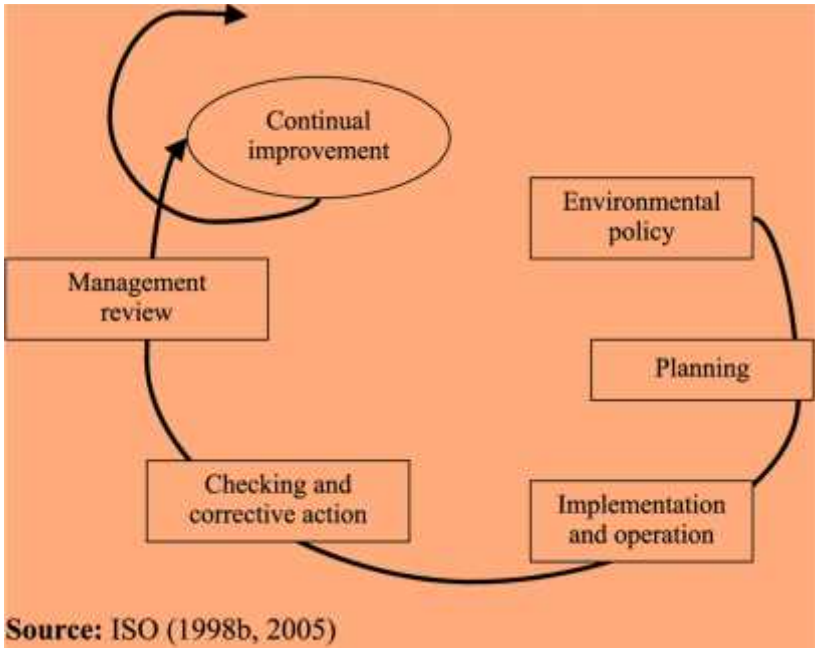


Fig: 1.2: EMS Continuous Improvement Cycle

An EMS follows a Plan-Do-Check-Act cycle (PDCA). The diagram shows the three-fold process of developing an environmental policy, planning the EMS and then implementing it. The process also entails checking the system and acting on the findings. The model is continuous because an EMS is a process of continual improvement in which an organization is reviewing and revising the system on a continual basis.

This model can be employed by a wide range of organizations- right from manufacturing facilities to service industries to government agencies.

What are Some Key Elements of an EMS?

- Policy Statement: a statement of the organization's commitment to the environment
- Identification of significant environmental impacts: environmental attributes of products, activities and services and their effects on the environment
- Development of objectives and targets: environmental goals for the organization
- Implementation: plans to meet objectives and targets
- Training: instructions to ensure employees are aware and capable of fulfilling their environmental responsibilities
- Management review

Fundamentals of Sustainable Development

In common parlance, sustainability means the capacity to endure. In ecology, it is a term describing how biological systems remain diverse and productive over a period of time. For human beings and for the purpose of our discussion, sustainability should be understood as the potential for long-term maintenance of well-being, which in turn rests with the well-being of the natural world and the responsible use of natural resources.

Some Definitions of Sustainable Development:

- Improving the quality of human life while living within the carrying capacity of supporting ecosystems.
- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs
- A change in consumption patterns towards more benign products, and a shift in investment patterns towards augmenting environmental capital.

Currently, 'mainstream' sustainable development typically urges:

- the maintenance of ecological integrity;
- The integration of environmental care and development;
- the adoption of an internationalist (North–South interdependence) stance;
- the satisfaction of, at least basic, human needs for all;
- 'utilitarian conservation';
- concern for inter-generational, inter-group and inter-species equity;
- the application of science, technology and environmental knowledge to world development;
- the acceptance of some economic growth (somehow without exceeding environmental limits);
- the adoption of a long-term view.

Principles of Sustainable Development

For sustainable development to be possible in the future, we must be ready and willing to maintain our natural capital assets. It is high time we understand and accept that our social wealth has come with a price tag. The price we have paid is intangible and irrevocable- erosion of our natural resources. These resources are exhaustive and their depletion has been harming the environment incessantly. As humans, as trustees of this wealth, we have failed miserably to use this wealth to generate adequate levels of secondary or tertiary industries, which would enable us to maintain a satisfactory level of financial prosperity while redirecting the resources back to maintain our natural resource base at the same time. Instead, we are being increasingly forced to liquidate our natural resources in the name of economies of scale and governments' commitments to free trade and global competitiveness.

There has been a mention of a vicious circle in this regard. Sustainable development is difficult to maintain without maintaining the growth rates, which, in turn, are difficult to maintain without harming the environment. There is a grain of truth in this statement, indeed. To a large extent, it appears to present before you a vision for transforming our currently growth-oriented socioeconomic system to one that is balanced on an emerging ecological worldview's vision of environmental sustainability and social justice. We know that vision to be an ideal, though. Therefore, the major debate rests on how to balance the two sides. Within this perspective, there is a growing body of literature that agrees on a broad set of principles for sustainability to guide us toward these goals. These principles will emphasise upon our political and economic institutions the importance of realising that our natural resources are limited and must not be overutilised.

Some ecological components from the emerging worldview include the following principles:

- The value of biological diversity
- Ecological limitations on human activity
- The intimately intertwined and systemic nature of the planet's abiotic and biotic components
- Thermodynamic irreversibility of natural processes
- The recognition of the dynamic, constantly evolving and often unpredictable properties of natural systems

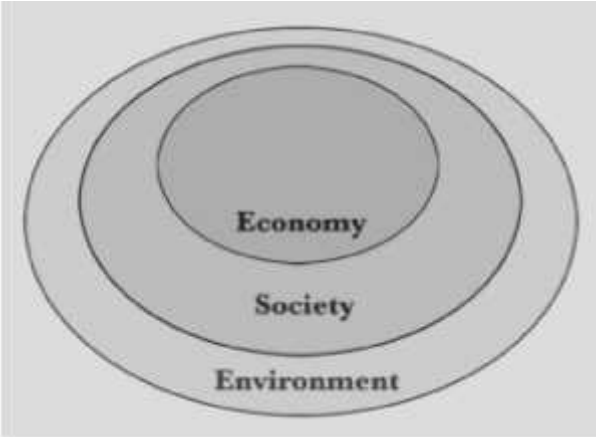


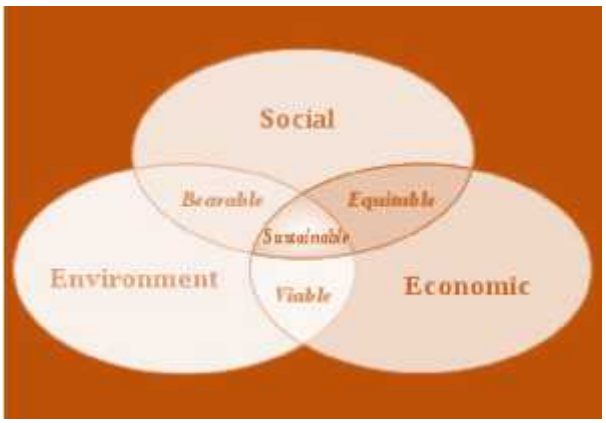
Fig: 1.3: A representation of sustainability

Successful sustainable development involves a comprehensive understanding of policy and issues as well as a balanced understanding of technical and financial realities. Emphasis is placed on understanding how the many diverse elements of "green" design and sustainable technologies and related cost implications can truly result in a well-defined and manageable sustainable development plan. It is intended for professionals whose roles include supervising and managing sustainable programmes.

The ability to sustain a quality environment depends on the ability to foster a strong and sustainable economy. Such an economy is more efficient and derives greater social benefits from the utilisation of

fewer environmental assets. In addition, a sustainable economy can make way for the means for increased environmental protection and conservation, while also offering the society alternatives to undue exploitation of natural resources. A sustainable economy is, therefore, very important for the betterment of the society and the increase in the standard of living of the people and the future of humanity. Some important facets of sustainable development are given below. If we, as humanity, need to meet the challenges of growing population and managing resources so that they can be utilised without harming the environment, these principles must take centre stage in all our lives.

Fig: 1.4 scheme of sustainable development



- Inspire diversified economic development: Development that augments employment and other benefits derived from a given stock of resources should be prioritised.
- Encourage efficient economic development: Development that reduces waste and makes efficient use of resources should be inspired.
- Ensure that all renewable resources are used in a manner that is sustainable over a long term: Renewable resources include soils, wild and domesticated organisms and ecosystems. Renewable resources should not be used at rates that exceed their capacity to renew themselves.
- Ascertain that nonrenewable resources are not exhausted and sufficient quantities are left for utilisation by future generations: Nonrenewable resources should not be used at rates that exceed our capacity to create substitutes for them.
- Economic activity should work within the capacity of ecosystems: It should strive to assimilate or process the waste associated with such activity.
- Stimulate environmentally sound economic activity: This must be done through a combination of educational awareness, political and legal measures and economic instruments.
- Inspire attitudinal and behavioural change: These profound economic changes can shape themselves only as a result of altered behaviours and attitudes.

The concept of carrying capacity is often defined as the maximum population that can be supported in a given habitat without permanently inflicting any damage to the ecosystem. However, in terms of human

life, the issue of 'quality of life' cannot be discounted. How individuals and communities define quality of life will contribute to their impact on the larger environment.

For instance, in case of a community that values a rich and luxurious lifestyle, the carrying capacity of the environment depletes. Therefore, the definition above might be amended by substituting "the optimal population" for the phrase "the maximum population".

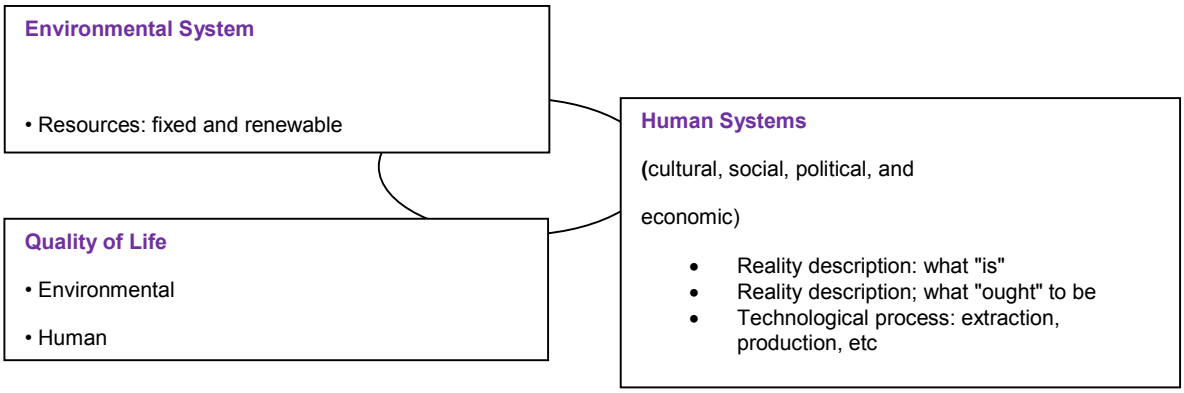


Fig: 1.5: Carrying Capacity and Quality of Life (adapted from Mabbutt 1985)

Consequently, carrying capacity, in terms of human systems, can be further defined as follows:
Carrying capacity means the level of human activity (including population dynamics and economic activity) that a region can sustain (including consideration of import and export of resources and waste residuals) at acceptable "quality-of-life" levels in perpetuity. (Mabbutt 1985)

Sustainable Environment

A healthy environment is the solid foundation on which the system of a country depends. Therefore, it cannot and should not be tampered with. The essential role that ecosystems play in supporting our society establishes an environment that must be respected in all land, resource and economic decisions. Our priority must, in all situations, be to maintain and retain natural systems for present and future generations.

- Conserve life-support services: Certain ecological processes sustain productivity, adaptability and capacity for the renewal of lands, water, air and all the life on earth.
- These processes include maintaining the chemical balance of the planet, stabilising the climate, recycling nutrients, breaking down pollutants and cleansing air and water, stabilising water flow, forming and regenerating soil and supplying food and a suitable habitat for all species.
- Conserve biological diversity in genes, species and ecosystems: This incorporates the total amount of plant, animal and other species that constitute the planet earth; the variety of different genetic stocks in each species and the variety of different ecosystems. we must strive to respect the integrity of natural systems and to restore previously degraded environments.

- Attempt to anticipate and prevent adverse environmental impacts: When making land and resource decisions, one must adopt a precautionary approach, exercise caution and special concern for natural values and should appreciate the fact that human understanding of nature is incomplete.
- Practice full cost accounting: We have to make sure that environmental and social costs are included in the process of maintaining the ecosystems and the people concerned need to account for land, resource use, species depletion and economic decisions.
- Recognise our responsibility to protect the global environment: We must exercise stewardship, reduce consumption to sustainable levels, avoid importing or exporting ecological stresses and help meet the global challenge of sustainability.
- Respect the intrinsic value of nature: Environment must be protected for man. We should not take undue advantage of the environment that we possess today and ruin it or create a worse one for the future generations; that will lead to our downfall and degradation, as a society.

A number of developments have helped to establish environmental management:

In an increasing number of countries the public have become environmentally aware and unwilling to trust government and corporations to protect the environment. This has largely grown out of their witnessing accidents, misuse of resources, and from concern about ecological threats.
NGOs, international agencies, businesses and governments have started to pursue environmental management.

1. The media monitor and report on environmental issues.
2. International conferences, agreements and declarations have publicised issues and supported environmental management.
3. The establishment in 1973 of the UN Environment Programme (UNEP) and other environmental agencies.
4. The 1969 US National Environmental Policy Act (passed 1970) and the creation of the US Environmental Protection Agency (EPA) in 1970.
5. Publications in North America and Europe which raised environmental concern after the mid 1960s.
6. The development of environmentalism and green politics since the 1970s.
7. Aid and funding agencies in the late 1970s began to require environmental assessments and environmental management before supporting development.
8. The Brundtland Report (World Commission on Environment and Development, 1987) increased awareness of the need for environmental care.

Broadly, the main principles of environmental management are carefulness and stewardship.

These are pursued via:

- forward-looking, broad-view policy making and planning (mainly left to various planners to undertake);
- establishing standards and rules, monitoring and auditing;
- co-ordination (the environmental manager adopting a multidisciplinary, interdisciplinary or holistic approach);
- operationalisation/implementation.
- Sustainable development is actually a key component of environmental management.

Clearly, sustainable development cannot be achieved without sustainable manufacturing. Sustainable manufacturing is one of the processes or strategies to achieve the goal of sustainable development. Sustainable manufacturing as a strategy will require the reengineering of the organization to change design, process, work attitudes and perceptions. It requires the entire organization to be environmentally conscious and will require the support and participation of top management. More importantly, it will require investment in the future and retraining of the work force. Sustainable manufacturing is a capital venture that a company must undertake and this is a risk that some may not yet be ready for especially from the developing economies.

Sustainable manufacturing is therefore, synonymous to eco efficiency. We shall therefore, define sustainable manufacturing as a means for manufacturers to add the most value to their products and services by making the most efficient use of earth's limited resources, generating the least pollution to the environment, and targeting for environmental clean production systems.

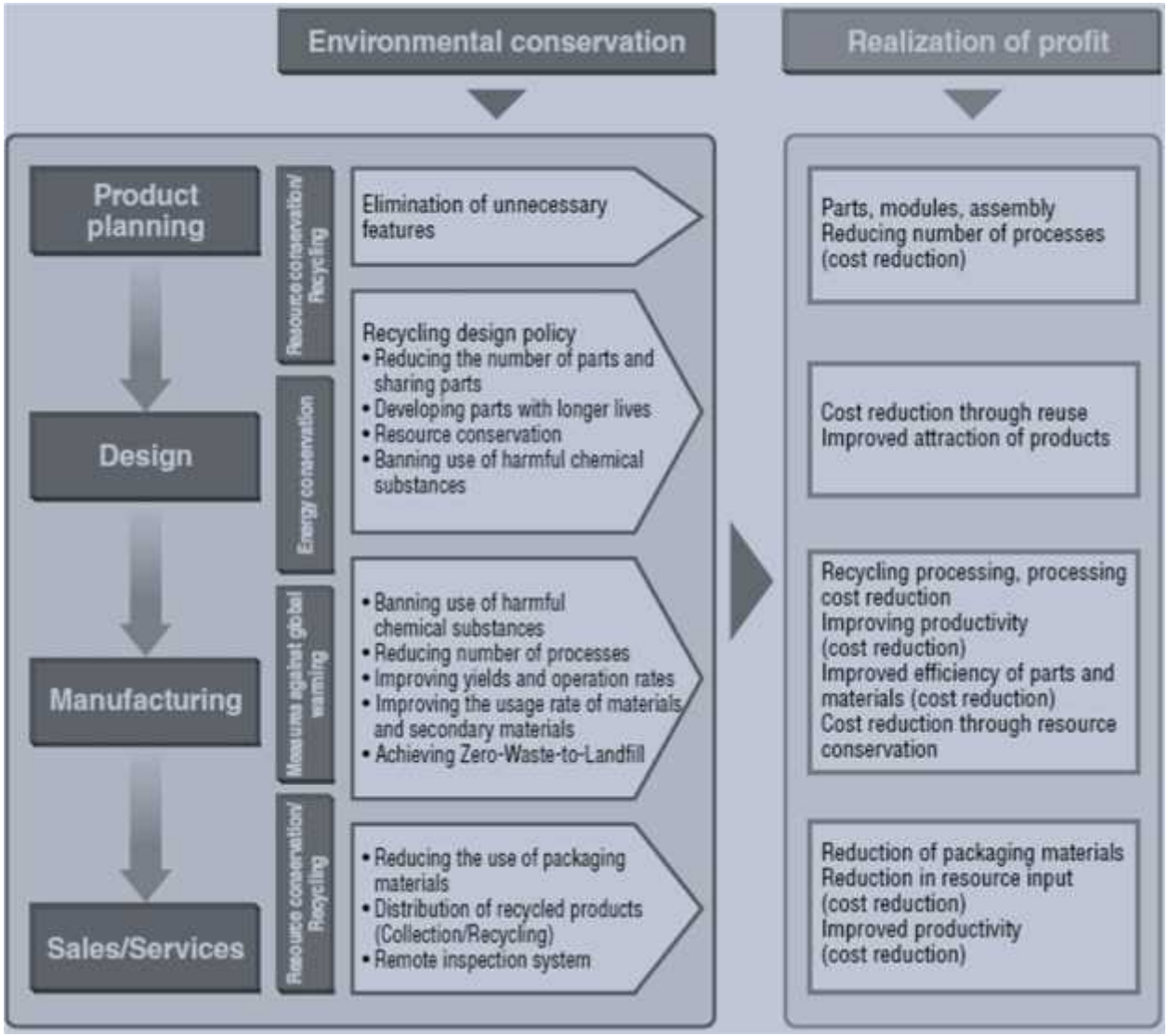


Fig: 1.6

Since the mid 1980s new branches have appeared on the evolutionary tree of environmental management, including:

- environmental law ;
- green business;
- impact, risk and hazard assessment ;
- total quality management (TQM), which has led to total environmental quality management
- environmental standards ;
- eco-auditing ;
- environmental management systems ;

Problems and opportunities

Some people are sufficiently aware of pollution, soil erosion, over-fishing, loss of forests and other changes in their physical surroundings, and are prepared to voice concern. Environmental management activities are often prompted by such people, by those monitoring developments, and also by historians, palaeoecologists, archaeologists, geologists and others interested in human–environment interactions and environmental change. Recently, the focus has been more on how humans affect the environment rather than on how environment affects humans, which is unwise.

Implications of Human Population Growth

A research on the reserves and the natural resources of the world concluded that the increase observed in global average temperature over the last century "is unlikely to be entirely natural in origin" and that "the balance of evidence suggests that there is a discernible human influence on global climate". Human population has grown over the past 50 years. When there were fewer citizens to the world, the dominant factors in control of the ecosystem were natural, but now that the human population has grown far and wide, there is concern that humans are converting themselves into a significant influence on ecosystem dynamics. The quadrupling human population and tripling per capita carbon dioxide emissions in the 20th century now have a more significant effect on the earth's climate than in the past. Due to the inevitable and consistent human presence on earth, human behaviour and lifestyle will be major factors in deciding the dimensions of global warming. The industrialised world uses energy and resources, which contribute towards global warming because most of the energy generates from carbon-based fossil fuels like coal, oil and natural gas. Transportation or conveyance (the movement of people and goods) accounts for about one-third of the developed world's CO2 emissions. There is a rapid swell in the energy consumed per capita as compared to the growth in the population. People must consider the sustainability of their lifestyles. Do we need so many cars? Do we need to burn fossil fuels to transport goods and people, manufacture products, heat and cool buildings, light spaces and cook food? Can we not practice moderation? Can we not compromise with alternative energy sources? Human behaviour's effect on global climate reaches beyond mere energy consumption and the burning of fossil fuels. Due to industrialisation, nearly half of the world's green belt or forests, i.e. 16 million hectares of virgin forest, have been cut down or burnt, thereby leading to global warming. As a natural process, these forests absorb carbon dioxide and release oxygen and help in regulating the climate. Human activities resulting in deforestation include logging, farming, ranching, use of wood as fuel and lumber, mining, building of dams and urban expansion.

Energy efficiency must be enhanced. We should try to develop new and renewable energy resources, encourage the design and use of low-energy buildings, eliminate government subsidies for fossil fuels, encourage energy efficiency programmes in industry, invest in public transportation and introduce hyper cars. Deforestation must be restrained. We should try to improve our technology and recycle as much as possible. Paper products should be replaced by more eco-friendly products wherever possible so as to decrease the amount of pulp needed to produce paper. We should encourage and insist on forest

products certification (a way of identifying products that come from sustainable forestry) and provide incentives to developing countries for limiting deforestation. We must implement sustainable development in routine life by including wise public investment, effective natural resource management, cleaner agricultural and industrial technologies and less pollution. Reduction of and if possible, a ban on chlorofluorocarbons (CFCs), which is one of the biggest culprits in polluting the environment as it is often used as a coolant in appliances like refrigerators and as product propellants in spray cans, should be implemented because CFCs stay in the atmosphere for extended intervals of time and contribute to global warming. Finally, we need better intergovernmental response and action on a large scale and more efficient urban planning on a smaller scale. Internationally, we must attempt to ratify a plan on the lines of the Kyoto Protocol. Locally, we must plan our cities better with the help of strong local governments supported by active citizen groups.

Environmental managers should be aware of these threats and seek to reduce human vulnerability and enhance adaptability – some worthwhile strategies should be relatively cheap and easy. Awareness of the past helps in scoping and planning future scenarios, and it can also interest the public in environmental forecasting.

Environmental stress may be caused by human activities (e.g. resource exploitation, urban growth, warfare, globalisation, capital penetration and technological change), and since the 1980s structural adjustment programmes, rising oil prices and debt have reduced the funds available to deal with pollution, conservation and other challenges. Environmental management may need to modify the activities and ethics of individuals, groups and societies to achieve its goals. There are three main approaches which can be adopted to try to do that:

1. **Advisory**

   - through education;
   - through demonstration (e.g. model farms or factories);
   - through the media (advertisements or covert approaches – the latter includes subtle 'messages' incorporated in entertainment);
   - through advice (e.g. leaflets, drop-in shops, helplines).

2. **Economic or fiscal**

   - through taxation ('green' taxes);
   - through grants, loans, aid;
   - through subsidies;
   - through quotas or trade agreements.

3. **Regulatory**

   - through standards and laws;

- through restrictions and monitoring;
- through licensing;
- through zoning (restricting activities to a given area).

Environmental problems often do not have a single simple workable solution. Attempts to address a problem may present alternatives and challenges. Bennett (1992: 5–9) explored such environmental management difficult choices, recognising:

- Ethical dilemmas – e.g. what to conserve: Inuit hunters or whales?
- Efficiency dilemmas – e.g. how much environmental damage is acceptable?
- Equity dilemmas – e.g. who benefits from environmental management decisions, and who pays?
- Liberty dilemmas– e.g. to what degree must people be restricted to protect the environment?
- Uncertainty dilemmas – e.g. how to choose a course of action without adequate knowledge or data.
- Evaluation dilemmas – e.g. how to compare different effects of various options or actions.

To summarise, environmental management is faced with 'real-world' challenges, which include:

- greed, corruption and foolishness;
- knowledge and technical skills which are still too limited;
- increasing numbers of people who demand more and more material benefits;
- the time available to make real progress in resolving key environmental degradation is probably limited (quite possibly less than fifty years).

Environmental management has to research, model and monitor to gain sufficient knowledge to try and give early warning. Some threats are random and difficult to recognise in advance; others develop in an insidious way and can be easily overlooked. Worse, a problem may have indirect and cumulative causes – a number of unrelated factors suddenly conspire to cause trouble – or a process develops positive or negative feedback which (respectively) quickly accelerates or slows down developments.

Environmentalism, environmental management practices, environmental ethics, environmental legislation, and techniques for monitoring and forecasting have in large part originated from the Western 'liberal democracies'. Consequently, things often need to be adapted to suit other countries' laws, attitudes, business, trade and so on.

Given that the spread of environmental management has taken place only in the past 30 years or so, there has been much progress. However, tools and methodology are still evolving, and the database of environmental and social knowledge for many countries is still woefully inadequate.

Environmental managers frequently find that they face:

- a poorly researched threat;
- transboundary or global challenges;
- problems demanding rapid decisions;
- an increasing exchange of information with NGOs via the Internet and various other networks (this means that environmental managers must keep abreast of the activities of many bodies, but it also offers possibilities for alliances and data gathering from different sources).

The past few decades have seen the manifestation or recognition of more and more transboundary or global threats. Before the 1970s, environmental problem solving seldom involved international negotiation. However, there have been helpful developments: environmental management can now draw upon improved knowledge of the structure and function of the environment, and of human institution building, group interaction and perceptions. There are also powerful new tools available that improve monitoring, data gathering, impact assessment, information processing, decision making and communication. Although environmental managers face growing problems, they have more powerful aids to draw upon and growing public and institutional support.

Further Reading:

- ✓ ***Evaluation in Environmental Planning,By Donald M. McAllister,(1982)***
- ✓ ***Environmental Planning,Edited by Jerome G. Rose,(2013)***